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The internal factors that influence incremental technological innovation in a South African organisation

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The internal factors that influence incremental technological innovation in a South African organisation

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

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ABSTRACT

In today's fast-changing digital world, technological innovation is necessary for organisations to ensure long-term sustainability and market success. In large, complex organisations, numerous factors influence the success or failure of innovation. These factors can be categorised as technological, organisational, and environmental. This study explored the internal factors that influence incremental technological innovation in an organisation. Organisation X forms part of a federated business model and, as a result, has a shared technology platform.

The study applied qualitative research methods with an interpretive paradigm that helped to evaluate the human experience and the understanding they attach to it. A purposive sampling method was applied using the researcher's professional network to interview 12 participants at various management levels in the organisation. While there was a predetermined interview guide, the instrument format offered flexibility to explore the topics. The primary data collection method was in the form of online interviews on a cloud-based collaboration software. The data was analysed using the thematic analysis approach, and the results highlighted an interplay of the themes as they were interdependent.

After applying the factors explored by the study within the technological, organisational, and environmental contexts, the research findings revealed significant areas that required focus and optimisation. The results indicated that organisational culture, processes, and leadership styles significantly influence technological innovation.

The research provides practical recommendations to solve for the gaps and inefficiencies revealed by the study. These valuable recommendations include setting up Centres of Excellence, defining Proof of Concept strategies and reconfiguring project teams working on the latest technology innovations.

KEYWORDS

Innovation, Technological Innovation, Incremental Innovation, Leadership, Transformational leadership, Transactional leadership, TOE Framework

LIST OF ABBREVIATIONS

TOE	Technological Organisational Environment
PoC	Proof of Concept
CoE	Centre of Excellence
IoT	Internet of Things

DECLARATION

I, ___Dhiyaksha Gobind_____, declare that this research report is my work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Dhiyaksha Gobind Signature: 

Signed at ……Lone Hill……

On the …16 th…….. day of …February…… 2024.

DEDICATION

The research paper is dedicated to my husband, parents, and parents-in-law.

To my husband, thank you for standing by me and supporting me throughout my academic journey and personal life. You ensured that I was comfortable and had everything I needed to embark on this journey.

To my parents, thank you for encouraging me to learn continuously and teaching me that education is the key to success.

To my parents-in-law, thank you for supporting me through this journey and constantly checking up on me.

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Thank you to my supervisor, Dr Ayanda Magida, for your support and guidance throughout this research process. You constantly advised and challenged me to deliver my best in this study.

Thank you to my sister-in-law for nudging me to embark on this Master's in Management program at WBS. Your encouragement and support are greatly appreciated.

Thank you to the colleagues and friends of the Master's group for teaching me and supporting me through this journey. I enjoyed working with talented and intelligent individuals through my syndicate work groups and have learned much from them. You made me believe in myself and drove me out of my comfort zone.

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1 INTRODUCTION

1.1 Statement of purpose

This research study aimed to understand the internal factors influencing incremental technological innovation in a South African organisation. The phenomenon of incremental innovation is everywhere and requires the ability to continually improve systems and processes.

Organisation X is part of a large, diverse organisation with a federated organisational structure divided into semi-autonomous business units with their own responsibilities and decision-making authority while still being aligned under central governance for overarching strategy. As a result, Organisation X is part of a federated technology architecture where technological innovations on the shared platform are managed and governed at the Group organisational level. Organisations should adopt a holistic approach to technology evaluations and consider the various factors that impact decision-making and investments in IT transformations by including technical and non-technical factors (Edward W.N. Bernroider, 2012).

This research paper explored the internal factors within Organisation X that influence the implementation of incremental technological innovation, which is required to provide benefits and long-term sustainability to their shared mobile technology platform.

1.2 Context of the study

Organisation X must continuously improve its mobile technology platform to enhance user experience and maintain market demands to support the mobile economy. New technologies are regularly launched to optimise and streamline processes for organisations that offer products to customers via mobile applications.

Globally, the mobile industry continues to increase, where mobile connectivity remains a lifeline, allowing people and communities to stay connected. The mobile industry was estimated to have a total of 5.4 billion unique mobile subscriptions by the end of 2022, with an expected rise to 6.5 billion by the end of 2030 (GSMA, 2023). Furthermore, there will be 9.5 billion mobile connections, of which 92% will comprise smartphone connections in 2030 (GSMA, 2023).

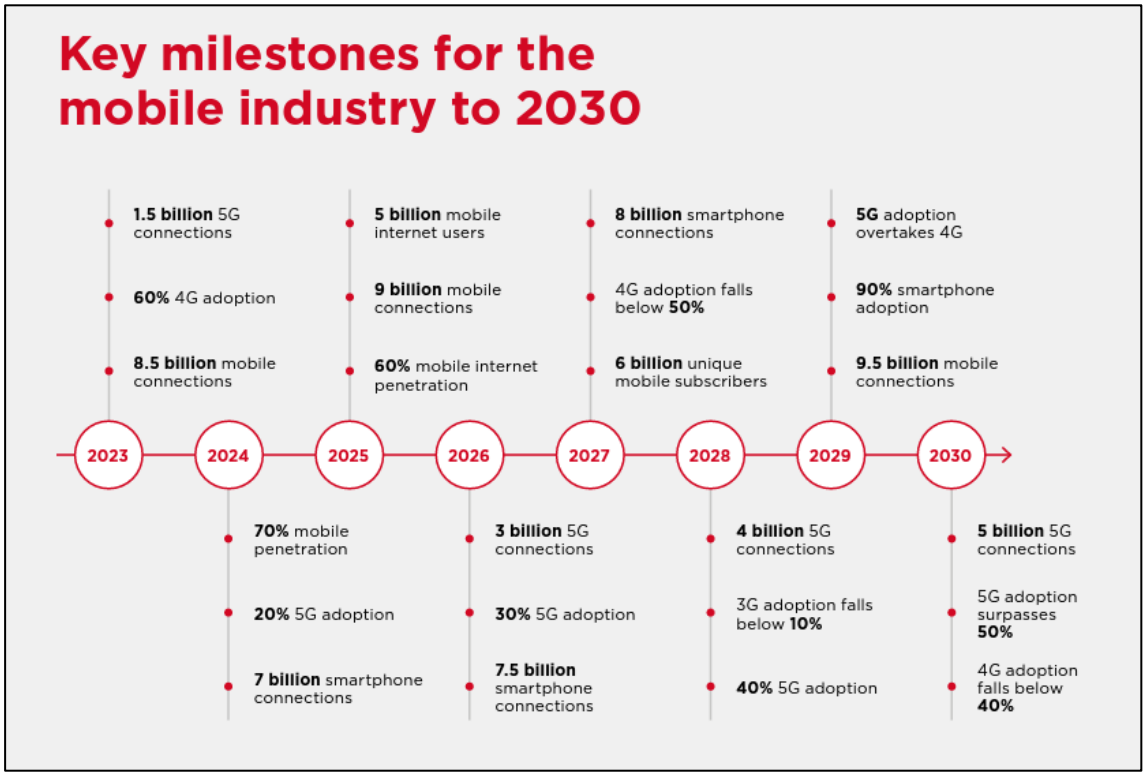


Figure 1-0-1 Mobile adoption statistics

Source: GSMA Intelligence Data

In South Africa, the adoption of smartphone mobile devices has been on the incline, with a total mobile cellular subscription (prepaid and postpaid combined) increasing by 12.21% over five years (ICASA, 2023). As per the 2023 State of the ICT Sector Report in South Africa, the total Mobile cellular subscriptions significantly increased by 40.91% from 103 million in 2021 to 145 million in 2022 (ICASA, 2023).

Smartphones offer easy access and are used in everyday life. As a result, organisations across various industries, including Banking, Travel, Healthcare, Digital Communication, Higher Education and Retail, see this as an opportunity to engage with customers directly (Forbes, 2021). They have strategically chosen to deliver their products and services to customers via mobile applications (Forbes, 2021), similar to Organisation X.

Organisations that have robust innovation strategies and keep up to date with technology trends frequently evaluate new technological innovation opportunities. Introducing Technological innovations into an organisation is a complicated process with various challenges, including resistance to change and fear of the unknown. Managing people, processes, and culture when technological change is introduced into an organisation is critical and provides a foundation for success (Fitzgerald et al., 2013).

1.3 Research Problem

In today's fast-moving global economy, large organisations must remain competitive and relevant and must innovate to support a strategy for long-term sustainability. Innovation drives growth, competitiveness, and social progress in business by creating different or increased value (Alshwayat et al., 2022). It can also be used to find new ways to optimise existing resources, improve efficiency, reduce costs, and enhance profitability (Dieffenbacher, 2023).

Innovation can take shape in many business areas: product, process, technology, and business model. This research focuses on the aspects that must be understood for technological innovation. Technological innovation considers developing and introducing new or improved technologies that offer enhanced capabilities, functionalities and efficiencies (Dieffenbacher, 2023).

Businesses can leverage four types of innovation, radical, incremental, disruptive, and architectural, to achieve their objectives (Dieffenbacher, 2023).

The speed of technological innovation is rapidly increasing and is influenced by factors such as relative advantage, compatibility, complexity, and observability. Google's principles of innovation involve having a mission, staying small, continually innovating and learning from failure (Vaughan, 2013).

An organisation's success is focused on both internal and external factors (Gursoy & Swanger, 2006). External factors include demographic, economic, technological, political, legal, social, and competitive forces over which organisations have limited control. Internal factors include the company's resources and capabilities, such as knowledge, personnel, capital, and marketing capabilities (Gursoy & Swanger, 2006). In today's technologically changing world, considering the organisation's internal factors is critical to innovation and sustainability (Alshwayat et al., 2022). The internal factors surrounding leadership, employees, skills, and communication will be the scope of this research study.

Employees are a key stakeholder group (Larson, 2020). The absence of employee engagement during the pre-implementation of a new technology may lead to challenges, such as issues in adoption and resistance to change. The role of leadership when implementing a new technology is another consideration that has a significant impact. Senior leaders ensure that the boundaries and expectations for technology implementation are set and clearly understood (Cortellazzo et al., 2019). Cross-team collaboration and alignment are challenging in large-scale organisations where technology choices are made at a group level (Lin et al., 2015).

Therefore, this study aims to identify and explore the relevant internal factors influencing incremental technological innovation in Organisation X. Using Google's principles; this study will explore the concept of incremental technological innovation within Organisation X while considering the influencing impact of leadership, employees, processes, communication, and skills.

1.4 Research Objectives

This research aimed to propose practical recommendations that Organisation X will utilise, which consider technological, organisational, and environmental factors for incremental technological innovation.

As per the abovementioned research, the research objectives were formulated on the following basis.

- To explore the technological, organisational, and environmental factors that influence the adopt of incremental technological implementation in a South African organisation.
- To understand the role of organisational leadership styles in the adoption and implementation of new technological innovation
- To explore organisational processes and efficiencies around employee involvement, skills and communication when implementing new technological innovations

1.5 Rationale

Implementing a technological innovation can be a daunting task for an organisation. During the technology selection process, emphasis is often placed on which technology to invest in. However, it is equally important to consider the internal organisational factors that influence the implementation process positively.

Firstly, one of the critical factors that an organisation needs to focus on is employee involvement. The employees working with the new technology must be engaged and prepared to use it (Larson, 2020). This includes training, upskilling, and setting clear goals and expectations on how they should effectively integrate the new technology into their current ways of working.

John C. Maxwell famously said, “A leader is one who knows the way, goes the way, and shows the way.”. The organisation's leaders must provide clear direction for the employees, communicate project goals and manage the risks involved (Cortellazzo et al., 2019). A leader must also inspire employees and communicate the alignment of technological innovation to the organisational strategic goals (Kesting et al., 2015). Organisational leaders must drive the regular review and assessment of the technology innovation throughout its incremental implementation to measure its success and evaluate the business benefit (Mitzkus, 2022).

Effective communication is fundamental in mitigating uncertainty, enhancing employee commitment and minimising resistance to change (Alshwayat et al., 2022). By encouraging a collaborative work environment, organisations can facilitate internal communication channels, promote knowledge sharing, and provide opportunities for employee participation and motivation, thereby enabling valuable contributions. Through effective communication, uncertainties are reduced, commitment is nurtured, and employees' fears and anxieties regarding unknown factors that affect their careers are addressed (Alshwayat et al., 2022).

Lastly, innovating with new technologies can benefit an organisation if executed thoughtfully. Organisations need to focus on several essential internal factors when incrementally introducing new technologies with existing technologies. Organisations and senior leadership must focus on employee engagement, upskilling, communication and long-term strategic goals (Cortellazzo et al., 2019). By implementing a detailed implementation plan and support framework that addresses the critical internal factors, companies are likely to improve the adoption of the new technological innovation, create internal efficiencies and gain a competitive edge in the market.

Taking the above into consideration, the purpose of this study is to provide a practical application that can be used to address a real-world challenge within the organisation. This study will propose a new framework with recommendations for optimising outcomes when implementing similar technological innovations. The study will explore

the relevant areas guided by the TOE Framework to gather insights and themes that support the recommendations.

1.6 Delimitations of the study

The following delimitations guided this study:

I. The study includes the factors that influence the implementation of incremental technological innovation by technical and business stakeholders inside an organisation.
II. This study excludes the factors that influence the implementation of incremental technological innovation by the stakeholders outside the organisation, such as customers or end users.
III. This study excludes the evaluation and selection criteria for a new technology.

1.7 Definition of terms

For this study, key terms are defined as follows:

Innovation refers to developing novel ideas that are converted into products, processes or services (Chesbrough & Bogers, 2013).

Technological Innovation involves introducing new technologies into the realms of production and consumption. This process includes identifying emerging technological opportunities, coordinating necessary human and financial resources to convert them into practical products and processes and supporting these essential activities (Scherer, 2001).

Incremental Innovation refers to the gradual and sequential modification of existing elements, often characterised by linear advancements. It primarily concentrates on the progressive enhancement of products, services, processes, technologies, and

business models. In practice, incremental innovation encompasses adding new product features, introducing fresh designs, refining processes, and reducing costs (Mitzkus, 2022).

Leadership is the act of using social influence to optimise the collective efforts of others in pursuit of an objective or goal (Kruse, 2013).

Transformational leadership is characterised by a leader's ability to inspire and motivate followers to exceed expectations and achieve remarkable results. It goes beyond transactional interactions, engaging followers in a manner that empowers them to realise their full potential. This leadership approach fosters positive organisational changes, promotes growth and encourages innovation (Odumeru & Ogbonna, 2013)**.**

Transactional leadership is a leadership style that focuses on exchanging rewards or punishments in response to their follower's performance. This leader approach sets clear expectations and defines specific goals for their followers and, in return, offers rewards and recognition or corrective actions depending on whether those goals are achieved (Odumeru & Ogbonna, 2013).

1.8 Assumptions

For this study, the following assumptions were made:

I. The environment and context do not influence the business and technical stakeholders participating in the study.
II. The business and technical stakeholders that will be identified to participate in the interviews will be truthful, and the information gathered will be unbiased to extract valuable contributions for the organisation.
III. The findings of the research study can be generalised to other similar contexts within the organisation,

IV. The data collected from the research is unbiased and objective to allow for fair research study outcomes.

1.9 Chapter outline

This research report consists of six chapters and is structured as follows:

Chapter One: This chapter introduces the study and lays a foundation for the subsequent chapter by describing the research problem and the scope of the study.

Chapter Two: Interprets, interrogates, and evaluates the existing academic literature to support the need for the research study. This chapter outlines the research objectives and presents the theoretical framework that will guide the study.

Chapter Three: Outlines the research methodology used to collect and analyse data and substantiates how the study proved its quality and credibility.

Chapter Four: Presented the study's findings by highlighting the emergent theme from the data analysis process.

Chapter Five: Discusses and interprets the findings from Chapter Four against the literature reviewed in Chapter Two. It also highlights the results that should have been covered in the literature review.

Chapter Six: Provides a conclusive overview of the research objectives set out by the study. It also provides practical recommendations for the organisation and concludes by making suggestions for future research.

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2 LITERATURE REVIEW

2.1 Introduction

In today's world, new technologies are revolutionising how organisations operate and provide opportunities that reduce costs, increase efficiencies, increase productivity, and enhance customer experience. However, driving technological innovation can be a complex and challenging process. Organisations must consider several critical factors, including leadership, skills, training, communication, and employees. This paper will focus on the internal context of leadership, employees and communication when introducing incremental technological innovations into an organisation (Tabrizi, 2019).

2.2 Background and definitions

Stakeholders are individuals or groups who have an interest in the organisation. These include employees, shareholders, suppliers, and customers. When introducing technological innovations, it is essential to consider stakeholder buy-in and address any concerns upfront, as stakeholders influence the success of the innovation implementation (Mazzetti & Schaufeli, 2022). For example, involving employees in the implementation process and communicating the benefits of technological innovation is vital in ensuring they do not feel threatened that their jobs will be replaced (Tabrizi, 2019).

During the implementation process, evaluating employee skill levels to assess any gaps in knowledge is necessary. These insights will guide the organisation in formulating and tailoring the appropriate training programs to close the skills gaps identified (Ciarli, 2021). Adequate time and resources invested in training will guarantee employee confidence and reduce resistance to change around the new technology. Assessing the effectiveness of the training program is also necessary to ensure that employee knowledge is retained, and that the latest

technology is utilised effectively to maximise its benefits. Implementing new technologies can significantly change an organisation's processes, culture, and structure. To ensure a seamless transition, it is essential to manage change effectively (Ciarli, 2021).

Efficient change management identifies any potential barriers to change. Devise a change management plan as explained by (Forbes, 2022) with processes that can overcome obstacles to change and incorporate an effective communication plan. The communication strategy manages critical stakeholders through the implementation process and supports employees. Introducing technological innovations into an organisation can be challenging. Managing change and stakeholder expectations is critical for the organisation to leverage the benefits to ensure successful implementation.

2.2.1 Definition of Technological Innovation

Technological innovation is one of the fields of innovation that refers to the development and introduction of new or improved technologies with more capabilities, functionalities, or efficiencies. This innovation is driven by creating new solutions or optimising existing ones through applying scientific, engineering and technical knowledge (Dieffenbacher, 2023).

Technological innovation can be approached in various ways, including (Dieffenbacher, 2023):

- New technology development: Creating entirely new technologies that can be applied to address existing problems or satisfy a new requirement.
- Technology improvement: Making improvements to existing technologies to increase their performance, reliability, or efficiency.
- Technology integration: Integrating different technologies to generate new solutions or applications.

- Disruptive technology: Establish new technologies offering a fundamentally different value proposition.

Technology innovation includes anticipating and responding to market changes and new technology trends (Dieffenbacher, 2023). It can lead to the development of innovative products and services. However, it requires substantial research and development investments (Alshwayat et al., 2022).

2.2.2 Definition of incremental innovation

Incremental innovation ensures that organisations maintain and expand their current market position and secure a steady revenue stream (Mitzkus, 2022). Incremental innovation is the gradual and step-by-step modification of something existing, leading to incremental improvements (Vaughan, 2013). It involves continuously developing products, services, processes, technologies, and business models (Mitzkus, 2022). Examples of incremental innovation include adding new features to existing products, updating designs, improving processes and reducing costs (Vaughan, 2013).

An incremental innovation strategy is based on existing products, knowledge, techniques, technologies, or processes to improve them continuously. Internal factors like an organisation’s desire for optimisation and external factors like changes in legislation can trigger incremental innovation (Mitzkus, 2022). The main objective of incremental innovation is to maintain and expand the current customer base. Internal changes involve creating new customer value, developing new markets, reducing costs, and optimising existing structures and processes (Ciarli, 2021). External triggers include changing laws, new guidelines, and societal changes (Mitzkus, 2022).

Incremental innovation offers several benefits, including lower risk than disruptive innovation, focusing on short- to medium-term success, evolutionary progress, and optimising existing organisational structures and processes (Mitzkus, 2022).

It incorporates marginal improvements to existing products rather than new business models and focuses on retaining customers and receiving feedback. Examples of incremental innovation include the continuous development of smartphones and personal computers and the optimisation and digitisation of analogue processes in companies (Dieffenbacher, 2023). Implementing incremental innovation strategies requires a well-planned approach and is crucial for existing markets and customers. It relies on established products with an existing customer base, which increases the predictability of success (Mitzkus, 2022).

The structure is essential in incremental innovation as it focuses on minor improvements and does not require as much freedom for creativity as disruptive innovation. Innovation management plays a key role, where fixed strategies are derived from the overall corporate strategy (Sethibe & Steyn, 2015). By leveraging existing knowledge and market analysis, risks can be minimised, and outcomes can be predicted accurately. Despite the lower risk involved, uncertainties and challenges still exist in innovation management regardless of the degree of innovation an organisation chooses to pursue (Mitzkus, 2022).

2.2.3 Leadership

There is a common misconception about leadership, such as the belief that it is linked to seniority or job titles. Instead, leadership is a process of social influence that goes beyond one's position or personal attributes (Kruse, 2013). A leader creates an environment that nurtures innovation and self-direction, allowing the employees to learn from their own and others' successes, mistakes and failures (Patterson, 2006). Leaders guide employees of the organisation to develop a sense of self-worth and a willingness to take calculated risks. In doing so, leaders and employees can collaborate to transform the organisation and accomplish its strategic objectives (Patterson, 2006).

While there is no unanimous definition of Leadership, Deschamps (2005) further said that the failure of innovation projects is most likely due to ineffective leadership skills (Kesting et al., 2015).

2.2.4 Transactional versus Transformational leadership style

In the fast-changing world, organisational leadership is more important than ever to ensure that the organisation thrives (Kesting et al., 2015). It is considered a critical success factor, with the two organisations' most researched leadership theories being Transformational and Transactional leadership in recent years. Both transformational and transactional leadership styles have strengths and weaknesses, and leaders should decide which style to adopt based on the situation (Odumeru & Ogbonna, 2013).

Leadership styles can shape the quality of work life in various organisational settings and significantly improve employee satisfaction, performance and organisational commitment (Nanjundeswaraswamy & Swamy, 2014). The role of leadership behaviour is key in influencing trust, satisfaction, and organisational citizenship among employees. Effective leadership is essential in understanding the complexities of the global environment and achieving organisational goals (Nanjundeswaraswamy & Swamy, 2014).

Transformational leadership plays a significant role in humanising the organisation's innovation culture. Organisations that practice innovative behaviour generally perform better than organisations that display less innovative behaviour (Sethibe & Steyn, 2015). Transformational leadership motivates and inspires followers to achieve extraordinary outcomes while addressing personal and developmental needs (Korejan & Shahbazi, 2016). Successfully leading an organisation towards the future necessitates leaders who recognise environmental needs and facilitate appropriate changes (Korejan & Shahbazi, 2016). Transformational leadership comprises four components: idealised

influence, inspirational motivation, intellectual stimulation and individual attention (Odumeru & Ogbonna, 2013).

- Idealised influence - The extent to which the leader exhibits credible behaviour, demonstrates strong beliefs and inspires followers to connect with them, representing a distinct set of values and serving as a role model (Odumeru & Ogbonna, 2013).
- Inspirational motivation - The level at which the leader effectively communicates a vision that captivates and motivates the followers, instilling optimism regarding future objectives and providing significance to the present tasks at hand (Odumeru & Ogbonna, 2013).
- Intellectual stimulation - The level to which the leader questions established beliefs and encourages and promotes creativity among followers. The leader offers a structure that allows them to recognise their connections to the leader, the organisation, each other and the goal (Odumeru & Ogbonna, 2013).
- Individual attention - The level at which the leader addresses the unique needs of every individual follower, assuming the role of a mentor or coach while showing respect and appreciation for everyone’s contributions to the team. This fulfils and enriches the self-worth of each team member.(Odumeru & Ogbonna, 2013).

Leaders who adopt the Transformational leadership style create ideas and new perspectives to produce a new growth path for the organisation (Korejan & Shahbazi, 2016). By developing commitment, passion and loyalty among managers and employees, these leaders mobilise employees to make fundamental changes in the organisation's foundation (Korejan & Shahbazi, 2016).

Transactional or managerial leadership focuses on supervision, organisation, and group performance. Unlike transformational leadership, transactional leaders use an approach to promote compliance by offering rewards or imposing

punishments based on task performance (Odumeru & Ogbonna, 2013). The transactional leadership style is effective in crisis and emergencies, as well as in specific project execution (Kesting et al., 2015). This style tends to be directive and action-oriented, with leaders often thinking inside the box and focusing on processes rather than forward-thinking ideas (Odumeru & Ogbonna, 2013). Leadership styles reveal that transactional leadership style is better suited if the organisation's objective is to instil a culture of innovation (Sethibe & Steyn, 2015).

2.2.5 **Leadership and technological innovation**

Leadership and innovation are closely interconnected and go hand in hand to play a significant role in the success of individuals, organisations, and societies. Successful leaders understand the importance of innovation in driving growth, staying competitive and adapting to organisational change (Kesting et al., 2015).

Leadership is essential in innovation management. Leaders play an important role in enhancing organisational creativity, driving innovation projects, and implementing innovation projects. The leadership style influences employee involvement and commitment towards innovation management, which may differ for the different innovation types (Kesting et al., 2015).

2.3 Technology-Organisation-Environment framework

An industry that requires rapid innovation demands quick decisions on new technology and innovation (Baker, 2011). A framework that considers the key elements and their interplay can guide the implementation of the organisation. Fleischer and Tornatzky (1990) created the technology-organisation-environment (TOE) framework, which is widely used to analyse the factors that impact an organisation’s decision to adopt and implement technological innovations. The TOE framework identifies three independent contexts: technological, organisational, and environmental (Larsen & Eargle, 2015). These

contexts influence the processes by which an organisation adopts and implements technology innovation (Larsen & Eargle, 2015). The dependent construct of this framework evaluates Technology adoption, Likelihood of adoption and Intent of Adoption.

The TOE framework provides structure by applying a holistic approach across the three contexts, looking at interdependency and highlighting complex interplays (Borg, 2020).

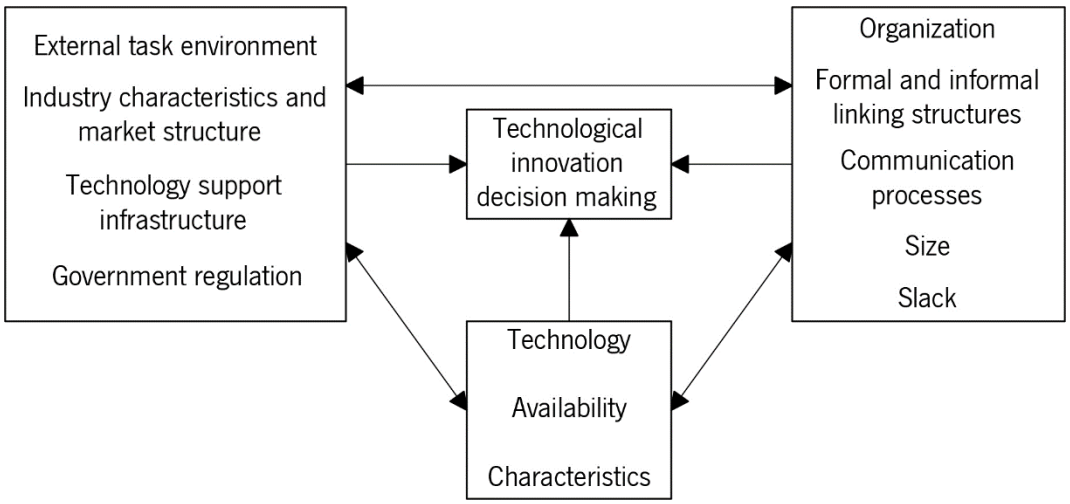


Figure 2-1 The TOE Framework (Larsen & Eargle, 2015)

The technological context considers both internal and external technologies that can enhance organisational productivity. The organisational construct refers to the resources available to support innovation acceptance, such as the organisation's size, managerial structure, and availability of human resources. The environmental construct considers the setting in which the organisation conducts business and is influenced by factors like industry trends, competition, access to resources and government interactions (Baker, 2011).

The TOE framework provides a comprehensive approach to understanding the complex factors influencing technological innovation in a South African organisation.

This research will adopt the TOE framework across the pillars of leadership, employee involvement, skills and communication while considering the technological, organisational, and environmental contexts. The research aims to understand better the challenges and opportunities involved in implementing new technologies and develop strategies that overcome potential barriers to these innovations in the organisation.

2.3.1 Technological context

The technological context considers all relevant technologies for the organisation, including those currently in use and those available in the market but still need to be utilised (Baker, 2011). Existing technologies set limits for the organisation's potential scope and pace of technological change. Innovations that exist but have not yet been adopted by the organisation influence innovation by indicating what is possible and how technology can drive evolution and adaptation.

External innovations are classified into three categories: incremental, synthetic, and discontinuous changes (Baker, 2011). Incremental innovation introduces new features to existing technology and poses the least risk and change for the organisation. Synthetic innovation combines existing technologies in a new way and offers moderate change. Discontinuous innovation, also known as radical innovation, is a significant transition from current technologies or processes.

Industries considering incremental or synthetic innovations can take a measured pace of adoption, while industries with discontinuous changes require quick and decisive decisions to remain competitive (Baker, 2011). When considering technologies that cause discontinuous change, organisations evaluate if they are competence-enhancing or competence-destroying. Competence-enhancing

innovations provide an opportunity for gradual change and building on current expertise, while competence-destroying innovations declare current technologies and expertise obsolete, leading to substantial industry shifts (Baker, 2011).

Organisations must carefully consider the organisational changes brought about by adopting innovations. Some innovations significantly impact the Organisations and the industry, while others have a relatively minor impact.

2.3.2 Organisational context

The organisational context refers to the organisation's characteristics and resources, including its communication processes, linking structures, resources, and size (Baker, 2011). These factors can impact the adoption and implementation of innovation. Internal communication and collaboration mechanisms can encourage innovation, such as cross-functional teams and employees with connections to other departments or value chain partners.

An organisation’s structure also plays a significant role in the adoption of innovation. Decentralised structures where teams have responsibilities and lateral communication support adoption (Baker, 2011). Alternatively, mechanical structures with clearly defined roles, formal reporting relationships, and centralised decision-making are better suited for implementing the innovation phase.

In an organisation, communication processes can influence innovation. By promoting open communication channels, organisations create an environment that enables employees to participate actively in the change process (Alshwayat et al., 2022). Leadership behaviours and communication processes demonstrated by top management encompass several aspects, including articulating the role of innovation within the organisation's overall strategy (Baker, 2011). Communicating the significance of innovation to employees, providing formal and informal recognition for innovative efforts and highlighting the

historical track record of innovation within the organisation are all significant aspects of the communication process (Baker, 2011).

Leadership's support for innovation and their communication of its importance is critical. Rewarding innovation efforts and aligning with the organisation's strategy creates an organisational context that fosters innovation (Baker, 2011). Slack resources have been found to promote adoption, but innovation can occur even without these resources. While larger organisations tend to adopt innovations more readily, the relationship between the organisation's size and innovation is inconclusive.

2.3.3 Environmental context

The environmental context encompasses the industry structure, the availability of technology service providers and the regulatory environment, all of which influence the adoption and implementation of innovation (Baker, 2011). Industry structure, including intense competition and the influence of dominant firms within the value chain, stimulates innovation.

The industry's life cycle also influences innovation practices, where organisations in rapidly growing industries tend to innovate more quickly. In contrast, those in mature or declining industries have less clear-cut innovation opportunities. Some organisations in declining industries may innovate through efficiency ideas or diversification (Baker, 2011), while others may avoid investing in innovation to minimise costs. The availability of a supportive technology infrastructure, including skilled labour and technology service providers, such as consultants, is essential to support and encourage innovation.

Government regulation can either promote or hinder innovation (Baker, 2011). While mandates such as pollution-control requirements may force firms to innovate, stringent safety and testing regulations may hinder innovation in various

industries. Government regulation can, therefore, have both encouraging and discouraging effects on innovation.

2.4 Technological innovation using the TOE framework

The literature review includes studies utilising the TOE framework to examine the factors influencing technological innovation, adoption and implementation within organisations (Arpaci et al., 2012). These studies explain the adoption of technologies such as e-commerce, e-business, Enterprise Resource Planning (ERP), Electronic Data Interchange (EDI), open systems and Knowledge Management Systems (Arpaci et al., 2012).

Analysing the perceived benefits and perceived costs of EDI adoption, organisations that adopt EDI technologies perceived higher direct benefits compared to non-adopting organisations (Kuan & Chau, 2001). However, these two adoption groups had no significant difference in the perception of indirect benefits. Adopter organisations also perceived lower financial costs and higher technical competence compared to non-adopter organisations. Additionally, adopter organisations perceived lower industry pressure but higher government pressure than non-adopter organisations (Kuan & Chau, 2001).

The TOE framework's technological, organisational, and environmental context significantly influences online retailing adoption (Nguyen et al., 2022). Specifically, elements such as relative advantage, compatibility, observability, top management support, entrepreneurial orientation, technological orientation, government support and legal framework are essential in driving online retailing adoption (Nguyen et al., 2022).

The relative advantage of online retailing is a significant factor in determining an organisation’s willingness to embrace it. Relative advantage refers to the benefits an innovation expects to provide the organisation (Nguyen et al., 2022). The article emphasises that the relative advantage of innovation compared to its

alternatives plays a crucial role in determining whether an organisation will adopt it. Previous research has shown that relative advantage positively impacts the adoption intention of various innovations such as big data, blockchain, social media marketing and mobile payment. Interestingly, organisation size, competitive pressure and number of employees do not significantly affect adoption. The study also finds that adoption positively impacts business performance (Nguyen et al., 2022).

The TOE framework was conceptually applied to investigate the factors influencing cloud computing adoption. Examining the organisational factors influencing cloud computing adoption suggests that top management support is positively associated with adoption. At the same time, organisation size and the skills of non-IT employees do not significantly impact adoption decisions (Borgman et al., 2013).

The environmental factors influencing cloud computing adoption include innovation pressure resulting from rapid lifecycle changes in products and services, which positively influences adoption (Borgman et al., 2013). A high perceived relative advantage of cloud computing, a high level of top management support and a high competition intensity are all three factors that are positively linked to the decision to adopt cloud computing (Borgman et al., 2013).

Employee resistance and uncertainties are not significant factors affecting the adoption of the Internet of Things (IoT) (Lin et al., 2016). Technical factors such as complexity, compatibility, perceived benefit and cost have a complicated influence on the adoption of IoT (Lin et al., 2016). Organisational factors such as the scale of the enterprise, executive support, trust among businesses and technical knowledge, as well as environmental factors such as external pressure and government support, all have positive relationships with IoT adoption (Lin et al., 2016).

Through the analysis of multiple empirical studies focusing on various technology innovations, the TOE framework has consistently demonstrated its effectiveness in understanding and explaining the adoption of technological innovations within an organisation.

2.5 Conceptual framework

A conceptual framework model was formulated using the factors considered by the technological-organisational-environmental contexts in the TOE framework as per the literature review in section 2.3 of this chapter. The diagrammatic representation in figure 2-2 below guides the research methodology to solve the research problems identified in this study.

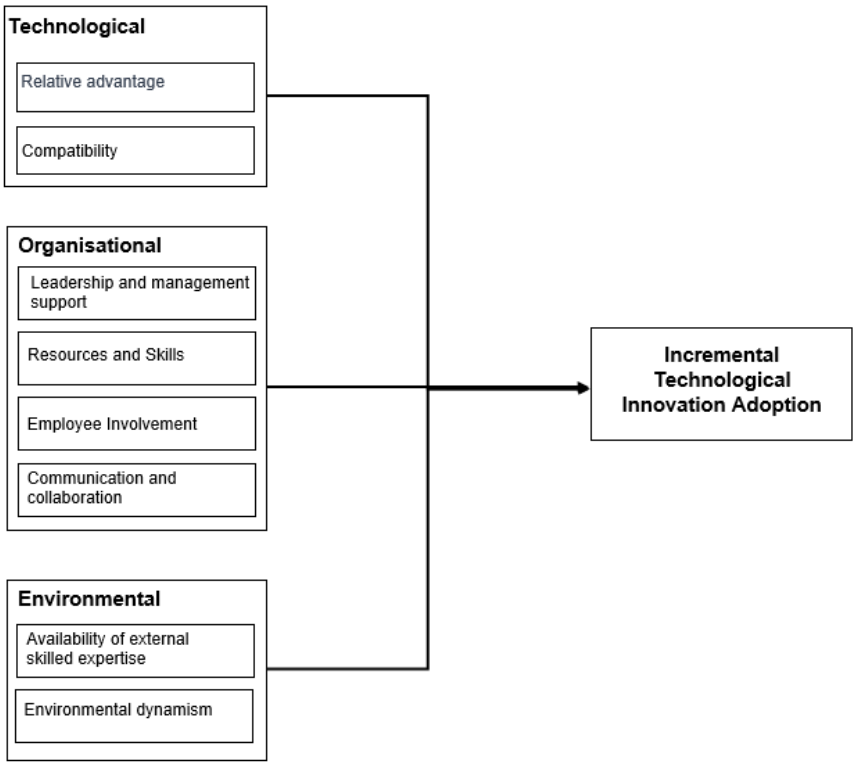


Figure 2-2 Researcher's conceptual framework based on the TOE Theoretical Framework

2.5.1 Technological context

For the Technological context of the TOE Framework, the study will explore the factors of compatibility and relative advantage with respect to implementing incremental technological innovation.

I. Relative advantage

(Rogers, 2003, p. 229) defined relative advantage as “the degree to which an innovation is perceived as being better than the idea it supersedes”. Relative advantage results in increased efficiency, economic benefits and enhanced status (Rogers, 2003). Extracting from this area of the framework, the study will look at the benefits of the new technology compared to existing technologies in relation to how it impacts adoption by internal teams.

II. Compatibility

According to Rogers's Diffusions of Innovations theory, Compatibility is defined as “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 2003, p. 15). The degree to which the new technology is compatible with existing technologies and systems within the organisation can affect its adoption (Rogers, 2003). The compatibility of the incremental innovation with existing technologies, systems, and infrastructure is an important factor. If the technology can seamlessly integrate with the current technological environment, the adoption and implementation of incremental innovation will be more streamlined.

2.5.2 Organisational contexts

For the Organisational context of the TOE Framework, the study will explore the factors of leadership, skills, communication, and employee involvement with respect to implementing incremental technological innovation.

I. Leadership and top management support

Within this context, leadership plays a crucial role in guiding and influencing individuals, teams and the organisation as a whole (Kesting et al., 2015). Effective leadership involves setting a clear vision, providing guidance and direction, motivating and inspiring employees and making strategic decisions with employee participation to align with the organisational goals (Mazzetti & Schaufeli, 2022).

Leadership within the TOE framework considers how leaders operate within the organisational structure, interact with employees, and utilise various leadership styles and approaches to drive performance and collaboration (Baker, 2011). It encompasses aspects such as communication, decision-making, team management and fostering a positive work environment. The study will explore the role of leadership in technological innovation under the organisational context of the framework.

II. Resources and Skills

As organisations adopt and implement new technologies, they require new skills for innovation, learning and adjustment to the evolving technology landscape (Ciarli, 2021). Technological innovation changes the way knowledge is classified, which has implications for organisational productivity and innovation. Skill requirements are changing within and across organisations, industries, and countries, rendering some skills redundant (Ciarli, 2021).

Organisations and employees must adapt and transform themselves to thrive in the ever-evolving digital world. Even seemingly incremental technology innovations can profoundly and unpredictably affect skills and job requirements. This study will explore how organisations and employees develop "meta-skills" to adapt existing skills continuously or acquire new skills to leverage the capabilities offered by technological innovation.

III. Communication and Collaboration

Communication is an important factor in reducing uncertainty and increasing employee commitment, ultimately leading to decreased resistance to change (Alshwayat et al., 2022). A work environment that encourages collaboration expands internal communication channels, improves the sharing of knowledge and supports the participation, motivation and opportunities for employees of the organisation to make valuable contributions (Alshwayat et al., 2022). Furthermore, effective communication reduces uncertainty, fosters commitment and addresses fears and anxieties for employees caused by unknown factors impacting their careers (Alshwayat et al., 2022). This study explores the factors for organisations to provide appropriate assistance and support open communication channels to facilitate successful change and minimise resistance when technological innovation is implemented.

IV. Employee involvement

Organisations that promote employee involvement are more likely to overcome the barriers that hinder innovation and change. The literature consistently supports the positive impact of employee involvement on readiness for change and overcoming obstacles to innovation (Alshwayat et al., 2022). Moreover, effective communication provides the foundation for engaging employees and enhancing their support for organisational change initiatives. By prioritising employee involvement and communication, organisations can stimulate innovation, reduce uncertainty and encourage a culture of continuous improvement (Alshwayat et al., 2022).

2.5.3 Environmental context

For the Environmental context of the TOE Framework, the study will explore the factors of external skills and expertise that should be considered by the organisation when implementing incremental technological innovation.

I. Availability of external skilled expertise

Skilled labour plays a pivotal role in driving successful innovation and technological change. The type of innovation, whether product or process-oriented, will inform the specific skills and qualifications required for innovation (Nesheim & Hunskaar, 2015). The innovation process by which organisations bring improved products and processes to the market is a learning process. Innovators may rely on and use skills and competencies from the firm's outside environment (Nesheim & Hunskaar, 2015).

Organisations who combine a broad range of competencies under an inspired and knowledgeable leadership can successfully innovate. This study focuses on incremental innovation. However, radical and incremental innovations are important for an organisation to be sustainable, and both types of innovation represent very different situations and demand a very different mix of skill sets.

II. Environmental dynamism

Environmental dynamism, within the framework of TOE (Technology-Organisation-Environment), pertains to the extent of fluctuation, uncertainty and unpredictability in the external surroundings that influence an organisation (Sila & Dobni, 2012). It evaluates the speed and unpredictability with which external factors evolve and impact the organisation's activities and decision-making procedures. A highly dynamic environment is characterised by frequent and rapid changes, posing challenges for organisations to forecast future conditions and devise long-term strategies (SIMERLY & LI, 2000). On the other hand, a stable environment encounters minimal fluctuations and alterations, enabling organisations to make more accurate forecasts and prepare long-term plans with increased confidence (SIMERLY & LI, 2000). The study will focus on uncertainty and rate of change as critical aspects of environmental dynamism.

2.6 Conclusion of literature review

In conclusion, this literature review in the previous section demonstrates a wide range of scholarly works to support the relevance and influence of the critical internal areas selected by this study. The vital internal themes from the reviewed literature included the role of leadership, employee involvement, skills, and communication. These themes will be guided by the TEO framework and clear definitions established from the theory to provide a foundation for the research study and inform the research instrument.

The research instrument will be a semi-structured interview that will capture the subjective experiences and perspectives associated with the research. Through a qualitative lens, this study will explore the research objectives bounded by the theory to gain deep insights and understand the complexities and nuances that influence incremental technological innovation within the organisation.

3 RESEARCH METHODOLOGY

The previous chapter explored the literature on Leadership styles, Technological Innovation and the selected theoretical Framework that guided the interplay of technological, organisational, and environmental factors for this study. This chapter explains the methodology chosen for the study and how it was applied to provide the outcomes for this research.

3.1 Research paradigm

The study utilised an interpretivist paradigm associated with a qualitative research approach (Creswell & Clark, 2016). For this study, the interpretivist paradigm provided a perspective that understood the subjective human experiences and the meanings individuals assign to their social experiences. An interpretive worldview was selected with the intention of exploring the personal, contextual and multi-dimensional nature of the research topic while acknowledging the role of participants in the data collection process (Gasson, 2004). This approach is particularly valuable in qualitative research as it enables a richer exploration of the phenomena being studied. It is based on the belief that reality is socially constructed and biased, varying from person to person (Creswell & Poth, 2018). By prioritising participants' perspectives, the researcher was able to discover insightful details that may be overlooked in more quantitative approaches. The interpretivist paradigm supports methods such as in-depth interviews, participant observation and thematic analysis (Creswell & Poth, 2018).

3.2 Research approach

This case study utilised Qualitative Research methodology, consisting of semi-structured data collection interviews. Qualitative research is a method used to investigate and understand the significance that individuals or groups assign to a

social or human problem (Creswell & Creswell, 2018). This research process involved developing questions and methodologies based on the objectives, gathering data in the participants' natural environment, and analysing the data by gradually progressing from specific instances to broader patterns (Creswell & Creswell, 2018). Researchers undertaking this type of investigation endorse an approach that values an inductive style, emphasises individual perspectives and recognises the significance of showing the complexity of a given situation (Creswell & Creswell, 2018). However, for the purposes of this study, a hybrid approach was adopted. This approach combined deductive reasoning framed around a conceptual, theoretical model while maintaining the flexibility of inductive reasoning to explore new insights.

This study utilised the interpretive research paradigm. This recognised the existence of multiple perspectives and focused on accommodating for differences rather than forcing all interpretations into a single perspective (Gasson, 2004). The interpretivist research aimed to explore the complexities of human behaviour and understand how individuals interpret their experiences within specific contexts (Creswell & Poth, 2018). This research paradigm assisted with a comprehensive understanding of the social phenomena being studied (Flick, 2009).

Internal consistency and making sense to observers who share the meanings of phenomena are important aspects of interpretive research—applying a qualitative approach to a study involves utilising methods that focus on understanding and interpreting subjective experiences, meanings and social phenomena (Creswell & Poth, 2018). For this research study, the triangulation method was applied by combining a secondary data source in the form of existing literature to validate and support the findings (Creswell & Poth, 2018). This secondary data source will be in the form of articles and insights available in the public domain.

The research approach covered the key principles of research design, data collection, participant selection, data analysis, interpretation and reporting (Flick, 2009). The qualitative research was iterative and flexible. It involved an ongoing engagement between the researcher and the data, allowing new insights and unexpected findings to emerge throughout the process (Creswell & Poth, 2018).

3.3 Research design

For this study, the research design followed a single case study design, which integrated a qualitative research method with an interpretive view to obtain critical insights on incremental technological innovation from leadership and employees. Research using qualitative data collection made the theoretical positioning explicit, ensured congruency between methodology and methods, established clear strategies for rigour and identified the analytic lens used to examine the data (Cooper & Endacott, 2007). Some key considerations in qualitative case studies included reflexivity, methods (such as sampling, interviews, and observation) and established rigour (such as respondent validation and process records). It also emphasised the importance of effectively communicating qualitative findings to a primarily quantitative audience (Cooper & Endacott, 2007).

Kahlke (2014) Interpretive description borrowed from various research methodologies, including grounded theory, naturalistic inquiry, and phenomenology. It catered for data collection from multiple sources, although individual interviews are often the primary source. Data analysis involves concurrent, constant comparative methods to generate a broad understanding of the data (Kahlke, 2014).

Interpretive description is a methodology that emphasises the subjective construction of knowledge (Creswell & Poth, 2018). It draws on various theoretical perspectives but does not require researchers to align with any

specific theory (Kahlke, 2014). The methodology involved collecting data from multiple sources, with individual interviews being commonly used. Data analysis aimed to gain a broad understanding of the data and locate the findings within the existing body of knowledge (Kahlke, 2014).

Due to the nature of the study, which considers the impacts across the stakeholder groups, the research targeted an even distribution of participants. The semi-structured online interviews included leadership, top management, and the implementation team, comprised of employees and external consultants from Organisation X. Interviews were conducted online where participants were in their natural environments. The interview questionnaire was formulated based on the conceptual framework devised for this study during the literature review in Chapter 2 of this research report.

3.4 Population and sample

3.4.1 Population

The population group for this study were the employees of Organisation X. The targeted population were the systems business area, which is a unit that manages and delivers technological innovation for Organisation X.

3.4.2 Sample and sampling method

This study applied non-probability sampling with the purposive sampling method. Purposive sampling is typically utilised in qualitative research to select cases that are particularly rich in information and efficiently use available resources (Ilker Etikan, 2016). It involved identifying and selecting individuals or groups with proficiency and a deep understanding of the phenomenon being studied (Creswell & Clark, 2016). A suitable number of interviews for a phenomenological study typically falls within the range of 5 to 25, while for a grounded theory study,

it is recommended to conduct approximately 20 to 30 interviews (Bekele & Ago, 2022). For a relatively homogeneous sample, a smaller range of 6 to 8 interviews might be sufficient. In contrast, for studies aiming to capture a broader range of perspectives, a higher range of 12 to 20 interviews may be more appropriate in order to achieve maximum variation (Bekele & Ago, 2022).

Overall, purposive sampling ensured that the chosen participants could provide the most relevant and valuable insights for the research being conducted.

No	Interviewee	Role
1	Participant 1	Consultant Specialist Software Developer
2	Participant 2	Quality Assurance Manager
3	Participant 3	Consultant Senior Program Manager
4	Participant 4	Senior Development Manager
5	Participant 5	Senior Systems Architect
6	Participant 6	Head of Systems Architecture
7	Participant 7	Head of Systems Delivery
8	Participant 8	Consultant Senior Developer
9	Participant 9	Chief Operating Officer

10	Participant 10	Development Manager
11	Participant 11	Head of Systems Delivery
12	Participant 12	Senior Software Developer

Table 3-1 Participant List

3.5 The research instrument

The research instrument utilised for this study was a semi-structured online interview questionnaire. This interview guide comprised sixteen (16) open-ended questions with twelve (12) participants engaged in an interview that lasted no more than 60 minutes each. The interview guide covered the key research areas in line with the TOE Framework: Technological, Organisational, Environmental, and general-themed questions. The interview guide has been provided in Appendix B.

3.6 Procedure for data collection

For this study, the primary data collection was semi-structured interviews. Due to the hybrid working model adopted by Organisation X, face-to-face, in-person interviews were replaced by online interviews conducted over the Microsoft Teams platform. Based on the nature of the study, this format offered flexibility while there was a pre-determined set of questions or topics to guide the interview (Wholey et al., 2010). This format allowed the interviewer to adapt and probe further based on the participant's responses. It enabled a more in-depth exploration of the participant's perspectives and experiences.

Semi-structured interviews also allowed participants to be actively involved in the research process. This participation led to a sense of ownership and investment in the study, which helped to enhance the quality of the responses.

During semi-structured interviews, the researcher provided participants with open-ended questions (Wholey et al., 2010). This approach allowed participants to share their experiences and thoughts in their own words, which generated rich and detailed responses.

The semi-structured interview format promoted participant engagement and active involvement in the research process (Creswell & Creswell, 2018). This approach allowed participants to share their experiences and thoughts in their own words, which led to rich and detailed responses. The interviews' participatory nature also helped build rapport and trust between the researcher and participant (Wholey et al., 2010).

3.7 Data analysis strategies and interpretation

For this study, the data analysis strategy applied was thematic analysis, using the network model to analyse response data.

The thematic analysis involved identifying basic themes that contributed to organising themes, which in turn contributed to global themes. This process helped researchers make sense of qualitative data by categorising and summarising the main themes and underlying assumptions (Attride-Stirling, 2001). The thematic analysis uses thematic networks, web-like illustrations summarising a text's central themes, as displayed in the figures below.

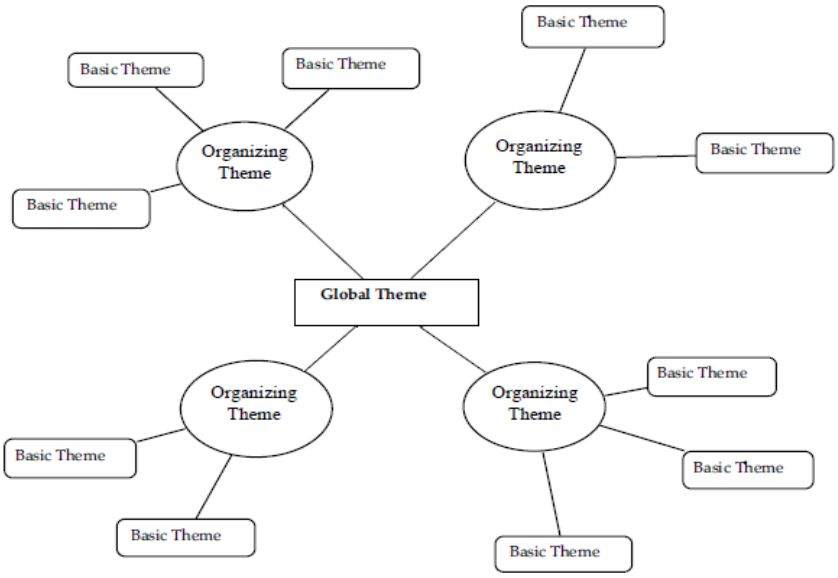


Figure 3-1 Structure of Thematic Network (Attride-Stirling, 2001)

The process involved coding the material, identifying themes, constructing networks, describing and exploring the networks, summarising the networks, and interpreting patterns (Attride-Stirling, 2001). During the interview process, common themes that were identified and highlighted with the thematic networks assisted in organising and presenting the analysis.

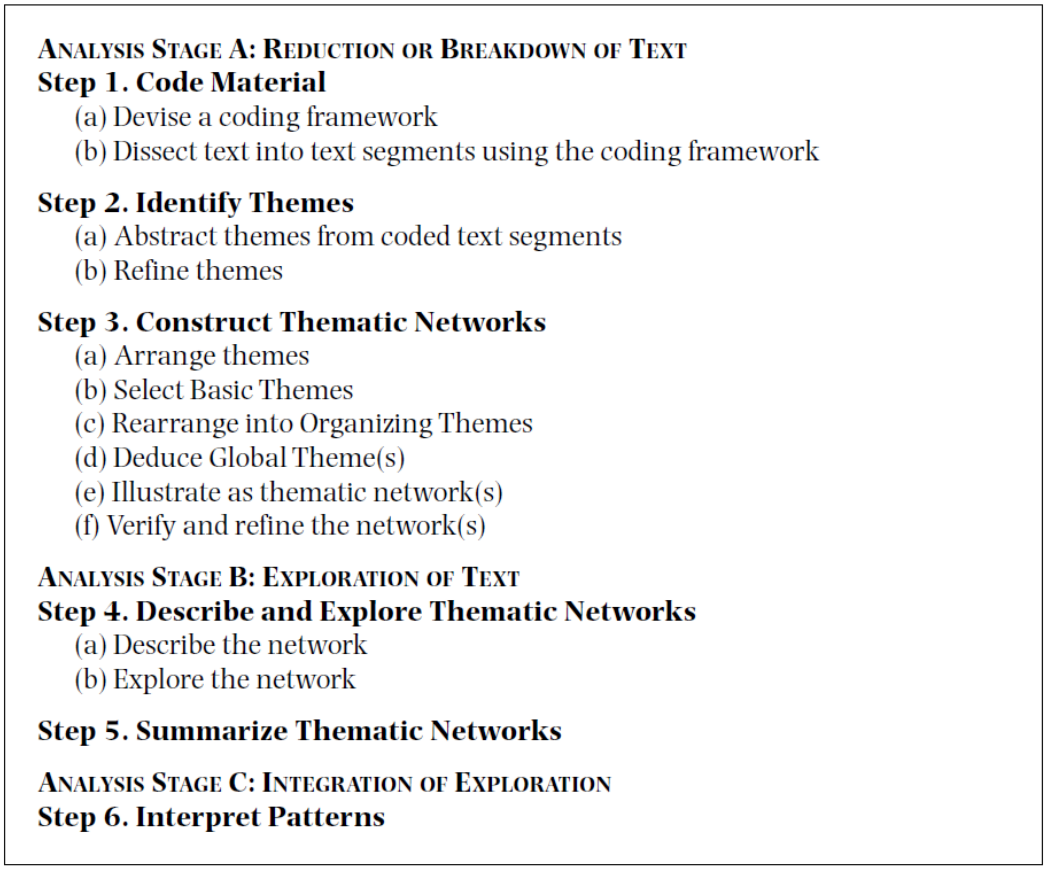


Figure 3-2 Steps for a Thematic Analysis (Attride-Stirling, 2001, p. 391)

Thematic analysis is a three-stage process, which includes the reduction or breakdown of the text, the exploration of the text and the integration of the exploration (Attride-Stirling, 2001). Although this three-stage process is standard, it is not the only way to conduct qualitative analyses. Various qualitative approaches are available, with coding being viewed as a helpful technique in qualitative analysis, although it is not considered unique or crucial. However, data reduction is a significant step for qualitative analysis (Attride-Stirling, 2001).

3.8 Quality Assurance

Quality assurance in qualitative research refers to the measures taken to ensure the rigour, credibility and trustworthiness of the research process and findings (Morse, 2015).

3.8.1 Transferability

Transferability in qualitative research refers to the extent to which the findings and insights from this qualitative study can be applied or transferred to other contexts or settings (Tracy, 2010). The outcomes of this study can be transferred to different business units in the organisation with the context of the target audience being maintained. The study focused on providing sufficient information to enable readers or future researchers to determine the degree to which the findings may apply to their situation without claiming generalisation.

Applying a comprehensive description of the research context, including the setting, participants, and specific conditions under which the study was conducted, allowed readers to assess the similarities and differences between the research contexts.

3.8.2 Credibility

In qualitative research, credibility is synonymous with internal validation and refers to the confidence and trustworthiness of the research findings, interpretations and conclusions (Morse, 2015). Creswell and Poth (2018) said that enhancing credibility is particularly important in qualitative research, where the researcher's subjectivity can influence interpretations. The participant validation technique, also referred to as member checking, was utilised in this qualitative research to strengthen the study's reliability and credibility (Creswell & Poth, 2018). This process entailed sharing the research results and

interpretations with the participants to verify whether the researcher's interpretations were accurately aligned with the participant's own experiences.

3.8.3 Dependability

Dependability in qualitative research is achieved by ensuring consistency, stability and reliability in the research process and findings (Flick, 2009). It concerns the extent to which the research process is structured and documented and can be replicated or repeated by others to attain similar results. This study adopted a straightforward research design, outlining the research objectives, selecting appropriate data collection methods, and specifying the analytical framework.

3.9 Ethical considerations

This study adhered to ethical considerations in qualitative research by protecting participants' rights and well-being, maintaining research integrity, and generating credible and meaningful insights.

The study poses minimal risk as the interviews were designed to be non-harmful and avoid presenting extreme perspectives that could lead to negative consequences (Creswell & Poth, 2018). Furthermore, the researcher obtained signed consent from the participants before conducting the interviews. All collected data was kept confidential and anonymous, with only the researcher being aware of the participants' identities.

For the purposes of this research study, the following ethical considerations apply:

- Informed consent will be obtained from participants, ensuring they are fully informed about the study's purpose, procedures, potential risks, benefits, and rights.

- Confidentiality and anonymity of participants to be considered by using pseudonyms or other methods to protect their identities. Data will be stored securely and shared only with authorised individuals involved in the study.
- Privacy and data protection regulations will be adhered to for the relevant data to ensure participant privacy. Personal information should be collected, used, and stored securely and responsibly. This information should be destroyed once the study is completed.

4 PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents the findings of the semi-structured interviews as part of the qualitative research methodology applied. These interviews aimed to explore the perspectives, insights, and experiences of research participants regarding the phenomena of incremental technology innovation. The findings of the interviews not only answered the research objectives but also provided a deeper understanding of the objectives studied. The interviews offered a valuable glimpse into the participants' experiences, enabling the identification of themes and patterns within the responses. The analysis of data resulted in the emergence of three themes and seven categories or sub-themes.

4.2 Background on participants

Interviews were conducted with twelve respondents during this study. Participant selection was guided by purposeful sampling, and employees on various management levels were identified to participate. These employees were perceived to have the required knowledge and experience due to their tenure at Organisation X, previously and currently embarking on technology innovation initiatives.

The sample of participants comprised of nine males and three females. The participant demographics were not pre-empted as this study was neutral on gender and race; however, it ended with an even distribution of African, White, and Indian participants.

The participants ranged from management to senior management level with technology and business qualifications. They have been exposed to implementing incremental technology innovations and embarking on initiatives to

decommission Organisation X's legacy technology as part of a strategic operational efficiency program led by executives.

4.3 Emergent themes

The primary objective of this study was to explore the factors that influence the adoption of incremental technological innovation in a South African organisation. The TOE framework governed the research and explored technological, organisational, and environmental considerations. In addition, the secondary objectives were to understand the role of leadership and employee participation during incremental technological innovation.

The study utilised a flexible hybrid approach to analyse and develop the research themes by combining the inductive and deductive methodologies. A hybrid approach offered the structure of deductive reasoning while maintaining the flexibility and openness of inductive reasoning. It allowed us to validate and challenge existing theories while also being receptive to new insights and patterns that emerged from the data. As part of the research methodology, the TEO Theoretical framework was compiled based on the factors steered by the theory in the literature review. The data collection process applied an inductive approach, allowing for openness and exploration of new themes during the participant interview process. The data analysis found evidence to support the initial factors set out by the study and identified new patterns emerging.

The research findings are based on a thematic analysis of the interview responses and the interview data generated. The codes are outlined in Table 1 below:

Categories	**Themes**	**Codes**
Organisational Culture	Innovative Culture	Problem Solving for innovative solutions
		Learning Culture
		Organisational agility

	Organisational Sustainability	Speed to market
		Operational Efficiencies
Organisational Processes	Process integration	Technology Awareness
		Training and upskilling
		Process and systems adherence
	Implementation Challenges	Time constraints
		Change Management Support
		Decommissioning Legacy Systems
	Knowledge Sharing and Collaboration	Knowledge sharing mechanisms
		Lack of intentional collaboration
Efficient Technology Implementation	Innovation Efficiencies	Product Delivery Enhancement
		Proof of Concept strategy
	Risk of external Dependencies	Effective Skills transfer
Leadership in Technology Innovation	Leadership's Continuous Improvement	Inclusive Decision-Making
		Hybrid Leadership style

Table 4-1 Thematic Analysis Coding

4.3.1 Organisational culture

A significant theme that emerged among the participants was the significance of the existing organisational culture. Delving into this theme, we examined the specific results that pertain to the study's objectives in greater detail. As mentioned earlier, the theme had two sub-themes, which will be discussed below: Innovative culture and Organisational sustainability.

4.3.1.1 Innovative culture

Participants believed that when implementing new incremental technology innovation, Organisation X should promote an open and inclusive environment where employees feel encouraged to share ideas, experiment and take risks without fear of failure when solving problems. It is essential to align the innovation with the organisation's goals, manage change effectively and provide necessary formalised training programs for skills development. Communication and collaboration should be encouraged, along with adequate leadership support. Leadership also plays a vital role in setting the tone for innovation by modelling innovative behaviour, supporting innovation initiatives, and aligning the organisation's values with a commitment to continuous improvement.

As the participant below shares, an innovative culture is demonstrated by a supportive environment where fresh ideas and creativity are encouraged during problem-solving practices.

> *"What that ultimately meant was that when looking at problems when seeing different designs that come from different team members, it made it easier for me to think through how to resolve these things and how to solve for those particular to get specific outcomes..."* **Participant 1**

> *“Leaving that ambiguity, okay, finding the hooks in everyday problems you are experiencing, and how the new technology makes that less different. Then, once you have implemented the new technology or are in the process of adopting a new technology, because sometimes it's not a flip switch, you're over. It continuously finds feedback cycles to reinforce why it was a good decision.”* **Participant 9**

Participant 9 says that he believes it is important to establish clear evaluation metrics and ensure the technology fits the organisational culture and is maintainable.

"It's what are you trying to solve? Is it around cost reduction, improved availability, agility, or addressing security flaws?" **Participant 9**

"…Apple for example, a lot of the innovation was a lot more top down, but in other organisations, you can get the innovation rising organically from the bottom. It's just a matter of you, as the leader in that business, knowing the kind of culture that you have and the type of leaders that you have as well." **Participant 1**

Promoting a culture of continuous improvement and actively engaging employees in the implementation process will significantly enhance the effectiveness and acceptance of the new technology.

The learning culture is aligned with Organisation X's strategic goals. It is characterised by flexibility, agility and responsiveness to market changes and creates an environment where innovation is not just encouraged but ingrained. The following responses reinforce the participants' beliefs that an organisation that supports a continuous learning culture, skills development, diversity, and inclusion allows for the enrichment of the pool of ideas and resources readily available for innovation.

*"… the first thing that when I think of the best ways to innovate is you should first hire the right kind of people that have within them a culture of curiosity**..."*** **Participant 1**

"…you definitely need to think about increasing the development times and make sure you've got a culture of people who want to learn. If you don't have that you're going to have a big, big problem where you're putting down your tech. And nobody's interested from a developer community to actually learn and use it." **Participant 6**

"You need to leave room for error... it needs to be a culture where people feel safe, to be in a culture where people feel included..." **Participant 7**

4.3.1.2 Organisational sustainability

An organisation that is adaptable innovates quickly and focuses on operational efficiencies is sustainable. Maintaining sustainability involves a strategic approach that balances innovation and core business stability. This requires a thorough understanding of market trends to guide the development of relevant technology that adds value to customers. Furthermore, organisations must be adaptable and open to innovation to remain sustainable. This includes staying informed of technological advancements and industry trends. Innovation should not only focus on products and services but also on improving operational processes and optimising business models.

To ensure organisational agility, an organisation must adapt. This includes adopting a culture of continuous learning, employing agile, flexible processes, and introducing new technologies. This encourages internal innovation, experimentation, and collaboration with external partners, which enhances the organisation's ability to adapt and maintain its competitive edge in a dynamic market.

The responses from participants 3, 4, and 10 below suggest that Organisation X can improve agility and adaptability. The organisation can improve its capabilities by practising collaboration, executing proof of concept testing, and identifying opportunities to change course during implementations.

> *"…I think doing more, more POCs or more tests, you know, test learn and adapt. I think that's, that's really critical at a micro level in a per team and you know, and trying to affect that then across more teams, you know, so in the environment, you can create that way the team can innovate, rather than wanting to innovate the cross."* **Participant 3**

> *"…we work together to innovate as much as possible, taking the advantage of the rewrites and the introduction of the new technologies. Collaborating again, in terms of how once the whole technology is*

implemented, will have an impact in other areas, like the finance operations spaces, the payment space for an example because all of that would have to change and adapt to the new tech because some of the stuff that would have been put in place in the different cross-functional spaces then now. It was mainly to respond to the limitations of the tech."
Participant 4

"…if you look at agility or adaptability, it's not about I think we are at a space we can say that we do and we do know that we have the ability to pivot. But we also have the understanding that when you pivot this there's an impact. We can analyse the impact and then when you deploy the change, you go through the different testing cycles to make sure that what you have implemented works correctly and what you what is existing is not broken. So we think we are quite agile and adaptable in terms of that."
Participant 10

To ensure speed to market an organisation should adopt agile methodologies for faster development cycles and continuous improvement. Streamlining decision-making processes and maintaining a customer-centric approach helps align innovations with market needs and reduce improvement times. Leveraging modern technologies and automation tools speeds up development, testing, and deployment. Continuous testing and feedback loops are essential for early issue identification and resolution.

The responses below from participants 1, 3 and 6 describe the importance of innovating to remain relevant and to apply innovation in an incremental approach using agile methodologies to ensure speed to market:

"...innovation is significant in an organisation because if you do not innovate, eventually there's going to be another company that comes and ends up taking that market share you can see it across many different spheres. And a lot of the greatest companies today, the reason why

they're still great, and the reason why they're still relevant is because they've prioritised innovation, but they've done it in a way that is safe and genuinely sustainable." **Participant 1**

"I think in today's very complex technology world, it is tough to replace a monolith or a set of systems all in one. So the notion of incremental change, you know, with a birth of agile I mean, we we've been doing that with software development for the longest time now, but even in replacing systems incremental is by far the more successful approach." **Participant 3**

"The ability to trial things that ability to fail quicker, you know to figure out what's going to work. So if you putting in these new pieces of technology, it's really about getting this individual product out, trying to get it out quicker to market and should the product not stick then you also don't have potentially such a massive technological investment in it." **Participant 6**

Participants 1, 6 and 10 reiterate the importance of creating the capabilities to ensure speed to market:

"From a pure technology perspective, I'd say the people using the technology, the speed and the experience when using these different product sets will be vastly improved when you consistently make a habit of innovating." **Participant 1**

"So the real thing is speed to market here is that if you're putting in a brand new architecture, it has to do with how do you get things out. And it's really for the team as well." **Participant 6**

"So the efficiency with which we can roll out products into the market is one of the key objectives of innovations like this in Organisation X." **Participant 10**

The participants agreed that when introducing new technology, it is essential to evaluate the operational efficiencies to ensure a seamless transition and optimal functionality. The insights gathered from the interviews indicated that regular evaluation and refinement of processes help identify inefficiencies and implement corrective measures. Maintaining flexibility in operations allows for quick resolution to any challenges or changes that may arise during the innovation process, ensuring the organisation remains agile and responsive. Integrating new technologies can significantly reduce time and resource expenditure, enhancing productivity.

The responses below were extracted to share participants' thoughts about the need to evaluate operational efficiencies when introducing technological innovation.

> *"…although to incremental change, implementing just one specific system… And I think you're the main benefit there for the team was visibility, but also developer Capacity and Productivity because, you know, it's hard to sometimes find difficult problems, and the more visibility you have through either logs or dashboards, it makes the developers world a little bit easier. So that's, yeah, I think that's probably the main benefit of that specific I mean, I can give many, many examples, but I think that's probably one of the top ones."* **Participant 3**

> *"I think that's one of the of the great advantages of this new tech that I've sort of been impressed by. And also I think in terms of the ability to monitor and recover when there's issues I've seen again, it felt a good example. At some point we had like an issue on prod and the recovery time to resolve that issue. Within that environment, comparing to if maybe that application that's the problem was on the on the legacy environment. It would have taken longer to recover."* **Participant 4**

"...like trying to find the wins, and, and, yeah, and progress it so that you can actually get the benefits but without disrupting existing operations, but moving towards being able to get the benefits." **Participant 9**

Below, Participant 7 and 11 shared their views, highlighting an important point to monitor and measure the technology's impact on operational efficiency.

"…how you manage anything right is to have you need to have you need to have a measure, right? So you can't just have a process that cannot be measured as an example. You need to have, this is what I'm trying to do. This is how I'm trying to do it. And this is what I'm trying to achieve. And so, you are able to go back and say have achieved." **Participant 7**

"If you don't have milestones, if you don't have targets, if you don't set the definition of done or you don't set what the outcome needs to be, and you don't measure against that. Right. So I mean, even in my previous organisations that I've worked at, I've seen people just go in circles with new technology." **Participant 11**

4.3.2 Organisational processes

Organisational processes that are well-defined and efficiently managed are key to the success of any organisation. Driving a culture of continuous improvement, integrating processes, and managing change to align the organisation's day-to-day activities will ensure it meets its strategic objectives. Organisational processes involve various activities, from research development and product development to human resources management and customer service. These processes add significant value to an organisation by enhancing efficiency and productivity, improving the quality of products or services, and clarifying roles and responsibilities. This section focuses on process integration, implementation challenges, knowledge sharing and collaboration, which are integral to facilitating innovation and integrating new technologies.

4.3.2.1 Process integration

Process integration requires a clear understanding of existing processes within the organisation and how the new technology will interact with or modify these processes. Creating awareness is crucial, and all stakeholders, including management, employees, and business partners, should be informed about the changes and their implications. Training and support systems must be in place to facilitate a smooth transition. Regularly monitoring and evaluating the integration process is essential to identify and resolve any non-adherence process promptly. Considering some of these aspects, the organisation can effectively integrate new technologies into existing processes, enhancing efficiency and productivity without disrupting core operations.

The findings revealed significant insights into the critical role that a comprehensive understanding of technological advancements, tools and trends plays for individuals within Organisation X. Technology awareness plays a crucial role in bridging the digital divide and ensuring that Organisation X can navigate the complexities of the digital age effectively.

> *"I myself was quite pleasantly surprised at how knowledgeable they were on the technology itself. And the potential prescribed benefits and how conservative they were in some of their estimations around potential improvements..."* **Participant 1**

> *“…we did a lot of campaigning and a lot of awareness creation in the sense that we did a lot of presentations to extra to inform them of, you know, this is this is the situation you know, of selecting the new tech, we had external assurance come in with the third party organisation to actually to actually assist with this and they are, you know, experts at dealing with exco and then they've been through so many trans transformational projects.”* **Participant 6**

Participants 5 and 7 reiterate that the Change Management and Training team in Organisation X drives technology awareness as part of their continuous learning strategy.

> *"…So change management has done a great job in our space in keeping everyone aware of these new technologies, even if they haven't worked on it."* **Participant 5**

> *"I do feel like they're the upfront work that we do in terms of knowledge share and creating the excitement and making sure our training team is working hard and sending the quizzes and all of that stuff which does help with the you know, like with familiarising people with what's happening."* **Participant 7**

> *"Firstly, your existing resource base to familiarise themselves with this new technology. And so you don't have a lot of turnover around staff, you can kind of keep the same people in a lot of similar roles."* **Participant 1**

Training and upskilling for employees are crucial to maximise the new technology's potential and ensure efficient incremental implementation.

> *"…an advantage is that it gives people exposure to new things and you know, like it's an educational moment. It provides an opportunity for upskilling for people. It also provides an easier way to build things and get things into the market right."* **Participant 7**

Interestingly, the study revealed that due to commitments and time constraints, capacity is an ongoing challenge when it comes to executing training programs for employees in product delivery teams.

> *"So you learn in your own time or you learn during office hours but you are plugged on to your profile in the system and you learn on your own.*

Sometimes, what I've also felt is peer programming is very efficient when it comes to upskilling." **Participant 10**

Participant 10 reiterates the challenges of securing capacity for employee training and upskilling on the new technology.

"So difficult in the sense you have to if you don't have the competency, you have to build a competency. You have to send people on training, you have to give them upskilled you have to allow them the time to learn the technology." **Participant 10**

Conversely, the following findings emphasise the lack of eagerness employees demonstrate when acquiring skills in a particular technological or subject matter area. Despite Organisation X's willingness to allocate resources towards employee upskilling initiatives, the reluctance of employees to participate in these programs is also evident.

"We didn't get there until the Mobile experts involved and therefore the devs It was like he has a project do it in flutter we upskilled we actually invested a lot in upskilling I'm not too convinced. I think we upskilled people who didn't want to react skills, weren't interested in being upskilled." **Participant 11**

Another participant shared similar sentiments demonstrated in the narrative below, suggesting that the training and upskilling of employees should be process-driven.

"So it depends how bleeding edge you would like to go. But your developers and upskilling they really need upskilling you're going to have to make sure your actual development processes are in place to make sure there's training available for them to make sure that you have the right people on board that are willing to learn and also make sure you've got the right partners involved." **Participant 6**

Process and systems adherence was another aspect of Organisational Processes that was identified. This involves evaluating the technology's compatibility with existing systems and processes, ensuring it enhances productivity and reduces redundancies. Streamlining workflows and automating routine tasks can significantly improve efficiency. The narratives below demonstrate the participants' sentiments on maintaining consistency with existing processes and systems.

> *"*Organisation X *follows quite a stringent solution architecture process, whereby when the projects get ideated, and they go through feasibility, already, at that point, your solution architects**."*** **Participant 6**
>
> *"So they will bring that deep technical expertise; you still need your people that have got institutional knowledge of your products, your environment, your processes, your culture, and equip them the best possible chance of success. Just because it's a new technology doesn't mean it's going to happen automatically."* **Participant 9**
>
> *"So you get benefits in terms of how you get to roll out some of the applications that you already have. Right? So it speeds up the processes that you already have in place. So some of the things become a bit more efficient**."*** **Participant 2**
>
> *"…you've got to have I think it's on a case-by-case basis. You've got to look at what the technology is and you've got to then see how you can fit it into your into your processes."* **Participant 8**

4.3.2.2 Implementation challenges

When implementing incremental technology innovation, organisations often face significant challenges. Leadership measuring the delivery cost for the new technology introduces time constraints, which usually creates pressure to speed the process, alleviating the time for upskilling. Resistance from employees

accustomed to existing processes can interfere with delivery timelines. Integrating new technology with legacy systems poses its own challenges as these systems are deeply embedded in Organisation X's operations, making it costly and time-consuming to replace.

Introducing any new technology within tight timelines inevitably presents several implementation challenges. One such challenge is that some employees may need help to adapt to the rapid changes, leading to resistance and disruptions in workflow. Tight deadlines can also impact the implementation of comprehensive training programs, leaving users unprepared to fully exploit the potential of the new technology, as expressed by Participant 2.

> *“Our space is a bit rapid and to be agile, so sometimes it doesn't afford you that opportunity to understand that entire technology and get enough time to get the implementation right and ensure that things are working.”*
> **Participant 2**

Participant 10 agreed with this sentiment as described in her narrative below:

> *"Even if it's on a new tech stack, you don't give the guys or the team or anyone the luxury actually to build it the way it's supposed to work."*
> **Participant 10**

The participants emphasised the significance of Change Management support in integrating new incremental technology within Organisation X. A frequent challenge is employees' resistance to change, as they may need to be more receptive to embracing new technology or adapting to revised workflows.

Below are extractions of some of the key narratives around this sub-theme.

> *“...the incremental approach is key, right. You know, this has to follow the key principles of a change management process or change process. And*

I think that you know, those there's, there's many tried and tested principles of the change management process." **Participant 11**

"So I think if you look at it, if you compartmentalize that into two units like that, the biggest challenge one is change management. It's tough to manage that change from a people perspective and from a process perspective. So difficult in the sense you have to if you don't have the competency, you have to build a competency." **Participant 10**

The absence of effective communication and engagement strategies may lead to a lack of commitment from key stakeholders, resulting in confusion and frustration. Additionally, aligning the organisational culture and values with technological changes can be challenging and require substantial time and resources, as indicated by the participants' responses below.

"We've had a recent you call it development strategy that was implemented and Veda and I think the change management was key to bringing the developers and not just the developers, the whole delivery team, you know, starting with management and rolling that down all the way. So that permeates through the whole team. So yeah, I think change management is probably one of the most important interventions that I've seen or observed." **Participant 3**

Resistance, misalignment, and communication gaps underline the critical need for comprehensive change management strategies that proactively address these nuances, ensuring a smoother transition and maximising the benefits of the adoption of the new technology. Participants 7 and Participant 10, respectively, believe it's a challenging journey and key for transformational project work.

"And then you also face the challenge with managing the change, I think people are generally nervous when it comes to things that they that I knew, and you know, like it's just the fear of unknown who am I gonna be

able to understand this new thing? But yeah, I think it's a journey. It's a challenging journey". **Participant 7**

"So now they need to get used to the new system. So it's also the change management from their side. So I think that that coordination between all the different business divisions driven by a central team, combined with the change management that needs to happen to whoever you are delivering this piece of work. That process is very important if you're looking at like very transformational, large piece of innovative things." **Participant 10**

Decommissioning legacy technology while introducing new technology in an organisation can present implementation challenges. Legacy systems often contain critical data, key business rules and processes that must be seamlessly migrated. This risks data loss or corruption if the migration is not executed carefully. Participants 6 and participant 7 shared their views as follows.

"The more challenges you're going to face in terms of legacy assistance and just trying to fit the new advanced technology with the old technology proves to be very challenging." **Participant 7**

"I mean, over my 10 years I've seen a lot of products actually get decommissioned. But the reality is the code is still in the codebase. The tables are still in the database. And it's because of that monolithic traditional architecture that you sit with a situation where product innovation happens, but the tech stays behind." **Participant 6**

Organisation X has a complex technology landscape, as iterated by **Participant 10**: *"...but implementing something new when you have an intertwined, complex wall of gunk application systems"*.

A complex technology landscape leads to the emergence of dependencies between new and old technologies, with a high degree of compatibility being

essential to effectively manage the organisation's operations, which are deeply entwined within interconnected systems. Participant 7 offers her perspective on this necessity for compatibility.

> *“So I think them the older IT company is, the more the more challenges you're going to face in terms of legacy assistance and just trying to fit just to try to get the new advanced technology to play nice with the old technology proves to be very challenging, and it takes a while for you to actually adopt this new technology, but it's doable.”* **Participant 7**

Introducing new technology may result in removing existing functionality, leading to resistance from employees who are reluctant to abandon their familiar tools. This additional complexity can complicate the decommissioning process.

> *“Disadvantage of putting in new technologies is that you potentially remove some functionality that the business was quite used to..."* **Participant 3**

Other complexities include budgetary constraints, time pressures and the need to ensure business continuity during the transition.

> *“But if you were looking at it on a run to run comparison between the old tech and the new tech, you'll just see a huge difference in some of them were the new tech seems to look to be more expensive. But when you look at the overall benefits, then that's where they would understand that as much as the new tech is expensive, but in the overall is what will keep us in the game. So let's go keep us innovating.”* **Participant 4**

The following extract was taken from the response of a C-suite participant who stressed his concern that as much as Organisation X has been eager to implement new technologies, it is equally important to ensure that Organisation X sunsets the old technologies to realise the benefits of innovation and reduce costs.

“…. a lot of people think that sunsetting a technology it implies, like watching a sunset, just sit there and the sun's gonna go down and then it happens. But now when it comes to technology, you have to take you need to take action to get out of it. Like you got to, you got to remove redundant code because otherwise their code needs to be maintained or regression. That means that if there's a technical upgrade that needs to be enhanced, so in the case of technology, sunsetting is an active task. It's not a passive task. And yeah, you need to plan for that. It's like it's, it's, and that's way less sexy than implementing the new technology sometimes so people tend to get distracted. With focusing on the new and not realizing the benefit of decommissioning the old.” **Participant 9**

Successful decommissioning necessitates comprehensive planning, thorough testing and clear communication to mitigate these challenges and ensure a smooth shift from legacy systems to new technology. Over time, this will ensure that Organisation X realises incremental technology innovation's full potential and benefits.

Participant 9 further shares his views on the decommissioning of legacy systems.

“So I'd like to think that's one example of where adoption of a new technology is actually aided in environment. But I don't know whether the way that we used to do it has been efficiently decommissioned to maintain that we've truly got the agility that we wanted out of that.” **Participant 9**

4.3.2.3 Knowledge sharing and collaboration

Knowledge sharing and collaboration while implementing incremental technology innovation in an organisation is critical in creating an environment that promotes open communication and teamwork. This can be achieved by establishing clear communication channels, such as regular meetings, collaborative platforms, or internal networks where employees can exchange ideas and updates about the new technology. Training sessions and workshops can be organised to ensure

all employees are up to date with the latest technology and understand its benefits and applications. Cross-departmental teams can be formed to enhance collaboration, bringing together diverse perspectives and expertise. Collaboration among cross-functional teams is essential for successfully delivering technology projects in large organisations.

To enhance knowledge-sharing when introducing new technology, Organisation X utilises a flexible approach as per Participant 2's response: *"There are different mechanisms that are used...ensuring that there's sufficient training for the employees that would be working on the new technology implementations."*

Organisation X has a well-established collaboration that facilitates information exchange, document repositories and discussion forums. Leveraging these learning tools encourages peer-to-peer knowledge transfer. The extracts below share some of these platforms being driven within Organisation X.

> *"So I think that consistency can be achieved through forums, you know, forums of what we're doing what's happening, and I know it's happening in their business. As an example, we know that this year was to have CIO forums where they showcase what's going on and what technology they're adopting."* **Participant 7**

> *"There is some merit, in making it part of a common dialogue? Yeah, like user groups, discussion forums, book clubs, like all of those kinds of things. Where you people need lots of reinforcement to change. And then often the best way of doing that is to actually make it part of a social experience."* **Participant 9**

> *"I've recently started running the AI forum, you know, just trying to impart some of the knowledge I have the, you know, on the team, just getting some discussions going."* **Participant 6**

Participant 6 highlights the importance of collaboration given that Organisation X is part of a shared platform and a federated architecture model. Collaboration amongst business units is essential to obtain a diverse perspective and expertise for successfully delivering technology projects in a large organisation.

> *"So firstly, you learn there you get an idea of what other business units are doing. If you're on the right track, bounce ideas, get some help. So that collaboration is absolutely critical. You need your allies internally, especially when it comes to technology choices. And that's really where you need to collaborate, because the business units use different pieces of technology. And if you're not collaborating, and you're not aware of what these other business units are doing and how that ties into your own business unit strategy or the group's strategy, you really are going to be isolated and you are going to, to miss you know quite a few things."* **Participant 6**

Intentional collaboration involves a deliberate effort by individuals, teams, or organisations to work together in a coordinated manner to achieve specific objectives. Without such collaboration, knowledge and expertise may remain siloed, hindering sharing best practices or lessons learned. All participants agreed that collaboration is crucial, and some shared their experiences where a lack of intentional collaboration posed challenges. These challenges included technology misalignment, technical project delays and creation of business unit silos.

> *"…that collaboration is absolutely critical. You need your allies internally, especially when it comes to technology choices. And that's really where you need to collaborate, because the business units use different pieces of technology."* **Participant 6**

> *"It's easy to communicate it and it makes sense. And it sounds like it should work. But I think when it actually went down to the ground, it*

became very difficult in a way to actually get a lot of the things that you needed or to have sight of what's actually going on. What ended up happening was it almost created silos of teams that don't really know who must communicate with who." **Participant 1**

"I think collaboration is 100% necessary for introducing new technology. Only a handful of people will know how it's been implemented. So you need collaboration between different teams to actually understand why things are happening the way they're happening. So yeah, it's, you know, it's really non-negotiable." **Participant 8**

Participant 11 shared her view, adding that the collaboration on initiatives when contracting houses are involved appears superficial and, therefore, requires special attention for Organisation X.

"We didn't solve for our contracting employees. Even though we worked with the contracting houses. We didn't get what they were truly feeling. So I'd say that we were collaborating superficially. It wasn't genuine. It wasn't genuine collaboration. And I suspect it's because of the failed communication in the early days, you know, in the early days of decision making," **Participant 11**

The absence of clear communication and coordination among teams and stakeholders often highlighted strategic misalignment and conflicting efforts, leading to technical project delays and inefficiencies, as Participant 6 and Participant 7 describe.

"And that's really where you need to collaborate, because the business units use different pieces of technology. And if you're not collaborating, and you're not aware of what these other business units are doing, you know, and how that tie into your own business unit strategy or the group's strategy, you really are going to be isolated and you are going to, to miss you know quite a few things." **Participant 6**

“I think the collaboration, it's there. It's not perfect. Every time you we get a different product. How is this different? It's a whole different experience. I mean, you know, some of the challenges that we have it's always I think everyone has their own way of working and when you now have to work they bring it into this space and or bring it and then sometimes there's conflict sometimes we find each other along the way.” **Participant 7**

4.3.3 Leadership in technology innovation

Essentially leaders should promote a culture of continuous learning by staying informed on the latest technological trends and industry best practices. This will encourage their teams to do the same. Effective communication is essential for leaders to communicate the vision and benefits of innovation to all business and technical stakeholders. Leaders must encourage a collaborative environment where feedback is valued, creating a sense of ownership and inclusiveness amongst team members.

4.3.3.1 Leadership's continuous improvement

Leadership must ensure inclusive decision-making during the implementation of technology innovation by actively involving team members during the evaluation and selection process. This includes seeking perspectives from employees across different departments and levels of experience to ensure a wide range of views are covered. Leadership should create a safe and open environment where all team members feel comfortable expressing their ideas and concerns. The decision-making processes must allow for transparent communication, which helps build trust and understanding among the team.

The participants reiterated the need and benefits of creating a culture of inclusiveness when evaluating and implementing new technology.

"…*mostly transformational because you want to empower people you want people to feel like it's there. It's their thing, you want the ownership from the community in the organisation, you know, so I don't think you necessarily have to be, it should be transactional all the time you want it to be I don't know. I think it's just makes it easier for adoption when people get a great excitement and the culture is right for it creates a culture of inclusiveness, and people feel a little bit of ownership and accountability,"* **Participant 7**

"...leadership has to be the I keep the head on the block. Leadership has to be held accountable, and sometimes higher leadership, right. So if we are doing this, it's your leadership layer that has to have that investment in and not just leave it to the implementation teams." **Participant 11**

Participants 7 and 11 continued to express their views on leadership's decision-making approach within Organisation X, suggesting that decision-making should be an inclusive process with employees representing various levels.

"...to bring key decision makers and employee to almost the implementation level and decision making level as one. It's like, you know, you wanted the people playing with the toys that the people that want to be part of the decision to buy the toy, I would think would be a toy that's broken up and thrown in the in the toy box." **Participant 11**

"I think for me, the adaptable and you're more likely to get people to adapt to this new thing that they have built because they have some ownership as well and they were part of it from this from scratch." **Participant 7**

"...to sort of do that in a more collaborative manner, again, because we can't implement such in isolation and then just expect everyone to just

jump in. So it is an essential aspect I think, to ensure that we are more sort of inclusive in the way we do stuff. We don't work in isolation, because at the end of the day, it's going to impact I think everyone within the space," **Participant 4**

The questionnaire explored the role of leadership and the leadership styles that support incremental technology innovation. Based on the responses from the participants, there was consensus that a hybrid leadership approach was more effective in leading change, people, and innovation.

"So, it will have to be a mixture, right. In my view, a small of a mixture of the type of leadership you bring in the initially, it looks to be a transactional because you know, like, as an organisation, we want to go to a certain direction. And then in this in this specific instance here, what we had done is to give the guys an opportunity" **Participant 4**

"…it's not an easy answer to say this management style is better I think it's a mixture of hybrid depending on the culture and people's personalities and skill sets." **Participant 5**

Participants also agreed that the leadership style should be situational and will depend on many factors that Organisation X is trying to solve at a point in time. Below are further insights from participants concurring that taking the best of transformation and transactional leadership styles is key to leading innovation.

"…in my opinion, put that in it is probably a bit of a hybrid situation, but I would do throw in a situation or leadership into that and the reason I, I say that as well as there's peaks and troughs of when you know, you're dreading it to push the new tech and when you potentially need to, maybe

back off and focus on something else, but it has to be transformational." **Participant 6**

"In my opinion, I think you do need a little bit of both, right? So but mostly transformational because you want to empower people you want people to feel like it's there. It's their thing, you want the ownership from the community in the in the organisation, you know, so I don't think you necessarily have to be, it should be transactional all the time you want it to be I don't know. I think it's just makes it easier for adoption when people get a great excitement and the culture is right for it creates a culture of inclusiveness." **Participant 7**

"…you need to hold the team together towards a shared vision and keep on inspiring them and you know backing them when the chips are down. So I might pick would be a combination of transactional and transformational." **Participant 10**

4.3.4 Efficient technology implementation

When implementing incremental technology innovation, an organisation should consider various efficiencies to maximise the benefits of the process. Innovation must align with the organisation's strategic goals to ensure it adds value and drives a competitive advantage.

4.3.4.1 Innovation efficiencies

The product development areas should focus on user-centric design to enhance adoption and ensure that the technology meets actual needs and is user-friendly. Implement agile methodologies to expedite development and responsiveness to feedback, enabling quicker adjustments and improvements. Collaborate with external partners and industry experts, to gain additional insights and expertise.

Regular review and delivery process refinement will eliminate redundancies and streamline workflows.

By adopting a culture of innovation and encouraging cross-functional collaboration, Organisation X has identified areas in their product development process that can benefit from technological advancements. Agile methodologies and DevOps practices can streamline product development, enabling quicker iterations and faster time-to-market. The below response from the participant describes some of the practices around product delivery in Organisation X.

> *"…new technology doesn't come in thick and fast unless there's a severe new use case for it or our technology is actually outdated that are the issues that we used to face where when the, when somebody else does something new, then we tend to come in, there's no actual like, prior to this. Before joining DevOps, there was no actual innovation."* **Participant 12**

> *"…think it's a good thing for the space. It's nice to keep track of what's happening because as you know what more updates comes in better stability, better features, and a way to progress much faster to a common goal."* **Participant 12**

> *"So the efficiency with which we can roll out products into the market is one of the key objectives of innovations like this in* Organisation X*. At least no one to generalise and save big corporates, but in reality, at least that's what I've seen. So the whole SDLC cycle actually reduces if you have a very efficient system that you have built. Then it reduces your development time it reduces your testing cycle because you the system you have built an engine"* **Participant 10**

The participants shared some of their views that validates staying well-informed with emerging technologies and industry best practices ensures that Organisation X remains adaptable and open to integrating innovative solutions that can

optimise their product delivery processes, enhance quality, and ultimately meet customer demands more effectively.

> *“In one department in order to deliver a feature out to the public. The cost to deliver the feature was more than what was feasible. And in order to actually deliver that feature. They realize that a new technology stack was required to deliver the solution faster.”* **Participant 5**

> *"Speed to market is a major advantage, allowing quicker trials, faster development, and the ability to fail and decommission products without a massive technological investment."* **Participant 6**

> *“…our ability not to just develop faster, but it was our ability to change faster in the organisation like prior to bringing on the likes of flutter, we had the clunky or we have it so do I have the clunky, mobile technology stack?”* **Participant 11**

Under the environmental factors the research study explored some of the agile principles within Organisation X. A proof of concept (PoC) strategy was highlighted as a popular theme to improve innovation and efficiency across all the participants in the study. The participants expressed their belief that implementing a defined PoC strategy can substantially benefit Organisation X, seeking to incorporate incremental technology innovations. Proof of concept serves as a validation step before full-scale adoption, helping organisations assess the new technology's feasibility, functionality, and potential impact without committing extensive resources upfront.

> *“I do think it's, it's so difficult because in a big team and in an environment like* Organisation X *is in a rapid is just, it is challenging. But I think doing more, more POCs or more tests, you know, test learn and adapt. I think that's, that's really critical at a micro level in a per team and you know, and trying to affect that then across more teams, you know, so in the*

environment, you can create that way the team can innovate, rather than wanting to innovate the cross." **Participant 3**

"…think at the decision making phase, right, which is POC at the end of POC and you know, we decided right to going I think they fairly knowledgeable, they get it. I don't think that he defined what we I don't think our definition of done for POCs is here to work. Okay, it definitely needs work plus the POCs that were done on flat out. I mean, we got once again doesn't like RPA definition of Done POC wasn't production process." **Participant 11**

"I mean, this case can be catered for in the POC or you know, upfront POCs and things like that. But implementing something new when you have an intertwined, complex wall of 'gunk' application systems, by putting your architects in there or your most experienced people on the application it will take away it'll probably, you know, solve for a lot of that." **Participant 11**

"Because then you have the luxury of time as well. But then, if it's a, you have a specific deadline and you have to deliver, I wouldn't necessarily say something like that should be pulled into a new technology or even the POC has already done because I mean, at that point, with the current team, it seems like it's a POC in a way because they haven't necessarily worked on that." **Participant 2**

By conducting PoCs, Organisation X can mitigate risks, refine their implementation plans, and make informed decisions based on tangible results. This approach encourages a culture of experimentation and learning, allowing Organisation X to identify optimal solutions, reduce implementation costs and accelerate time-to-market for new technologies.

"So you would divide a specific feature and introduce that technology to a tiny part of the business a very small part feature of the feature just so

that you can it gives you enough time to play around with the technology do POCs so for example, if we needed to introduce a new technology for a product." **Participant 5**

"…it takes a bit of time, but I think that if I mean the POC is done properly, in a proper way and you've detailed all the necessary processes and pathways that you'd need to follow, then it makes it a bit easier." **Participant 2**

"So we would be the one doing the research, optimising applications, making sure it's coming right, looking at the latest tech that's coming and see if we can work in our system. Do POCs that's what you do on the general basis." **Participant 12**

4.3.4.2 Risk of external dependencies

The study extracted participants' insights on minimising the risks of external dependencies. Organisation X's Systems area comprises approximately seventy-five percent of contingent workers and external experts, contrasting with twenty-five percent permanent employees. To minimise the risk of external dependencies when implementing incremental technology innovation, Organisation X should prioritise practical skills transfer within its workforce.

"I think that's probably the most important way to use an external implementer effectively is do they have the skill that can augment your team and ensure that the skills transfer happens, post the implementation that they don't just, you know, dump you with a new system and you need to figure it out." **Participant 3**

By encouraging internal expertise and promoting a culture of continuous learning, Organisation X can enhance their self-sufficiency, reduce external dependencies, and ensure a smoother and more sustainable transition to new technology innovations.

> *“There's conflict, right? Because you are the experts and I'm the worker bee. And you know the perception of you getting paid so much more to do this and I'm getting it makes it very uncomfortable. I think the quicker you have a solid Transition Plan and exit strategy, it makes it easier because the staff themselves feel like this person is not coming to take my job.”* **Participant 11**

This involves identifying key technical skills and knowledge required for the new technology and investing in training and development programs to upskill existing employees. Cross-training and mentorship initiatives can facilitate knowledge transfer among team members, reducing Organisation X’s dependency on external experts.

> *“You want to then get your team involved so that we can absorb a lot of that knowledge and involving the external partners is mainly in those like teething stages, as well. But you still need to have a like the right strategy to say how do I upskill my people so that I don't necessarily have to be making an external call every time I've got problems. I think that's like one thing that we have to watch closely.”* **Participant 4**

> *“I'm digressing slightly there. But it's just an important factor on it's critical to get these vendors. It's critical to get external support, but you need to make sure you line yourself up correctly, that in a year's time from now that vendor isn't the only person who can support your environment.”* **Participant 6**

Participant 6 reiterated the importance of ensuring that knowledge retention is pertinent when utilising external expertise to implement technology innovation in Organisation X.

> *“So it's that fine line between getting that external team in but keeping that knowledge in the house, you don't want to have them come in each time*

there's a little thing and you have to pay them astronomical amounts of money to make a small configuration change." **Participant 6**

"*And the other risks, I would say is probably relying way too much on that third party to help you implement this. So, you would need to really have someone you know, sort of shadow the implementation at all times to make sure that you don't lose that knowledge when that third party is no longer involved in the process."* **Participant 8**

4.4 Linking the findings with the objectives of the study and theoretical framework

For ease of reference, the table below demonstrates a summary view of research objectives and sub-objectives as well as their relationship to the research themes that resulted from the study. The themes identified from the data analysis were interdependent as the framework considered the key elements and their interplay that support the implementation of new technology.

Research Objective	**Research Sub-objective**	**TOE Framework mapping** **T –Technological** **O – Organisational** **E – Environmental**	**Themes**
To explore the technological, organisational, and environmental factors influencing the adoption of incremental technological implementation in a South African organisation.	To explore the role of organisational culture when implementing new technological innovations	Organisational	Innovative Culture
		Organisational / Environmental	Organisational Sustainability
	To explore organisational processes and efficiencies around employee involvement, skills and communication	Technological / Organisational	Process integration
		Technological / Organisational	Implementation Challenges

	when implementing new technological innovations	Organisational	Knowledge Sharing and Collaboration
		Technological/ Organisational / Environmental	Innovation Efficiencies
		Environmental	Risk of external Dependencies
	To understand the role of organisational leadership styles in the adoption and implementation of new technological innovation	Organisational	Leadership's Continuous Improvement

Table 4-2 Linking findings to Objectives

4.5 Conclusion of findings

In conclusion, the aspects of technological, organisational, and environmental factors when implementing incremental technology innovations in Organisation X were explored by this research study. The thematic data analysis has provided interesting findings and valuable insights that justify the complex nature of implementing incremental technology innovation.

Innovative culture as a theme indicates that a productive environment that encourages continuous learning and change is essential for success. Factors such as adaptability and speed to market emerged under Organisational sustainability as key areas for improvement. This highlights the need for strategies that ensure long-term capabilities amidst innovation. The themes of process integration and implementation challenges are closely connected, with the former being critical for smooth transitions and process adherence and the latter requiring strategic oversight to overcome and manage.

Knowledge sharing and collaboration also stood out as important enablers of innovation, suggesting that information dissemination is key for effective implementation. Innovation efficiencies highlight the necessity of optimising resources and processes to maximise the value of new technologies. The risk of external dependencies was identified as a potential blocker, pointing out the importance of strategic partnerships. Lastly, the leadership's continuous improvement theme pointed to leaders' dynamic role in navigating their organisations through the ups and downs of technological change.

5 DISCUSSION OF FINDINGS

5.1 Introduction

This chapter is a discussion of the key findings presented in the previous chapter in relation to the research objectives that were explored by this study, namely:

- To explore the technological, organisational, and environmental factors that influence the adoption of incremental technological implementation in a South African organisation.
- To understand the role of organisational leadership styles in the adoption and implementation of new technological innovation
- To explore organisational processes and efficiencies around employee involvement, skills and communication when implementing new technological innovations

The study's main contribution is providing practical recommendations for real-world challenges experienced by Organisation X. The research questionnaire was guided by the Technological, Organisational and Environmental (TOE) framework, which explored factors under each area. The themes identified from the data analysis were interdependent as the framework considered the key elements and their relationship that support the implementation of new technology.

Incremental technological innovation requires intentional and significant actions driving considerable change to services, products, or operational processes. It extends from incremental improvements to radical disruptions, each contributing to any organisation's overall growth and sustainability (Dieffenbacher, 2023). To address these factors, the conceptual framework derived by (Fleischer & Tornatzky, 1990) was utilised to consider the elements of the technological-organisational-environmental contexts. These contexts influence the approach

and processes through which an organisation embraces and executes technological innovation (Larsen & Eargle, 2015). As per the discussion of findings below, it is evident that as mandated in the literature review, the three contexts defined by the theoretical framework are undoubtedly interdependent and introduce complex relationships (Borg, 2020).

5.2 Role of organisational culture

This section discusses the insights identified with themes related to the organisational culture for Organisation X. In today's rapidly evolving technological landscape, it is crucial to consider the organisation's internal elements as a fundamental aspect of both innovation and sustainability (Gursoy & Swanger, 2006). The themes of innovative culture and organisational sustainability overlap the organisational and environmental contexts per the literature reviewed. The organisational context refers to the organisation's characteristics and includes resources available to support innovation acceptance and communication processes (Baker, 2011). The environmental context refers to the availability of a supportive technology infrastructure, including skilled labour and technology service providers who are essential to support and encourage innovation (Baker, 2011).

5.2.1 Innovative Culture

The result of the study indicates that promoting collaboration across different teams and functional areas embraces diverse viewpoints that can yield creative solutions with fresh perspectives. Allocating time and resources to problem-solve for innovation in the form of innovation hubs or opportunities for employees to dedicate time to personal projects will enhance their creative thinking. Adopting this approach will allow Organisation X to drive the creation of new solutions or optimise existing ones by applying scientific, engineering and technical knowledge (Dieffenbacher, 2023). From the insights analysed, participants

implied that problem-solving for any innovation must align with the organisation's mission and values with defined success criteria and specific outcomes. This aligns with Dieffenbacher (2023), who states that evaluating innovation initiatives' effectiveness is important and a key component of the assessment process.

As per the study results, participants believe that Organisation X must champion an inclusive and open environment to create a foundation for a learning culture. A learning culture empowers employees to spontaneously share ideas, be creative and not be afraid of failure when taking risks during the integration of incremental technological implementation (Patterson, 2006). This is further supported by literature from (Alshwayat et al., 2022), that by emphasising engaging employees and encouraging effective communication, organisations ignite innovation and promote a culture that consistently seeks improvement will provide a successful outcome for the new technology implementation.

5.2.2 Organisational sustainability

A sustainable organisation demonstrates agility, innovates at speed, and is committed to driving operational efficiencies. Strategically balancing innovation with core business stability is required to maintain long-term organisational sustainability. As per the research findings, Organisation X must ensure adaptability and implement agile, valuable processes.

Organisational agility is the ability of Organisation X to be agile and adaptable while implementing internal innovation and cooperating with external partners will guarantee its competitive advantage in a dynamic marketplace (Delaney & D'Agostino, 2015). An agile organisation is characterised by its quick response to unforeseen market circumstances, including new competitors, advancements in technology, and unexpected changes in the market landscape. As per the literature, a highly dynamic environment is recognised by frequent and rapid changes, making it challenging for competing organisations to predict future conditions and devise sustainable strategies against Organisation X (SIMERLY

& LI, 2000). However, there are challenges for Organisation X due to dependencies across other business areas. This business would need to oblige to move at the same pace to support Organisation X to improve its organisational agility.

Simplifying the process of making decisions and prioritising customer needs ensures that innovations meet market demands and reduce the time required for enhancements. As per the participant's sentiments, the incremental implementations of cutting-edge technologies and automation can accelerate the processes of development, testing and rollout, thereby improving Organisation X's speed to market. As per the literature, since Organisation X is aiming for rapid market growth, it must promote the best agile practices to speed up development time and ability to effectively trial enhancements (Delaney & D'Agostino, 2015). Further literature references technology innovation as the capability to forecast market shifts and react to emerging technological developments (Dieffenbacher, 2023).

Incremental innovation includes adding new features or improvements to existing products, renovating user interface designs, refining processes and reducing operational costs (Mitzkus, 2022). When an organisation like Organisation X embarks on such an innovation journey, several operational activities must be evaluated to ensure operational efficiencies and sustainability. Participants agreed that the primary requirement for introducing new technology was the ability to provide continuous systems support. Effective resource management, including budget allocation, is critical to maintaining a balance between innovation and ongoing operations. The literature confirmed that streamlining operational processes through automation and extending existing support processes when integrating the new technologies can significantly reduce operations time and expenditure, enhancing productivity (Mitzkus, 2022).

5.3 Role of organisational processes and efficiencies

This objective was distributed across all three contexts covered by the conceptual framework that guided this research study. The insights derived from the research surfaced multiple themes that were aligned to this objective. These themes include process integration, implementation challenges, knowledge sharing and collaboration, innovation efficiencies and risks of external dependencies.

5.3.1 Process integration

The literature states that ensuring employees who are going to utilise the new technology are involved and ready to operate it is essential (Larson, 2020). The results of the study highlighted the value of driving a thorough understanding of technology improvements, tools, and trends to employees in Organisation X. Being aware and knowledgeable about technology is key in closing the digital gap and enabling organisations to face the complexities of the digital era optimistically. Organisation X effectively drives this awareness with the support of the Change management team.

The research literature stressed the importance of training and enhancing the skills of employees to fully leverage the capabilities of the new technology and facilitate a seamless incremental implementation (Ciarli, 2021). The participants agreed that it is necessary to assess the skill levels of employees during the implementation process to identify any knowledge deficiencies. This assessment, according to (Ciarli, 2021), will provide valuable information for the organisation to develop and customise training initiatives aimed at closing the identified skills gap. Also uncovered in the study were the concerns emphasised by participants around the challenges experienced by employees to secure sufficient capacity for training and skills development due to ongoing project commitments and time constraints. Conversely, while exploring the theme of training and upskilling, participants revealed a fascinating insight, which appeared to be a lack of

eagerness from certain employees when it came to developing skills in a particular technological or subject matter area. This reluctance was despite Organisation X's drive and investment in training resources to ensure employee upskilling. Organisation X should be more rigid in enforcing its mandatory training policy to ensure that employees who will be working with the new technology are engaged and prepared to use it (Larson, 2020). This drive will guarantee employee confidence and reduce resistance to change around the latest technology (Ciarli, 2021).

Another key theme identified within Organisational Processes was the adherence to processes and systems. This involves understanding how compatible the new technology will be with the existing systems and processes, with a focus on optimising productivity and minimising redundancy (Mitzkus, 2022). According to (Rogers, 2003, p. 15), compatibility is defined as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters". Participants highlighted the importance of aligning the new technology with the existing processes and systems to ensure compatibility. They further agreed that Organisation X adopts stringent processes to ensure the streamlining of workflows and automation of repetitive tasks to improve efficiency continuously.

5.3.2 Implementation challenges

Throughout the study, the theme of tight timelines consistently surfaced among the participants. This is due to Organisation X's innovative market positioning and the goal to deliver as the first in the market. Being a deadline-driven organisation can hinder employee growth and productivity (Ciarli, 2021) literature interpretation.

Effective change management finds potential barriers to change. Formulating and enhancing the change management plan on a case by case base, as explained by (Forbes, 2022), with processes that can overcome barriers to

change and ensure a seamless transition (Ciarli, 2021) is critical for Organisation X. Employees' resistance to change is a common challenge which makes it critical to secure stakeholder support and proactively address their concerns, as stakeholders play a significant role in determining the success of implementing innovation throughout Organisation X (Mazzetti & Schaufeli, 2022). Organisation X must convey the advantages of technological innovation loud and clearly to reassure employees that it is not a threat to their job security and curb the fear of the unknown (Tabrizi, 2019).

Decommissioning of legacy systems was a common theme highlighted by participants but was not explored as part of the literature review. When introducing new technology in an organisation, decommissioning legacy systems can pose significant challenges and require a deliberate strategy, which Organisation X does not currently have in place. As shared by participants, Organisation X's legacy landscape is growing, and the abrupt discontinuation of legacy systems is not feasible as it could disrupt daily business activities (Bakar et al., 2020). Legacy systems typically hold critical data, fundamental business rules and processes that must be smoothly migrated. Incremental technology implementation is a way to modernise these legacy systems to align with industry changes and enhance organisational competitiveness (Bakar et al., 2020). There is a risk of losing or corrupting data if the migration is not managed accurately. A complex technical environment creates interdependencies between the new and old technologies.

5.3.3 Knowledge sharing and collaboration

During the implementation of incremental technology innovation, encouraging an environment of knowledge sharing is crucial for any organisation (Lin et al., 2015). As per the findings in the study, Organisation X promotes knowledge sharing through multiple mechanisms of information exchange. These mechanisms include regular meetings, online collaboration platforms, and internal

communication networks where employees can share thoughts and information about new technology within Organisation X. Another important factor that supports information sharing is trust. Trust is built over time as team members interact more and more with each other and share their growing knowledge and expertise through these various information exchange mechanisms (Lin et al., 2015).

Successful collaboration requires a deliberate and coordinated effort from individuals, teams or entire organisations to work together towards a defined innovation goal (Alshwayat et al., 2022). As confirmed by the research findings, the absence of intentional collaboration and communication in Organisation X risks knowledge and expertise being confined within silos. Communication is essential in reducing uncertainty and increasing employee commitment, ultimately leading to decreased resistance to change (Alshwayat et al., 2022). Participants within the study concurred on the importance of collaboration, with some recollecting experiences where the absence of such collaboration led to misalignment and negative project impacts. The study revealed that due to Organisation X's being part of a federated business model, knowledge sharing, and communication can be a challenge across the group-level organisation. The literature infers that to support technology innovation, setting up cross-functional teams is critical to successful implementation (Lin et al., 2015). Cross-functional collaboration involves formulating a group of individuals at similar levels in the organisational hierarchy to each represent their different business areas when accomplishing a specific objective (Lin et al., 2015). This research finding led to a valuable recommendation on how a federated business model can improve their processes to support information by considering the concepts of a Centre of Excellence.

5.3.4 Innovation efficiencies

Implementing strategies for incremental innovation requires a thoroughly structured plan and is important to integrate and grow existing markets and customers. This approach will depend on a well-established product suite that has a substantial customer base, thereby enhancing the likelihood of successful outcomes (Mitzkus, 2022). In the research study, participants acknowledged that keeping up with emerging technologies and industry standards is important to deliver flexible solutions which will improve Organisation X's product development process. Similarly to the literature, participant responses suggest that technology innovation equals product innovation (Scherer, 2001). By investing in incremental innovation, Organisation X can support and refine the product development process which leads to quicker delivery and market launch.

The requirement for Organisation X to establish a formal strategy around Proof of Concept (PoC) was a prevalent theme uncovered in the research. Participants affirmed that adopting a well-defined PoC strategy could yield considerable advantages for the organisation when integrating incremental technology innovations. A PoC acts as a preliminary validation phase prior to adoption, enabling organisations to evaluate the practicality, effectiveness and potentially the impact of new technologies without substantial initial investment. Through executing PoCs, organisations can minimise risks, enhance their implementation strategies and base their decisions on real-world outcomes. This method encourages experimentation and learning, helps the organisation to identify the appropriate solutions, reduces the costs associated with implementation, and speeds up the introduction of innovative technologies to the market. Due to the exploratory nature of the research study, the thematic analysis revealed this as an unexpected finding. An elaboration of a PoC strategy will follow in the recommendations section of the study.

5.3.5 Risk of external dependencies

Based on Organisation X's resourcing strategy, external expert labour has played a vital role when it comes to driving successful innovation and technological change. The type of innovation, whether product or process-oriented, informs the organisation on the specific skills and qualifications required for innovation (Nesheim & Hunskaar, 2015). Furthermore, in Organisation X's Systems area, which formed the focus of this study, seventy-five percent of its workforce comprises of contingent labour and external specialists. As a result, the innovation process to optimise and enhance products and processes for the market will always be a learning process for Organisation X (Ciarli, 2021), as they rely on and use skills and competencies from the outside environment of the firm (Nesheim & Hunskaar, 2015). The research explored ways to reduce the risk of external dependencies when Organisation X implemented technology innovation, and the insights gathered from participants emphasised the need for effective skills transfer among implementation teams. Focusing on building in-house expertise and promoting a culture of continuous learning will help Organisation X become more self-sufficient and sustainable. A recommendation on how to reduce the risk of external dependencies will be explored further in the next chapter.

5.4 Role leadership styles in technology innovation

Leadership was an overarching theme throughout this research study, as leaders are at the centre of Organisation X when it comes to leading innovation. Kruse (2013) defined leadership as the act of using social influence to maximise the collective efforts of others in pursuit of an objective or goal. Organisational leaders need to drive the regular evaluation and review of the technology innovation during its incremental implementation in order to measure its effectiveness and assess its benefits to the business (Mitzkus, 2022).

5.4.1 Leadership's continuous improvement

Key research findings identified that when it comes to technological innovation, Organisation X's leadership should encourage decision-making that involves active participation from employees in the assessment and selection phases. Participants agreed that leaders in Organisation X should promote an environment where team members can freely share their thoughts and concerns, ensuring psychological safety to avoid restrictive information sharing (Alshwayat et al., 2022). Participants emphasised the advantage of promoting an inclusive culture while evaluating and implementing new technology innovation. Seeking insights from employees from the relevant functional areas with different experience levels provides a broader perspective when making technological choices. Practising transformational leadership characteristics provides a clear vision, motivating and encouraging employee participation when strategic decisions are required to align with Organisation X's objectives (Mazzetti & Schaufeli, 2022).

Transformational leadership is defined by a leader's ability to motivate and inspire their team members to go above and beyond to accomplish exceptional achievements. This style of leadership is associated with initiating favourable transformations within organisations, stimulating development and inspiring creative thinking (Odumeru & Ogbonna, 2013). Transactional leadership is a leadership approach that establishes clear expectations and defined objectives for team members, providing rewards and acknowledgement or implementing corrective measures based on the outcome of those objectives (Odumeru & Ogbonna, 2013). The research participants advocated for a hybrid or situational leadership style that blends elements of transformational leadership and transactional leadership within Organisation X. The consensus is that there is no single approach for leadership, as it is dependent on the specific context and must be adapted to meet the demands of the current situation, similarly highlighted by (Cortellazzo et al., 2019). This adaptable leadership style should inspire and motivate employees towards a shared vision, with aspects of focusing

on organisational efficiencies and standard business operations in the organisation (Kesting et al., 2015).

5.5 Researcher positionality

As the researcher is employed by the organisation being studied, her positionality was naturally connected with her professional role and experiences within Organisation X. Being familiar with the organisation granted her access to information and a deeper level of trust from participants. Having an insider perspective provided a unique understanding of the organisational culture, dynamics, and processes. The researcher acknowledged the need to constantly question how her role and experiences might influence her research choices and the interpretation of data. This position was both an asset and a potential source of bias. The researcher had to actively identify any biases stemming from her positionality to uphold the credibility and integrity of this research study (Creswell & Poth, 2018).

5.6 Conclusion

Based on the research findings and supported by the literature, it is evident that internal factors have a significant influence when implementing incremental technology innovations. Based on the factors selected under the three contexts of the TOE framework, namely Technological, Organisational and Environmental, the study was able to establish valuable insights and identify inefficiencies within Organisation X.

While Organisation X has the capabilities and processes to support the implementation of technology innovation, the study revealed process flaws as well as the absence of standards and processes in critical areas. These areas will require attention and focus to ensure Organisation X realises the benefit of innovation within the business. The study highlighted minor and significant

opportunities for improvement within Organisation X. The summary below elaborates on the areas that were consistently highlighted in the findings and are therefore considered the most relevant and useful for practical recommendations:

- Due to the organisation's federated business model, knowledge sharing and collaboration on specific areas of expertise at the Group level is challenging and requires improvement.
- The absence of a PoC strategy to guide the success measures and outcomes when running technology PoCs can result in poor planning and execution of innovation projects.
- The reliance on external expertise and the high ratio of contingent workers within Organisation X poses a risk to business continuity, knowledge retention and technical support when new technology is introduced.

Focusing on these areas of improvement, the following chapter will offer recommendations that provide impactful outcomes and ensure that Organisation X realises the value of its technology innovation investments.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter summarises the conclusions and recommendations based on the findings of the research objectives that were highlighted in Chapter 1. The recommendations include practical implications that Organisation X can review as well as suggestions for similar future studies conducted. This study sought to understand the internal factors that influenced incremental technological implementation within Organisation X. The discussion of findings identified and summarised insights from the participants of the study and was supported by the literature review. However, due to the openness of the study, unexpected findings were also discussed in the previous chapter. These findings will be expanded on in the recommendations section.

6.2 Conclusion

6.2.1 Role of organisational culture

In today's fast-changing technology environment, it is key for organisations to focus on their internal factors to support innovation and ensure long-term sustainability. The literature highlights a significant connection between a culture of innovation and organisational sustainability, emphasising the importance of both organisational and environmental contexts. These contexts include internal characteristics like resource availability and external factors such as a supportive technological infrastructure with skilled labour.

The study underlines the value of collaboration across different teams and functional areas in sparking creativity. Allowing employees to engage in personal projects or innovation hubs aligned with the organisation's mission and values can lead to the development of new or improved solutions. In addition,

establishing clear success criteria and regularly evaluating the effectiveness of these initiatives is advisable. Establishing an inclusive environment, as seen in Organisation X, is key to driving a learning culture that supports knowledge-sharing, creativity and risk-taking. This is key for the incremental integration of new technologies and for continuous improvement through innovation.

For an organisation to be sustainable, it must balance agility and rapid innovation with operational efficiency and core business stability. Organisation X demonstrates this need for adaptability and agile processes to remain competitive. Organisational agility is measured by a quick response to market changes and technological advancements. However, achieving this agility for Organisation X can be challenging due to interdependencies with other business areas in the federated business model.

In summary, streamlining decision-making processes, focusing on customer needs, and incrementally implementing technologies are considerations that can enhance Organisation X's responsiveness and market growth. Incremental innovation, which includes updating existing products and processes, is key to ensuring operational efficiency. Effective resource management and ongoing system support are required to integrate new technologies, reduce operating time and costs, and enhance productivity. In conclusion, the organisational goals for sustainable innovation and agility require a holistic approach involving internal collaboration, environmental change and continuous learning and improvement.

6.2.2 Role of organisational processes and efficiencies

The evaluation of Organisation X's innovation processes presented this study with a detailed overview of various key aspects influencing their approach to technological change and development. The research identified the critical role of aligning new technologies with existing systems and processes to enhance productivity and reduce redundancies. The findings also highlight the importance

of a well-established suite of products to support and realise the benefits of incremental innovation.

Central to Organisation X's strategy is the upskilling and training of employees on new technologies, highlighting the need for an awareness of technological advancements. Given the challenges in allocating training time and with some employees' reluctance to upskill, the study encourages more stringent training policies to boost employee engagement and reduce resistance to change.

A significant portion of Organisation X's workforce comprises external experts. The study highlights their reliance on external skills for innovation. This workforce configuration requires a continuous learning process, with a focus on promoting knowledge-sharing in the environment and enhancing in-house expertise to mitigate the risks associated with external dependencies.

Effective change management was also a significant theme that revealed from the study. The primary change management focus should be to address employee resistance to change, and the challenges posed by tight delivery timelines due to Organisation X's aim to be a market innovator. The research findings stress the importance of stakeholder involvement and collaboration to secure successful innovation and change management support.

The study indicated challenges in decommissioning legacy systems. The finding proposes a gradual approach to prevent data loss and manage the complexities of integrating new and old technologies. Another vital finding is the need for a defined Proof of Concept (PoC) strategy to assess the feasibility and impact of new technologies. This strategy will aim to reduce risks and guide decision-making based on real-world outcomes.

In conclusion, the study provides an overall view of Organisation X's innovation initiatives, highlighting the need for structured planning, effective change management, employee upskilling, and intentional collaboration to succeed at technological innovation and change.

6.2.3 Role leadership styles in technology innovation

The study identifies leadership as a key influence in driving innovation at Organisation X. Leaders in the organisation play a critical role in utilising social influence to unite individual efforts towards collective goals, especially in the scope of technological innovation. Their responsibility extends to consistently managing the evaluation and review of technological advancements to ensure their effectiveness and benefit to the business.

A significant aspect of leadership in the context of technological innovation is the encouragement of sharing decision-making. Leaders at Organisation X are advised to develop an environment where employees feel safe to share their thoughts and concerns. This psychological safety is necessary for encouraging open and free information exchange. Embracing an inclusive culture, where insights are obtained from employees across diverse functional areas and experience levels, optimising the decision-making process, particularly in technology-related evaluations.

The research underlines the effectiveness of transformational leadership, known for its ability to motivate and inspire team members towards exceptional achievements and promote a culture of creativity and positive change. In contrast, transactional leadership's focus lies in establishing clear goals and expectations with performance-based rewards.

The study advocates for a hybrid or situational leadership approach at Organisation X, blending elements of both transformational and transactional leadership. This adaptable style recognises the need for diverse leadership approaches depending on specific situations and challenges. This aims to inspire and motivate employees towards a shared vision and to maintain a focus on organisational efficiency and standard operations. These characteristics align leadership strategies to meet the dynamic needs of Organisation X.

6.3 Recommendations

The practical recommendations below are based on the outcomes of the study and focus on areas where implementation of these recommendations could be quite impactful for the organisation.

6.3.1 Define a strategy that articulates success measures for Proof of Concepts

To make informed decisions about the future of technology innovations in the business, Organisation X must clearly define and measure the success of Proof of Concept's (PoC's) on a case-by-case basis. Defining the objectives and specific goals will help understand when a PoC is required and what the PoC must aim to prove. The strategy should articulate what success looks like for a technology PoC, with each PoC having an appropriate list of critical success criteria. Measures such as performance metrics, cost savings, scalability and speed of implementation should be considered in addition to qualitative measures such as user experience and ease of integration, the latter being particularly important for technology innovation projects. To ensure that PoC costs are well managed, clear timelines and milestones must also be set and monitored against the budget. By carefully defining and monitoring these aspects, Organisation X can clearly outline and measure the success of PoC, guaranteeing informed decisions about the future of technology innovations for the business.

6.3.2 Setting up Centres of Excellence for innovation

Centres of Excellence (CoE) can function as specialised units created to lead and coordinate areas of innovation excellence by strengthening expertise and resources. Based on the federated structure that Organisation X is placed in, these Coes should be configured to promote cross-functional collaboration and ensure efficient management and deployment of organisational resources for

innovation initiatives. CoEs play a critical role in setting standards, defining best practices, and enhancing employee skills to align with strategic initiatives within the organisation. These centres bring together skilled professionals to form hubs of advanced knowledge and problem-solving capabilities, leading the development and implementation of new technologies and methodologies.

Generally, there are three options to configure CoEs in a large organisation, namely the centralised model, federated model, and hybrid model. Given that Organisation X resides within a larger, diverse organisation, the hybrid CoE model is recommended as it combines elements of both centralised and decentralised approaches to establish expertise where the different units have varying needs and capabilities. The hybrid model deploys an expert from each business unit to represent the central-level CoE. This model provides the right balance between central governance and local autonomy, combining the benefits of both approaches to create a more dynamic, flexible, and effective way of developing and leveraging expertise for Organisation X.

6.3.3 Configuration of innovation project teams

To mitigate risks associated with knowledge sharing and business continuity, this recommendation suggests the strategic move of deploying at least one permanent employee to liaise with external experts in every technology innovation project delivery team. Candidates selected to fulfil this role must be well-versed in Organisation X's culture and processes and must have undertaken the appropriate training. This employee acts as a bridge between the external experts and the internal teams and must be responsible for assimilating the knowledge and information to be retained within Organisation X. Deploying a permanent employee as a knowledge agent and integrator offers a reliable way to mitigate risks related to knowledge sharing and business continuity. This approach not only safeguards critical knowledge within the organisation but also optimises internal capabilities for Organisation X.

6.4 Suggestions for further research

This study focused on the internal factors that influenced incremental technology innovation in a South African organisation. The report focused on the insights that were provided by employees of Organisation X. The employees that participated in the study were a combination of permanent and contingent workers. The below suggestions were elements that were excluded from this study and based on the insights, will be appropriate for further research.

- In terms of research methodology, a future research suggestion would be to use a mixed method research methodology. Combining a quantitative and qualitative research approach would have provided a comprehensive understanding and given the researcher flexibility around the research instrument and nature of the questions.
- In terms of the internal factors, a future research suggestion would be to consider the external factors that influence technological innovation in a South African organisation. Some examples of the external factors would include legislation, competitors, population analytics and social awareness.
- In terms of an internal sample group, a future research suggestion would be to extend insights from other business units sharing the technology architecture. The extended sample group would provide perspectives on the client-consumer interactions to provide richer analysis data.
- In relation to incremental innovation, a future research suggestion would be to consider studying the factors when an organisation chooses to implement a different type of innovation, namely, architectural, radical, or disruptive innovation. The various types of innovation will cover different internal aspects that can be considered in a study, providing further insightful outcomes.

These suggestions to extend a study of this nature will bring valuable insights for Organisation X and expand the practical recommendations offered by this study.

6.5 Limitations of the study

The following limitations of this study were noted:

- This study had limited generalisability as it focused on a specific context with a small number of participants. It emphasises understanding a particular phenomenon rather than statistical representation. The participants were limited to one business unit within Organisation X, a leading South African brand.
- Based on the nature of the study, the researcher and participants' biases can potentially introduce subjectivity. Any preconceived notions or perspectives may influence the data collection and analysis. To overcome this, the researcher needed to be aware of their biases and strive to present a fair interpretation of the findings.
- The study was conducted in Organisation X, where technological innovation decisions are occasionally driven at a group level. The data collection did not include participants at the group level.
- The research required significant time and resource investment, which limited the scale and scope of the study. As a result, some valuable insights may be missed.

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APPENDIX A: PARTICIPANT LIST

No	Interviewee	Role
1	Participant 1	Consultant Specialist Software Developer
2	Participant 2	Quality Assurance Manager
3	Participant 3	Consultant Senior Program Manager
4	Participant 4	Senior Development Manager
5	Participant 5	Senior Systems Architect
6	Participant 6	Head of Systems Architecture
7	Participant 7	Head of Systems Delivery
8	Participant 8	Consultant Senior Developer
9	Participant 9	Chief Operating Officer
10	Participant 10	Development Manager
11	Participant 11	Head of Systems Delivery

12	Participant 12	Senior Software Developer

APPENDIX B: INTERVIEW GUIDE

General:

1. What are your roles and responsibilities in Organisation X?
2. What experience do you have in terms of new technological innovations as a decision-maker, implementer, or user?

Technological

3. What is your view on technological innovations, mainly incremental technological innovations?
4. What do you think are the key benefits of this technology innovation in relation to your role and/or department?
5. What would you say are the advantages and disadvantages around the Organisation X's adoption of this technology innovation compared to current technology utilised?

Organisational

6. Leadership is important to drive technological innovation, in your opinion what type of leadership is required to drive this?
7. What do you believe is leadership's role and view of this new technology innovation in the Organisation X? What have you observed in this regard?
8. How knowledgeable is leadership in terms of the benefits and risks when it comes to deciding on incremental technological innovations?
9. What interventions are utilised to train and upskill employees on this new technology adoption and implementation? How effective have these interventions been?
10. How does Organisation X ensure that this new technology solution is consistent with the company's existing processes, systems, and skills?

11. How effective is the culture of collaboration and communication when technological innovations of this nature are introduced?
12. During the implementation of the incremental technology change, how effective were the communication channels between teams and stakeholders?

Environmental

13. How do we leverage on external expertise to successfully implement this incremental technological innovation?
14. What are the risks associated with external expert dependencies and how can these risks be minimised?
15. How do we manage the challenges which are brought about by rapid change during technological innovation?
16. How do we ensure agility and adaptability to support a dynamic environment?

APPENDIX C: CONSENT FORM

Research Title: The internal factors that influence incremental technological innovation in a South African organisation.

Researcher: Miss Dhiyaksha Gobind

I, ……..……..., agree to participate in this research project. The research has been explained to me, and I understand what my participation will involve. I agree to the following:

(Please circle the appropriate options below).

I agree that my participation will remain anonymous	YES	NO
I agree that the researcher may use anonymous quotes in his / her research report.	YES	NO
I agree that the interview may be audio-recorded	YES	NO
I agree that the information I provide may be used anonymously after this project has ended for academic purposes by other researchers. This is subject to their own ethics clearance being obtained.	YES	NO

…… (signature)

…… (name of participant)

…… (date)

…… (signature)

…… (name of the person seeking consent)

…… (date)

APPENDIX D: PARTICIPANT INFORMATION SHEET

Good day (Insert Name),

I hope this email finds you well.

My name is Dhiyaksha Gobind, and I am a Master of Management of Digital Business student at the University of the Witwatersrand in Johannesburg. As part of my studies, I have undertaken a research project titled “The internal factors that influence incremental technological innovation in a South African organisation”. The goal of this research project is to explore the concept of incremental technological innovation within an organisation while considering the influencing impact of leadership, employees, communication, and skills.

As part of this research, I am inviting you to participate in an interview. During the interview, I will ask questions related to the research title. The interview guide comprises of 4 categories of questions, including general, technological, organisational, and environmental. The maximum duration of the interview will be 60 minutes. With your permission, I would also like to audio record the interview. You will not receive any direct benefits from participating in this research, and there are no disadvantages or penalties for not participating. You have the choice to withdraw at any time or not answer any question if you do not want to. The interview will be confidential, and the information you provide to me will be stored safely and not shared with anyone else. I will be using a pseudonym (anonymous name) to represent your participation.

If you have any questions pertaining to the research study during or after the interview, feel free to contact me or my supervisor at the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,
Dhiyaksha Gobind

Researcher:
Dhiyaksha Gobind
2601598@students.wits.ac.za

Supervisor: Ayanda Magida +27 11 717 3953

APPENDIX E: ETHICS CLEARANCE

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB2601598/339
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below)

Project title	The internal factors that influence incremental technological innovation in a South African organisation
Investigator / Researcher	Miss Dhiyaksha Gobind
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	15/08/2023
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 +27 82 733 6587 pius.oba@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

28 August 2023
Date: