DIGITAL INNOVATION STRATEGY: A FRAMEWORK FOR CREATING BUSINESS VALUE FOR AN AIRLINE ORGANISATION

by

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Dedication

To my beloved mother, Dianne, whose memory shines on every page of this journey. Your spirit is my guide. You are the foundation of my life and the inspiration for this PhD. This work honours your legacy.

May the world learn from you.

Acknowledgements

I want to thank my wife, Ilse, for your support, encouragement, patience, and unwavering love throughout this journey. Without you, this would not have been possible.

To my children, Duandré, Mieke-Aileen and Lana, you are the centre of my world. Thank you for being part of this journey. I always strive to make you proud.

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Finally, I extend my deepest gratitude to my Creator for giving me the strength to persevere through challenging times with unwavering faith. By His grace, I have had the privilege to complete this study. With humility and gratitude, I honour Him.

DIGITAL INNOVATION STRATEGY: A FRAMEWORK FOR CREATING BUSINESS VALUE FOR AN AIRLINE ORGANISATION

Abstract

Digital innovation in the airline industry is a holistic approach that involves leveraging advanced technologies to improve customer service, drive value, and enhance efficiency. As a crucial strategic asset, digital innovation strengthens competitiveness and skills development within airlines. The sector's growing involvement with digital innovation reflects a commitment to experimenting with digital technologies and accelerating their adoption.

However, the swift pace of technological change coupled with the high-costs of implementation and a lack of standardised protocols can often lead to fragmented customer experiences and operational silos. Addressing these challenges requires a focused strategy on integrating new technologies seamlessly with existing systems, ensuring interoperability, and aligning digital transformation with the overall business objectives to create a unified, customer-centric approach.

This interpretive case study collected data from online questionnaires distributed to employees, customers, and suppliers of the airline organisation. The data analysis provided a detailed perspective on the organisation's agility and strategic approaches through diverse stakeholder lenses, revealing key themes that deepen theoretical knowledge. It concluded by connecting these insights to the core elements of a digital innovation strategy, aligning practical observations with the broader goal of strategic digital innovation. In addition, semi-structured interviews were conducted with the airline organisation's executive management team, executive foresight, and experience, which highlighted the practical challenges and opportunities in navigating digital transformation.

This study introduced a layered digital innovation framework within an airline organisation operating in a volatile and rapidly evolving environment that demands an ability to innovate, scale, and revamp the organisational structure persistently to align with a digital innovation strategy. The first surrounding layer addresses factors critical to the core components: a company culture open to change, technological integration for smooth operations, and process efficiencies for scalability.

The second layer presents outcomes such as improved decision-making and operational efficiency through optimised processes and strategic data use, integration of data and systems for better insights, and a culture of continuous digital improvement.
The third layer highlights broader objectives like seamless customer and employee digital experiences, the emergence of new technologies, and overall digital transformation aiming for full integration of digital technology to enhance performance and competitiveness.
The outermost layer represents strategic end goals like streamlined operations and new methodologies such as agile project management, data-driven strategy, and customer-centric product development. This study describes a multi-layered digital innovation strategy model with *People*, *Technology*, and *Process* at its core. These elements are foundational for any digital strategy, focusing on a prepared workforce, technological infrastructure, and efficient methodologies.

Fundamental dynamic capabilities, such as sensing and seizing opportunities, navigating transitions, and transforming operations, are vital in fostering agility and resilience. These capabilities should inform and shape the foundation of a strategy focused on digital innovation, which rests on the interplay of human resources, processes, and technology. In the current fast-paced climate of the airline industry and its competitive market, it's crucial to devise a digital innovation framework that not only identifies but also effectively leverages the right strategic levers. Doing so is essential for extracting maximum business value from digital transformation efforts, ensuring they are well-aligned with the organisation's overarching goals and market demands.

The study makes several significant theoretical contributions. Firstly, it deepens the understanding of digital innovation strategies in the airline industry, providing insights into how these strategies can be effectively developed and implemented. Secondly, it expands the knowledge of organisational agility and strategic alignment in the context of digital transformation, highlighting the critical factors that contribute to successful digital innovation. Lastly, the study provides a detailed theoretical framework that can be applied to similar industries facing rapid technological changes, offering a valuable reference for further research and practical application.

Regarding practical contributions, the study offers actionable insights for airline executives on implementing and scaling digital innovations. It emphasises the importance of integrating new technologies with existing systems to ensure seamless operations and avoid operational

silos. Additionally, the study identifies critical challenges and opportunities in digital transformation, providing practitioners with valuable information to develop effective strategies. This practical guidance can help airline organisations navigate the complexities of digital innovation and achieve their strategic objectives.

Overall, the model advocates for a strategic, layered approach to digital innovation, where each level supports and amplifies the next, culminating in a business that is agile, efficient, and future-ready, thereby delivering substantial business value through enhanced competitive advantage, increased operational efficiency, and accelerated market responsiveness.

Abreviations

AI - Artificial Intelligence

API - Application Programming Interface

AR - Augmented Reality

BI - Business Intelligence

CEO - Chief Executive Officer

CIO - Chief Information Officer

COO - Chief Operating Officer

CRM - Customer Relationship Management

CTO - Chief Technology Officer

ERP - Enterprise Resource Planning

HR - Human Resources

ICT - Information and Communication Technology

IoT - Internet of Things

IT - Information Technology

KPI - Key Performance Indicator

ML - Machine Learning

NLP - Natural Language Processing

PaaS - Platform as a Service

R&D - Research and Development

SaaS - Software as a Service

SME - Small and Medium-sized Enterprises

UI - User Interface

UX - User Experience

VR - Virtual Reality

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PART 1

1 INTRODUCTION

Chapter 1 establishes the groundwork for the research by offering essential background information, thereby contextualising the study within its broader field. It identifies the problem the research study intends to solve and also defines its key aims. The chapter further presents the research questions that will direct the analytical course, explains the assumptions upon which the study is predicated, and acknowledges any restrictions that may impact its scope or findings. Concluding with a chapter overview, it summarises the main points addressed. Figure 1.1 depicts the outline of Chapter 1.

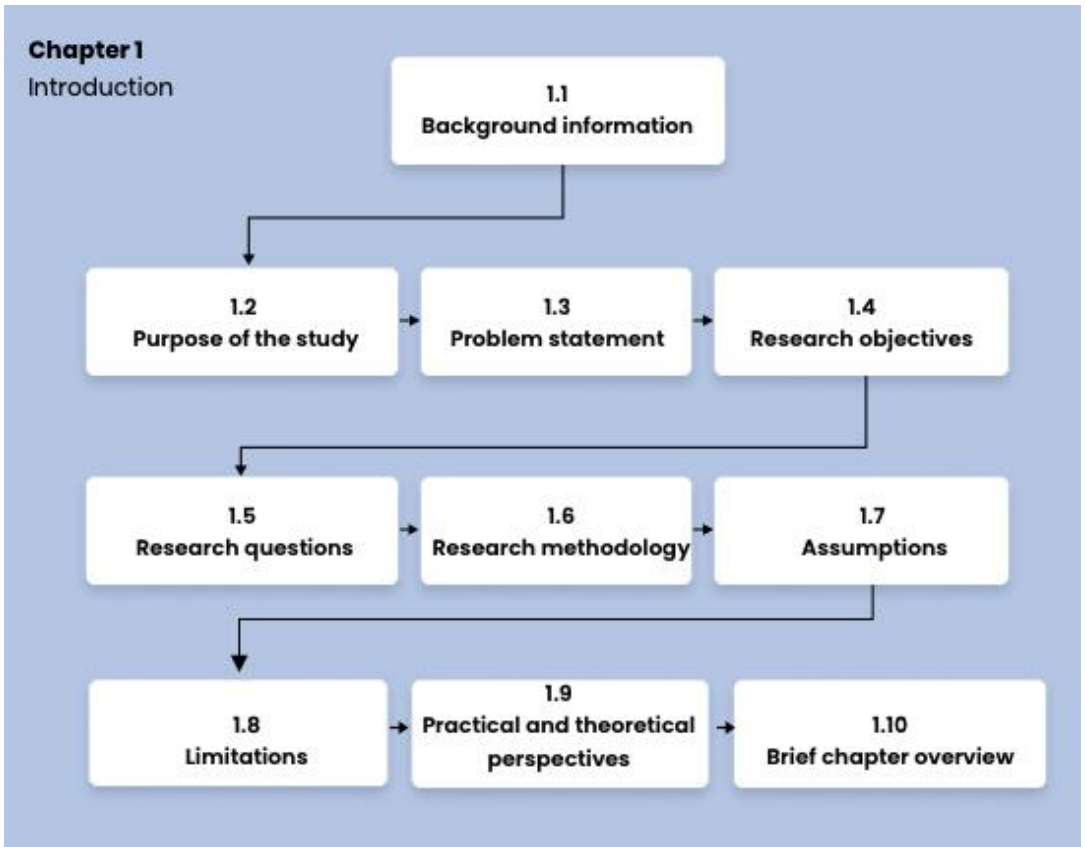


Figure 1.1 Outline of Chapter 1.

1.1 BACKGROUND INFORMATION

Digital transformation and innovation are essential for reconsidering how an organisation uses technology, people, and processes to change business performance and improve customer satisfaction (Warner & Wäger, 2019). The intelligent mobile internet has created new ways for organisations to compete (Warner & Wäger, 2019). This has given rise to the challenge of fostering a more customer-focused mindset and building a digital organisation

closely integrated with operations—not just sales. Digital innovation can please customers, change organisational structures, and disrupt industries. Digital innovation transforms how an organisation utilises digital technologies and business models to generate more value for both the organisation and the customer (Verhoef et al., 2021). However, to realise this value fully, organisations must also embrace digital transformation at a foundational level by implementing new strategies that include changes to organisational design and culture (Strauss, 2018).

Through the adoption of digital innovation, real-life business benefits have been realised by some of the leading organisations in the world. This success underscores the importance of embracing digital technologies and innovative approaches to evolve business practices and maintain competitive advantage (Nylén & Holmström, 2015). Also, unlike large Information Technology (IT) implementations, digital implementations are more amenable to an agile, iterative, minimum-viable product approach. This enables organisations to scale up only those technologies that prove effective, ensuring that any failures have minimal impact (Ranjan, 2019). In line with this flexible approach, organisations must develop a mature strategy that aligns with their digital focus and goals, thereby facilitating more resilient and adaptable technological growth. Hence, organisations should take a holistic view of how digital innovation can be implemented in their innovation departments and as part of the global organisational strategy (Nylén & Holmström, 2015).

However, to embrace digital innovation effectively, an organisation needs to identify technologies that align with its core strengths and business goals (Saarikko et al., 2020). Recognising that digital innovation represents an organisation-wide adoption, it's crucial to understand that the challenge extends beyond mere technology or process but encompasses the entire company's approach to innovation (Strauss, 2018). Consumer resistance, along with several other factors, can significantly impede the success of innovations in the digital domain. These include inadequate market research leading to irrelevant solutions, poor user experience reducing adoption, technical challenges affecting integration and reliability, organisational resistance from employees, lack of necessary training and support, security concerns deterring trust, regulatory hurdles, misalignment with business strategy, ineffective change management, insufficient funding limiting development and marketing, the rapid pace of technological change making innovations obsolete, and inflexible business processes that obstruct the integration and scaling of new digital solutions. (Talwar et al., 2021). To address this resistance, an organisation should start by building digital trust. Digital trust is the

confidence users and customers have in people, technology and processes (Domini et al., 2020). Digital trust is built on two main components: technical trust and relational trust (Talwar et al., 2021).

Technical trust focuses on three areas: security of digital offerings and data protection, transparency from the organisation about their digital direction and goal, and traceability to ensure fair and ethical use of digital engagement touchpoints (Mattila & Seppälä, 2016). Relational trust focuses on social relations, where customers expect organisations to deliver on their technical and digital strategies. Cultivating relational trust is pivotal in instilling customer confidence in the organisation's brand and commitment, achieved through the diligent effort of building and maintaining strong customer relationships, which hinges on effective communication and exceptional customer support (Poppo et al., 2016).

Organisations embarking on a digital transformation strategy face significant challenges, even if senior management teams support the digital transformation process (Warner & Wäger, 2019). Organisations across industries, including airlines, encounter a common challenge of striking a balance between maintaining their existing technology systems and embracing new technologies to align with their digital transformation strategy (Warner & Wäger, 2019). This challenge is particularly pronounced in the case of airline organisations, where the adoption of new digital innovations carries significant implications for their broader business operations and standard digital design.

Therefore, digital transformation for an airline organisation is not just about modernising software or migrating back-end systems to the cloud. Instead, it is about how an airline organisation could incorporate the latest technology platforms and applications of its processes to serve its customers better, generate more value and become more efficient (Price et al., 2019). In the modern industrial revolution, digital innovation and technologies have become critical strategic drivers for organisations, including airline organisations. Elements like competitiveness, dynamic capabilities, and skill acquisition have highlighted the importance and necessity of digital innovation (Tortora et al., 2021). Innovation can support digital transformation for an airline organisation, evidenced by the rising participation of airline organisations in innovation hubs. The critical goal is to trial digital technologies for diverse scenarios while simultaneously increasing the adoption rate towards these new technologies (Halpern et al., 2021).

1.2 PURPOSE OF THE STUDY

Recently, digitalisation has entered the air transport industry, airline organisations and airports. Aviation services are now available quickly and suitably through seamless online distribution channels increasingly developed by airline organisations. Customer-focused digitalisation concentrates on user adoption and is vital to the customer's end-to-end journey and organisation adoption (Warner & Wäger, 2019).

The present research study seeks to address the challenge surrounding the formulation and execution of a digital innovation strategy within an airline organisation aimed at optimising its potential to yield significant business value. It further considers the distinctive intricacies and operational dynamics characterising the airline industry.

This study established how digital innovation would address airline organisations' customer-facing outcomes and the business-facing benefits of airline organisations' digitalisation (Smit et al., 2018). The study highlighted the internal business areas, systems, and processes an airline organisation should implement to build a digital innovation strategy. It is essential to understand what the organisation has done in the past and the current state of digitalisation, which would guide the organisation on how to compete in the future digital economy. New digital technologies are not always created but developed by merging existing technologies, forming the platform for future digital innovations (Snow et al., 2017).

In contrast with outdated technologies, digital technologies are reproductive; these technologies can be combined and recombined infinitely for new and advanced resolutions. Digital technology allows information to be effortlessly compacted, conserved and communicated. When joined with human initiative, these features enable digital technologies to be developed and implemented quickly (Snow et al., 2017). Organisations must be cautious about aligning recently deployed technology with their business strategy and marketplace tendencies. An organisation must still do the basics well, revisit its business mechanism and develop an improved, digitally integrated strategy (Strauss, 2018).

It is essential to realise the implication of digital innovation for an airline organisation, its core goals and strengths, and how digital innovation will not disrupt its core values but contribute to its growth, transformation, and customer base (Smit et al., 2018). Digital transformation is a disruptive change, but if executed correctly, can transform the organisation through an agile approach that would make it even more difficult for competitors to keep up (Smit et al., 2018). Consequently, this research has uncovered a variety of strategic planning frameworks aimed

at illustrating how the adoption of this disruptive approach can shed light on challenges and prioritise efforts to extract their inherent value.

1.3 PROBLEM STATEMENT

Digital innovation starts with a problem worth solving and drives customer satisfaction and adoption (Talwar et al., 2021). Airline organisations operate in a heavily regulated environment with strict safety measures. Many airline organisations work with legacy operational and back-end technology systems, making agile development and processes difficult to implement. Digital innovation can be an industry-changing strategy in this environment. In that case, it can have a disruptive industry effect initiated by an airline organisation that desires to push the boundaries around digital innovation and disruption (Smit et al., 2018). Airline organisations must determine how to go from the desire to innovate digitally to a process for innovation that everyone (the organisation and its customers) can embrace (Kuisma, 2018).

This research study delves into the application of a digital innovation strategy framework within airline organisations to enhance their business value. Managing digital innovation necessitates addressing challenges related to organisational structure, technology, processes, and customer adoption (Nylén & Holmström, 2015). These elements all lead to the basis for digital trust (Hinterhuber & Nilles, 2021). Ultimately, organisations must plan to implement this disruptive strategy and prepare to respond to these new disruptions (Christensen et al., 2018).

1.4 RESEARCH OBJECTIVES

It is necessary to identify, plan, and understand a digital innovation strategy to understand the challenge of digital innovation.

Therefore, the research objectives for this study include:

- To understand the different opportunities of a digital innovation strategy for an airline organisation.
- To establish how to implement digital innovation to add business value to an airline organisation.
- To identify the challenges that impact digital innovation strategy in an airline organisation.

Many unknown elements are associated with a potential risk and are integral to experimental initiatives. The essential purposes of this study are to identify a digital innovation framework for an airline organisation, understand the organisation's vision and mission statement, and incorporate the digital innovation framework (Halpern et al., 2021). A digital strategy should identify the impacts of and distance between where an organisation is and where it wants to be, determine what technologies are available, determine what the ideal "digital dream" looks like, how an organisation would reach the dream, and who needs to be empowered to achieve that (Talwar et al., 2021).

1.5 RESEARCH QUESTIONS

Based on the problem statement, it is imperative to understand how an organisation will re-align and adjust end-to-end to succeed with digital innovation and transformation. The digital initiatives involve a technology shift and impact various areas within the wider aviation industry (Zaharia & Pietreanu, 2018). These areas include airline organisations, airports, regulatory elements, and passengers.

For this study, the research question focuses on the airline organisation as the source, which directs to the following primary research question:

> **What are the elements of a digital innovation strategy framework for an airline organisation towards creating business value?**

Once these elements have been identified and researched, it is essential to investigate the strategic drivers, and the airline organisation must focus on addressing the changes required for digital innovation. These measures lead to the sub-research questions within this study:

Secondary Research Question 1: What are the critical digital innovation strategy opportunities?
Secondary Research Question 2: How to achieve business value by implementing digital innovation?
Secondary Research Question 3: What challenges impact digital innovation in an airline organisation?

In this study, the researcher indicates an airline organisation's contribution to achieving digital innovation goals by considering these questions.

1.6 RESEARCH METHODOLOGY

The research methodology section of this study outlines the systematic approach used to conduct research, detailing the processes, techniques, and tools employed to collect, analyse, and interpret data.

The research design articulated in this study constructs the support for a detailed examination of digital innovation practices within a South African airline. This interpretive approach synergises the experimental objectivity of quantitative data with the understanding of qualitative insights. By employing semi-structured interviews, the study gathers in-depth perspectives from various stakeholders, while online questionnaires quantify user interactions and adoption patterns.

The data analysis transcends mere aggregation, applying content analysis to distil complex qualitative responses into thematic findings and leveraging descriptive statistics to reveal trends and outliers in quantitative data. Combined, these methods aim to yield a multi-dimensional view of the digital innovation landscape, assessing both the implementation strategies within the airline and their reception among the workforce and clientele. This comprehensive methodological combination is designed to culminate in actionable analysis, informing strategic digital initiatives and driving industry innovation forward.

To enhance the discussion on research methodology in Chapter 4, the interpretive foundation it sets for the study must be articulated. With an interpretive study, the use of online questionnaires and semi-structured interviews as part of a mixed-methods approach allows for a comprehensive understanding of the research subject. Online questionnaires can capture quantitative data that offer broad trends and patterns, while semi-structured interviews provide qualitative insights into the participant's thoughts, feelings, and experiences. This combination enriches the research, enabling an interpretation of the data that reflects the complexity of social realities and human behaviour, crucial for a study that aims to understand meanings and contexts from the perspectives of individuals. The mixed-methods strategy, merging qualitative and quantitative research, offers a balanced perspective, capturing the richness of subjective experiences and the objectivity of empirical data.

The chosen case study deepened the investigation, allowing for insights into digital practices. Data collection through semi-structured interviews and online questionnaires promises to provide a well-rounded understanding of the phenomena. A case study is a frequently

employed research method, although it lacks a well-defined sociological research approach due to its absence of distinct and structured procedures. As a result, aspiring researchers who opt for case studies often find themselves navigating a research method that stands apart from conventional approaches.

Characterising a case study involves an examination of a contemporary phenomenon within its real-life context, particularly when the boundaries between the phenomenon and its context are blurred, and the researcher has limited control over both. It is noteworthy that traditional research strategies, experiments, and questionnaires may not effectively capture the essence of a case study, which is why researchers seek a specialised comprehensive research strategy known as a case study. From this perspective, a case study represents a first-hand exploration that delves into the case by addressing "how" or "why" questions about a significant phenomenon.

This study employed a single case study research strategy, involving the collection and analysis of data from a South African airline organisation. Due to privacy and confidential considerations, the airline organisation is referred to as “the case study organisation”. The study chose this approach to draw specific, relevant, and in-depth insights into digital innovation within the context of an airline organisation. Consequently, the case study method allows for the exploration of key characteristics, consequences, and recommendations pertinent to this research study.

To conclude, this research study employed a mixed-methods research approach. Using a mixed-method approach, including a detailed case study, facilitated the collection of comprehensive data through semi-structured interviews and an online questionnaire.

1.7 ASSUMPTIONS

This study assumed that most of the customers participating in the research were advanced digital users. This assumption implies that these individuals are likely to engage with the airline's digital resources more frequently, effectively, and with a greater degree of self-sufficiency, thus potentially influencing their expectations and experiences. On the other hand, a smaller percentage of customers were slow adopters of using digital platforms when engaging with airline organisations. These users might demonstrate reluctance or face challenges in adopting new technologies, which could impact their service satisfaction and loyalty. Understanding these distinctions is central for the airline industry to tailor its digital

transformation strategies and ensure that services are accessible and user-friendly for all customer segments.

1.8 LIMITATIONS

This study's primary limitation is its reliance on datasets, analyses, and research findings derived solely from the observations and experiences of a single airline organisation, thereby limiting the broader applicability and general applicability of the results. Various restraints exist in data collection and availability, future studies, and research prospects within the aviation industry. Additional data sources and a lengthier period in data compilation could increase the high-level analysis of data enhancement.

Another limitation worth investigating is customers' reluctance to move towards the digital experience. Airline organisations should build digital customer trust to enable seamless interaction with the airline organisation (Smit et al., 2018).

However, it's essential to clarify that the investigation of customers' reluctance to embrace the digital experience is explicitly excluded from the scope of the present study. Airline organisations should build digital customer trust to enable seamless interaction with the airline organisation.

1.9 PRACTICAL AND THEORETICAL PERSPECTIVES

The study makes several significant theoretical contributions. Firstly, it deepens the understanding of digital innovation strategies in the airline industry, providing insights into how these strategies can be effectively developed and implemented. Secondly, it expands the knowledge of organisational agility and strategic alignment in the context of digital transformation, highlighting the critical factors that contribute to successful digital innovation. Lastly, the study provides a detailed theoretical framework that can be applied to similar industries facing rapid technological changes, offering a valuable reference for further research and practical application.

Regarding practical contributions, the study offers actionable insights for airline executives on implementing and scaling digital innovations. It emphasises the importance of integrating new technologies with existing systems to ensure seamless operations and avoid operational silos. Additionally, the study identifies critical challenges and opportunities in digital transformation, providing practitioners with valuable information to develop effective strategies. This practical guidance can help airline organisations navigate the complexities of digital innovation and achieve their strategic objectives.

1.10 BRIEF CHAPTER OVERVIEW

This study consists of five parts, with chapters contributing to each part. The outline of the study is shown in Figure 1.2, followed by a brief description and overview of the chapters with the five parts.

PART 1 - Introduction

Chapter 1: Introduction. This chapter provides an overview and background of the study to the reader. The introduction informs the reader about the relevant concepts essential to this study and highlights the purpose of this study. It studies the problems this study investigates, the research questions and their related objectives, the reason and goal, and finally, the assumptions and limitations the author has considered.

PART 2 – Literature review and research approach

Chapter 2: Literature Review. Chapter 2 presents a literature review that covers the state of the airline industry, its use of technology, and projections for its digital-focused future. It explores the elements, strategies, and challenges of digital innovation and the drivers of digital transformation within the industry. The chapter also examines the relationship between airline organisations and digital innovation strategies, addressing enabling technologies. Lastly, it considers the impact of digital innovation on airlines, including data management, security, human factors, social implications, governance, and financial investment. This review provides the theoretical backdrop against which the research study is framed.

Chapter 3: Theoretical Framework. This chapter examines the theoretical framework, focusing on the role of theoretical frameworks in academic research. Central to this chapter is the analysis of the Dynamic Capabilities Framework, which explains how organisations adapt and maintain competitive advantage in rapidly changing environments. This framework highlights strategic management aspects, emphasising the importance of adaptive and innovative capabilities. The chapter provides a theoretical understanding of the framework's application in dynamic business contexts.

Chapter 4: Methodology. Chapter 4, the methodology section, is crucial for outlining the structured research approach. It introduces methods, describes the design, and explains the philosophical approach, whether qualitative, quantitative, or mixed. The methodology outlines the data acquisition and examination procedures, which are elaborated upon in the data

collection and analysis sections. The data sampling subsection explains the criteria for choosing the data set. Ethical considerations are also considered to ensure the study complies with ethical and professional norms. This chapter constitutes the core of the research, clarifying the process through which conclusions were drawn.

PART 3 – Data Analysis and Examination

Chapter 5: Analysis of Online Questionnaires. Chapter 5 focuses on analysing online questionnaires, a fundamental aspect of the research study. This chapter examines the various types of questionnaire questions, such as demographical, open-ended, and Likert scale questions, and explains their purpose and structure. It encompasses web-based questionnaires distributed to three key respondent groups associated with an airline organisation: employees, suppliers, and customers.

Each sub-section investigates the specific types of questions directed at these groups, capturing a range of quantitative and qualitative data. The chapter also details the consolidation of results, discussing how responses from different groups are compared to draw comprehensive conclusions. Furthermore, it analyses the respondents' feedback on the research questions, mainly focusing on the organisation's dynamic capabilities as perceived by employees, suppliers, and customers. This in-depth analysis provides insights into the organisation's adaptability and strategic management from multiple perspectives.

Chapter 6: Analysis of semi-structured interviews. Chapter 6 presents the analysis of the semi-structured interviews, which are central to qualitative research in your study. The chapter begins with an overview of the semi-structured interview questions designed to elicit in-depth responses; it then proceeds to a demographic analysis of the interviewees, providing context and background to the collected data.

The subsequent section, Consolidated Feedback from Interviewees, integrates the responses, allowing for an understanding of the interview data. Emerging Themes and Concepts identify and discuss recurrent patterns and ideas, which are critical for building theoretical insights.

The chapter concludes with a section on the four components of a digital innovation strategy, which likely ties the interview findings to the study's focus on strategic innovation in a digital

context. This analysis will provide a detailed understanding of how digital innovation is perceived and implemented, critical for the research's contribution to academic and practical knowledge.

PART 4 – Digital Layered Framework Creation

Chapter 7: Digital Innovation Framework. This chapter explores the digital innovation Framework, emphasising how people, processes, and technology converge to drive digital change. It describes developing this framework using integrated data and outlines its core structure. The chapter details the incorporation of essential digital innovation elements and emerging research themes into the framework. It highlights the collective benefits these layered components offer to digital innovation strategies. The chapter concludes with practical steps for implementing the framework, stressing the significance of strategic roadmap planning for successful digital transformation.

PART 5 – Contribution and Findings

Chapter 8: Contribution. Chapter 8 specifies the contributions of the research study. It assesses how each secondary and primary research question had been addressed, explaining the study's impact. The scientific contributions discuss how the research advances academic knowledge, while practical contributions relate findings to real-world applications. Reflections critically evaluate the research process, and limitations highlight the study's constraints. The chapter concludes with suggestions for future research, guiding subsequent academic investigation based on the groundwork laid by this study.

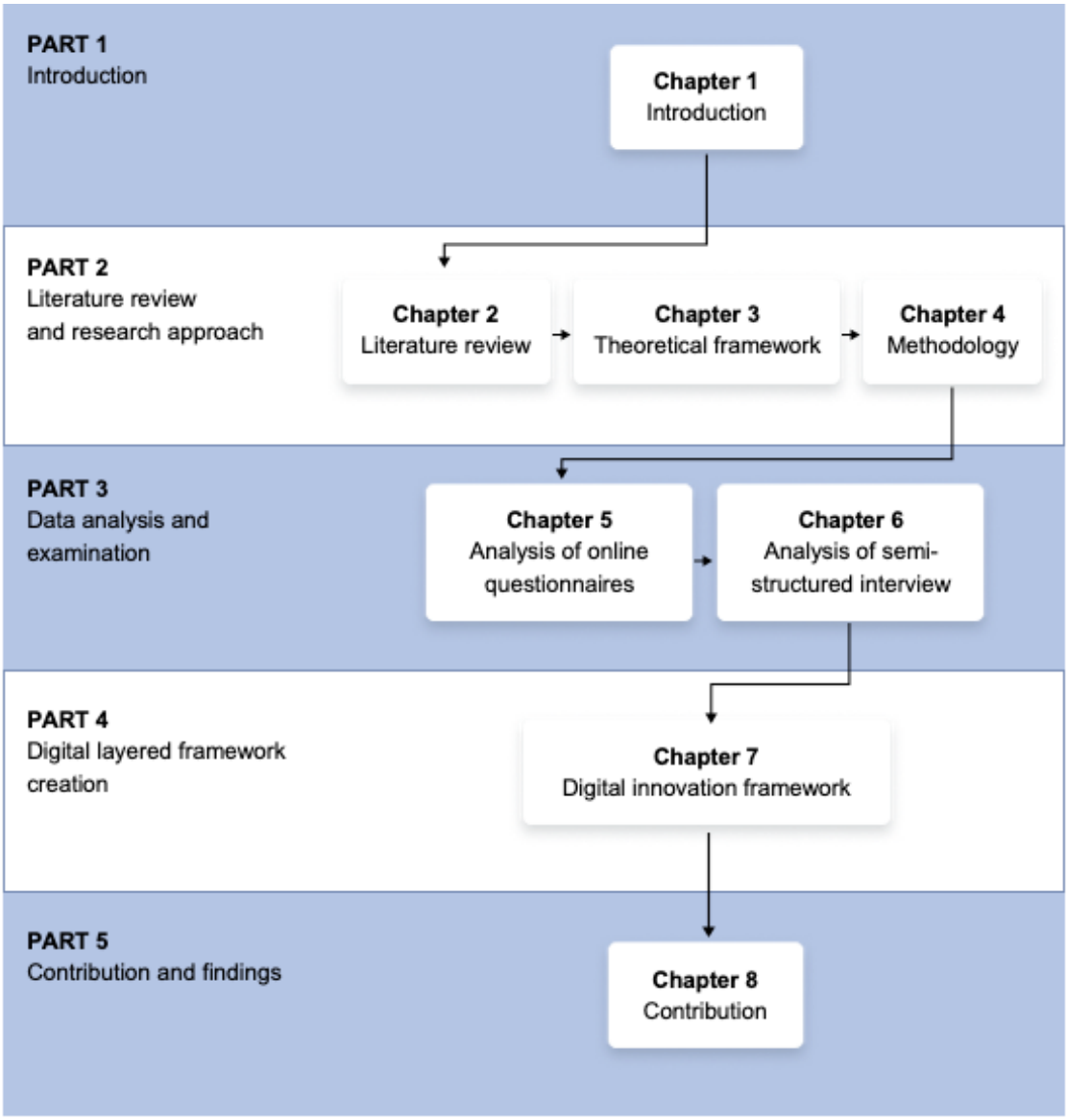


Figure 1.2 Outline of the research study.

PART 2

2 LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter outlined an introduction to this research study. Chapter 2, Literature Review, intends to offer a theoretical context for the rest of this study by reviewing existing literature on the phenomenon under investigation. Chapter 2 will also review the literature on the critical elements of creating a digital framework for airline organisations to benefit.

The following section provides a detailed overview of the airline industry and the strategic elements that airline organisations must focus on to excel in digitisation, as outlined in Figure 2.1.

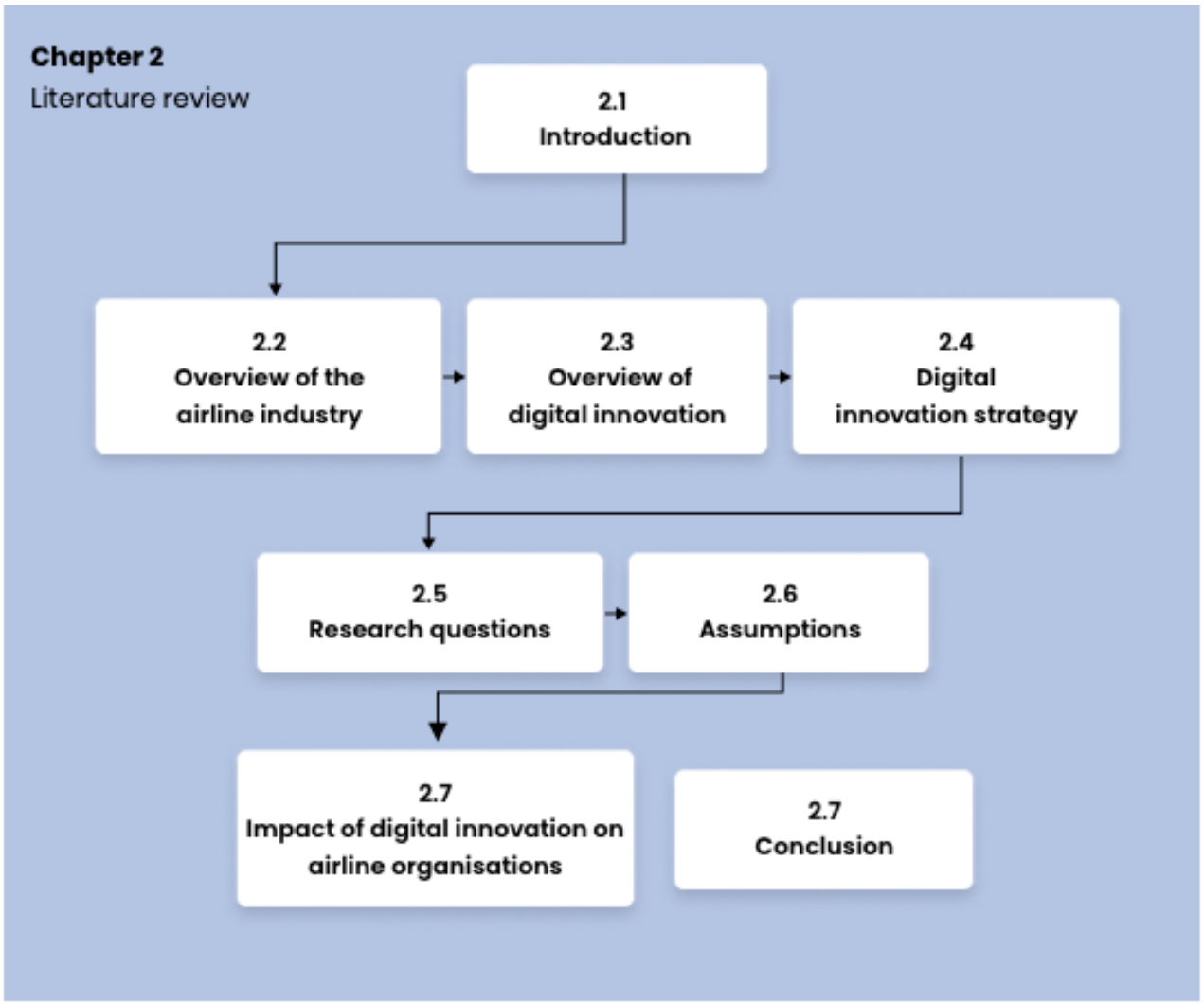


Figure 2.1 Outline of Chapter 2

2.2 OVERVIEW OF THE AIRLINE INDUSTRY

The airline industry offers services to almost every country internationally and has played an essential role in creating a globally connected economy. The airline industry is an economic force in its operations, and its impacts on tourism are enormous. Limited other industries generate the amount and force of attention like to airline organisations, both by internal operations, but also by government policymakers and regulators, the news media, as well as its billions of customers, who almost all have an anecdote to share about an abnormal, good or bad, air travel encounter (Peter Belobaba, 2016).

2.2.1 THE CURRENT STATE OF THE AIRLINE INDUSTRY

The global COVID-19 pandemic has impacted the travel industry tremendously, which fast-tracked airline organisations' need to become digital faster than planned to assist with an enhanced touchless experience. Travel restraints have restricted the movement of individuals both locally and internationally. The airline industry has seen a decrease between 60 - 80% in demand for most airline organisations. The aviation industry, especially low-cost carriers (LCCs), typically operates within very tight margins, and it was notable how many LCCs closed down their operations while others had to make drastic cuts to their operations due to the pandemic (Sobieralski, 2020).

The pandemic appears to have accelerated the drive towards a digital strategy; the airline industry was already experimenting with digital transformation before the COVID-19 pandemic. Recently, airline organisations began implementing consolidation processes and internal transformations, including investment in relevant technologies needed for digital innovation (Magdalina & Bouzaima, 2021).

2.2.2 THE USE OF TECHNOLOGY IN THE AIRLINE INDUSTRY

Technology is central to the future of the aviation industry. Indeed, the airline industry has recently experienced the application of digital and digitally enabled technologies, including the options for online ticket purchasing and customer check-in. Digital technology has highlighted the move towards check-in kiosks, websites and, most recently, mobile applications. Mobile applications are vital for airlines and airports alike, and an apparent demand has been detected for customers to manage the end-to-end experience. There is a significantly lesser than predictable acceptance of mobile digital technologies. Owing to the accessibility of mobile and broadband technology, digital and online channels have multiplied recently (Smit et al., 2018).

Airline organisations have progressively begun to evaluate their opportunities, develop and deliver technology, and network with customers and other stakeholders digitally. Mobile applications, social media, and access to big data are some of the enablers of the future airline organisation, and these digitally based technologies significantly impact organisations and industries. The advancement of technology in the aviation industry will increase competition and collaboration between various industry stakeholders. The need to excel technologically is no longer a preference but rather a necessity (Snow et al., 2017).

Digital technology platforms have developed as essential enablers for organisations to control knowledge because these platforms supply alternative methods for airline organisations to cooperate with external partners for innovation, technologies, and information. Digital platforms also act as carriers of innovation (Hossain & Lassen, 2017).

In South Africa, this state has not progressed rapidly due to accessibility, reach and cost. This discrepancy has caused digital technologies to differ considerably across industries because of disparities in income and accessibility. In the South African aviation industry, a lack of supply and demand elements has been predominant in affecting the realisation of digital technologies. The aviation industry has made a substantial commitment to investing in technology platforms to make the customer journey more manageable and accessible (Smit et al., 2018).

2.2.3 THE FUTURE OF A TECHNOLOGY-FOCUSED AIRLINE

Information communication technologies (ICTs) can provide powerful strategic and technical enablers for airline organisations, bringing substantial competitive advantages. As the conventional communication channel and as an infrastructure for business transactions, the influence of the internet has produced various strategic propositions for the aviation industry. The occurrence of the internet forced airline organisations to change their strategies to technological and digital innovations to improve their competitiveness. Airline organisations recognised the internet as an opportunity to challenge distribution costs and to re-engineer the industry. Airline organisations are very interdependent organisations. Therefore, airline organisations must use technology strategically to integrate and improve their operations, internal structures and customer experience (Buhalis, 2004).

Investigating the future customer experience, it has become clear that combining data availability and technology will play a crucial role in this evolution. With all-inclusive data and technology standards, a system for developing and creating the right digital technology

features will play a crucial role in airline organisations becoming more digital (Harrison et al., 2014).

Schallmo et al. (2017) also mention the focus on mobile devices and applications as enablers of a technology drive by a digitally hungry organisation. By driving the mobile technology experience and creating value for customers, organisations can interact with their customers more easily to ensure an enhanced travel experience. Technology, primarily digitally enabling technology, can improve the entire customer travelling experience. Frequent customers demand faster digital and online experiences with higher flexibility and control over their travel experience. The ability of customers to connect from almost anywhere with their smart devices and change their itinerary is projected to be one of the most extensively used services. Therefore, technology can be foreseen to facilitate and support the successful transformation from a traditional airline organisation to a digital airline organisation of the future (Buhalis, 2004).

2.3 OVERVIEW OF DIGITAL INNOVATION

The term for digital innovation has yet to be clarified in detail. Digitalisation underlines the comprehensive interaction of all sectors of the economy and society, gathering applicable information and analysis and interpreting information into actions and conversions.

Digital innovation is a complicated concept that involves a company's organisational and technological features, improving customer experience, delivering more agile technology implementations, and changing the digital environment for an organisation (Urbinati et al., 2020). Receptiveness to innovation measures an organisation's tendency to change across a method intended to obtain a competitive advantage from developing new ideas and technologies (Di Vaio et al., 2021).

The increasing digitisation of work and personal spaces is introducing a new era of innovation, specifically in digital domains, transforming how individuals, organisations, and the broader society operate and interact. Over the past ten years, various digital technologies have emerged and grown, including cloud computing, mobile technology, the Internet of Things (IoT), and digital control systems (Nambisan et al., 2017). Regarding research, innovating within a digital setting is being explored across various scholarly fields. However, this has not led to the development of a comprehensive, agreed-upon view of digital innovation (Hund et al., 2019).

Nambisan et al. (2017) characterise digital innovation as integrating digital technologies within the innovation process. This term also refers to the results of innovative efforts, in whole or in part. Digital innovation has catalysed profound changes in developing and organising new products and services. It has given rise to new methods of creating and capturing value, fostered collaborative networks of stakeholders with varied objectives and skills, led to the evolution of innovation methodologies, and has had a transformative impact on entire sectors.

Traditionally, innovation was seen as a discrete set of challenges, with clear demarcations between problem and solution spaces, often within the boundaries of specific industries or sectors. However, digitalisation has blurred these lines, creating a fluid and ongoing interaction between problems and solutions across an extended innovation ecosystem (Nambisan et al., 2017).

Historically, innovation was often confined to siloed domains, but digitalisation has removed these barriers, allowing ideas and solutions to permeate across previous divides and encouraging a broader spectrum of contributors. This openness has led to less predictability in the innovation process, as the path from idea to execution is no longer a straight line but an adaptable journey that evolves with real-time feedback and data (Nambisan et al., 2017).

The distinctions between an innovator and a beneficiary are also fading. Digital platforms facilitate a more integrated approach where creators and users collaboratively refine and evolve ideas. Moreover, the emphasis on socio-cognitive factors signifies a move towards valuing the social and cognitive processes underpinning the acceptance and success of digital innovations. The advent of algorithms as innovation drivers marks a significant transition from sole reliance on human ingenuity to data-driven decision-making. Algorithms are now crucial to uncovering opportunities and optimising resource allocation, which can lead to innovative outcomes that might not have been discovered through traditional methods.

In the digital era, the line between innovators and beneficiaries is blurring, as digital platforms enable collaborative idea refinement. Socio-cognitive factors are gaining importance, emphasising the role of social and cognitive processes in digital innovation success. Algorithms are also now driving innovation by identifying opportunities and optimising resource allocation, complementing human creativity with data-driven decision-making. This shift represents a significant change in the innovation landscape.

2.3.1 THE ELEMENTS OF DIGITAL INNOVATION

Fast-changing technological and digital innovations disrupt the customer experience. It affects a customer's feelings and emotions. digital innovation changes how people believe in organisations' ability and reliability. Rightfulness, effectiveness, transparency, and technological innovation towards digital transformation can build long-lasting customer trust. Digital trust is the start of digital innovation as it considers organisational changes, customer adoption, and trust towards the organisation (Marcial & Launer, 2019).

The development of competition forces airline organisations to deal with difficulty managing technology, customer experience, and trust. Technologies are in uninterrupted development that need to increase customer trust. Therefore, digital innovation and technology require the search for appropriate methods to manage the implementation of technology solutions that can enhance a customer-centric philosophy in an airline organisation (Osarenkhoe, 2006).

Digital innovation changes how people believe in organisations' ability and reliability. Rightfulness, effectiveness, transparency, and technological innovation towards digital transformation can build long-lasting customer trust (Marcial & Launer, 2019).

The upcoming sections discuss the critical elements of digital innovation.

2.3.1.1 Process as an element of digital innovation.

Digital transformation encompasses the ongoing initiatives within organisations to adopt digital innovation in developing or enhancing products, services, and business models. Such transformation often necessitates significant shifts in resource allocation and operational structures to accommodate the novel avenues of value creation that digital transformations facilitate (Skog, 2019). It is an iterative process whereby each cycle of digital innovation lays the foundation for subsequent advancements. This view aligns with other interpretations that regard digital transformation as a product of successive digital innovations (Hinings et al., 2018).

Li et al. (2018) note that digital transformation is an unceasing journey deeply influenced by external environmental factors—a perspective that merits further exploration. Similarly, Gimpel et al. (2018) suggest digital transformation is a perpetual endeavour, with evolving environments continuously presenting new opportunities and challenges, necessitating ongoing adjustments to digital transformation strategies.

While digital innovation is vital for organisations to exploit digital technologies, it also introduces opportunities for enhanced service delivery. However, one of the significant hurdles organisations face in this journey is grappling with the unique complexities of digital innovation processes. The rapidity with which digital innovation evolves presents a particular challenge for those embarking on digital innovation strategies. The inherent pro-creative nature of digital technology—which denotes its inherent capacity to induce swift and significant changes—is one of the reasons managing digital innovation processes can be especially difficult to steer and foresee (Nylén & Holmström, 2015).

2.3.1.2 Business model transformation as an element of digital innovation.

The pervasive digitalisation trend reshapes business and technology, giving organisations opportunities and challenges. These forces can either act as catalysts for change or necessitate adaptation. Digital transformation encompasses the iterative processes by which organisations immerse themselves in digital innovation to evolve or enhance their business models (Skog, 2019).

Hinings et al. (2018) view digital transformation as an organisational response to changes in the business and technology environment, propelled by strategic initiatives and largely a matter of management. It is commonly initiated by disrupting traditional business models due to the emergence of novel digital products and services, altering the existing operational and innovation frameworks. Digital transformation is significantly shaped by the technological and business milieu, which presents challenges that compel organisations to change and provide vital opportunities and resources for genuine transformation.

The transformation of organisations through technology is frequently seen as an intrinsic process within organisations. This reliance on the interplay between business and technology environments sets digital transformation apart from purely technology-driven transformations (Skog, 2019).

2.3.1.3 Technology as an element of digital innovation.

Industry 4.0, characterised by advancements in robotics, digitalisation, and cyber-physical systems, significantly shapes technological innovation. Technologies stemming from Industry 4.0 have made innovation and production processes more knowledge-intensive (Mubarak &

Petraite, 2020). On the one hand, this industrial revolution is accelerating the pace of innovation, while on the other, it is leading to shorter lifespans for products and services, compelling firms to hasten their innovation efforts. Moreover, digital trust is seen as enhancing an organisation's comprehension of technology, which, in turn, bolsters innovation. Despite the well-established concept of absorptive capacity, its role in the context of digital technologies and innovation remains an area for further exploration (Rajput & Singh, 2019).

Key technologies of Industry 4.0, such as big data, cyber-physical systems, and the Internet of Things, need to be synergised with trust centred around humans to strengthen the structure of business networks through a technology-oriented trust (Mubarak & Petraite, 2020). When these digital technologies are melded with traditional organisational competencies, they form a critical factor for success in competitive, tech-driven marketplaces (Mubarak & Petraite, 2020).

Digital technologies integrating elements of information science, computing, communications, and connectivity (Coskun-Setirek & Tanrikulu, 2021) are pivotal in achieving business objectives. Their widespread impact has led to the restructuring of entire industries over time. The distinctive attributes of digital technology foster innovative and unpredictable processes. Developing digital technology involves accruing insights on new technological trends, digital channels like web services, mobile operating systems, and standards and application programming interfaces (APIs) that present opportunities for innovation (Nylén & Holmström, 2015).

2.3.1.4 Organisational transformation as part of digital innovation.

The deployment and utilisation of information technology (IT) systems are strategically aligned with organisational goals to enhance efficiency and achieve defined business strategies. Digital transformation represents a shift in how value is created and captured through innovation in digital products, services, and business models (Gimpel et al., 2018).This process often triggers broader organisational transformation, typically starting from the ground up as new IT systems introduce novel practices that eventually reshape organisational structures and influence core functions and operations. Conversely, digital transformation can also be seen as a top-down process where the drive for innovation directly modifies organisational roles and operations, with comprehensive organisational change following in response to new objectives and methodologies (Gimpel et al., 2018).

In the competitive landscape of the airline industry, organisations face challenges in managing technology, enhancing customer experience, and building trust. Continuous technological advancements necessitate increased efforts to foster customer trust. Therefore, digital innovation in this sector involves seeking effective strategies to implement technology solutions that prioritise customer-centric approaches (Osarenkhoe, 2006).

Nylén and Holmström (2015) note that digital innovation processes often emerge from employees experimenting with digital technology in a practical, hands-on manner, leveraging available resources and opportunities for creativity. For successful adaptation to digital innovation, it is crucial to have mechanisms that can synchronise such organisational shifts.

2.3.1.5 Humans as part of digital innovation.

Popular culture often depicts artificial intelligence (AI) in a dichotomy of extremes, ranging from revolutionary advancements to ominous scenarios. These portrayals typically oscillate between utopian visions where AI fulfils every human need and dystopian outcomes where AI usurps human authority (Shneiderman, 2020b). In such narratives, humans are relegated to a passive role, overshadowed by the autonomy of machines. However, a third vision proposes a symbiotic future where computing enhances human capabilities exponentially, a concept known as human-centered AI (HCAI). This approach envisions a future where AI can augment human intellect and agency. It fosters an environment where people can use technology to enhance their cognitive and creative abilities in unprecedented ways, supported by AI that seamlessly integrates into services designed around their needs (Shneiderman, 2020b).

This paradigm shift led to the characterisation of HCAI as a second Copernican revolution. It reframes the dynamic between humans and AI, moving away from the traditional view in which humans are ancillary to AI processes. Instead, HCAI places humans at the forefront, with AI revolving around human intent and interaction, thus restoring humans as the focal point of technological advancement (Shneiderman, 2020b).

In Figure 2.2 (Shneiderman, 2020a), The second Copernican revolution conceptually represents a shift in design philosophy regarding the role of humans and artificial intelligence (AI) in systems and processes. Initially, AI and algorithms are depicted as the core of

operations, with humans adjusting to these technologies. This reflects a stage in which AI drives the system, and human roles are secondary, adapting to the technology.

Figure 2.2 (Shneiderman, 2020a) shows the transition into placing humans at the centre, with AI in support. This suggests an evolution towards a human-centred approach, whereby AI is a tool to augment human decision-making and capabilities, not the central driver. The metaphor of the second Copernican revolution is used to indicate a significant shift in perspective: from technology as the primary focus to technology as an enabler for human-centric systems.

This shift is emblematic of an aspirational trajectory for technology development, where AI is integrated into human processes to enhance, not overshadow, human abilities. It advocates for a future where technology supports and amplifies human intelligence in a symbiotic relationship.

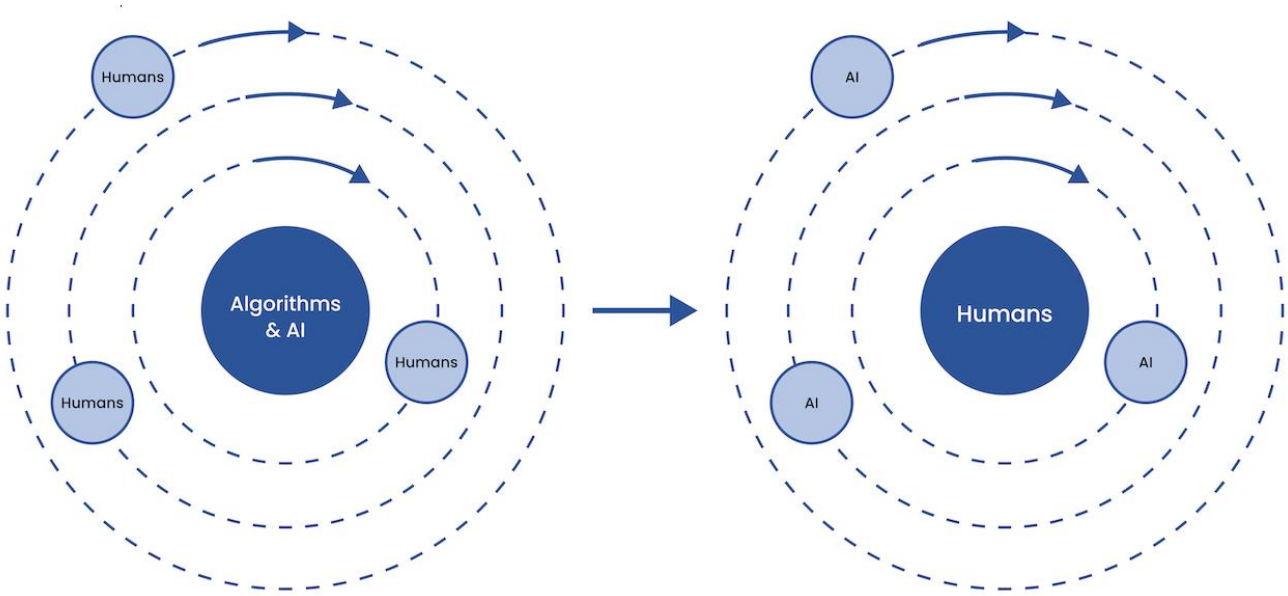


Figure 2.2 A second Copernican revolution (reproduced from (Shneiderman, 2020a).

Adopting a human-centred approach in design thinking does not relate to replicating human appearance or behaviours. Instead, it pertains to creating intuitive, reliable, and manageable tools, devices, and experiences, all fulfilling human necessities, as seen in Figure 2.2 (Shneiderman, 2020b).

2.3.1.6 Data as part of digital innovation.

The digital innovation landscape increasingly hinges upon using big data, a pivotal tool for understanding the dynamics of open innovation and transformation. The interplay of digital systems provides a wealth of behavioural data, allowing airline organisations to make informed strategic decisions grounded in real-time data flow analysis (Brunswicker et al., 2015).

In today's digital era, using big data has become a cornerstone for innovation, particularly in the airline industry. This data-driven approach enables airlines to tap into vast customer behaviour and operational data streams, facilitating a more agile response to market trends and consumer needs. By analysing real-time data, airlines can optimise everything from flight operations to customer service, creating a more personalised and efficient travel experience (Brunswicker et al., 2015).

2.3.1.7 Customer adoption as part of digital innovation.

In the face of evolving customer demands, organisations must embark on digital transformation or risk obsolescence. This strategic shift reconfigures business models to offer customers enhanced experiences by integrating digital technologies. Airline organisations encounter the dual pressures of competition from innovative start-ups and heightened expectations from digitally proficient customers. Digital innovation is pivotal across industries as it extends beyond conventional distribution channels, products, services, and business processes. A critical challenge for airlines is to integrate and advance new digital technologies that, when allied with organisational data, can unlock novel opportunities and enrich customer engagement (Belle & Dyk, 2019).

2.4 DIGITAL INNOVATION STRATEGY

2.4.1 THE STRATEGIC DRIVERS FOR DIGITAL INNOVATION

The increasing significance of digital technology in achieving business objectives has led to a profound transformation of entire industries. As a result, managers are showing a keen interest in managing digital innovation. Recent research highlights the vast potential for product and service innovation stemming from digital technologies, which are challenging to control and predict. Consequently, organisations require agile tools to navigate these emerging digital innovation processes effectively. These processes compel companies to

reassess their assumptions about product portfolios, digital landscapes, and innovation strategies (Nylén & Holmström, 2015).

The digitalisation of businesses across various industries, driven by technologies like the IoT, big data analytics, artificial intelligence, and cloud computing, is an emerging phenomenon. Firms must embrace this transformation successfully through digital technology to achieve substantial improvements in areas such as customer experience, operational efficiency, and the creation of new business models. Failure to do so might leave them vulnerable to competition (Fitzgerald et al., 2014).

Digital innovation integrates emerging technologies into non-technology industries like banking, healthcare, manufacturing, and retail to support digitalisation. Given the growing importance of digitalisation, digital innovation has become a significant area of research due to the increasing demand for innovative digital solutions (Khin & Ho, 2018).

Digital technology possesses unique characteristics that facilitate rapid and unpredictable innovation processes (Turber & Smiela, 2014). Therefore, organisations require dynamic tools to support their digital innovation endeavours. Nylén and Holmström (2015) identify five crucial areas for evaluating and managing digital product and service innovation:

- The user experience of digital products and services should be efficient, easy to learn and provide richness. This experience can be assessed based on usability, aesthetics, and engagement.
- Firms must articulate the value proposition of each digital product and service, focusing on how they create value for users. The quality of these propositions is evaluated through customer segmentation, product bundling, and commission structures.
- Digital evolution scanning involves gathering intelligence on new devices, digital channels, standards, and APIs to identify opportunities for innovation across emerging use contexts and user behaviours.
- As digital innovation necessitates new skills, organisations must assess their mechanisms for facilitating continuous learning and forming dynamic innovation teams.
- Digital innovation often arises when organisational members experiment with digital technology. Therefore, assessing the available space and time for improvisation and the mechanisms for coordinating such efforts are crucial.

Implementing strategic drivers involves making informed decisions across three dimensions: the organisation's service offering, its digital environment, and its organisational properties (Nylén & Holmström, 2015).

Some scholars assert that one of the primary objectives of digital transformation is to ensure digital readiness (Berghaus & Back, 2017). This means organisations aim to stay alert to changing contexts to respond swiftly when necessary. Other objectives include enhancing existing products, engaging in product innovation, exploring potentially disruptive business models, improving digital channels and customer-facing processes, delivering up-to-date digital products, and enhancing customer satisfaction and dialogue to align with evolving customer behaviours and expectations (Berghaus & Back, 2017; Mocker & Fonstad, 2017).

2.4.2 SUCCESS FACTORS NEEDED TO ACCOMPLISH DIGITAL INNOVATION

The factors outlined below were determined to be essential for accomplishing digital innovation based on their ability to address various aspects of an organisation's approach to adopting and integrating digital technologies and strategies. Each factor contributes significantly to the effectiveness and sustainability of digital innovation initiatives.

Supportive organisational culture: Organisations should cultivate a culture that embraces change to ensure a successful digital transformation. Such a supportive culture encourages collaboration between business and IT teams, facilitating digital transformation (Mueller & Renken, 2017). It values innovation, willingness to learn, failure tolerance, risk-taking propensity, entrepreneurial mindset, trust, participation, cooperation, and open communication (Hartl & Hess, 2017).

Well-managed transformation activities: Digital transformation strategies vary based on organisational context. There is no one-size-fits-all approach. Organisations engage in various activities such as improving digital channels, simplifying processes, updating infrastructures, innovating, and developing digital strategies. These activities are often executed by designated teams in collaboration with external partners (Berghaus & Back, 2017).

Leverage knowledge: Collaboration with business units and external partnerships is crucial for large manufacturing companies in digital transformation. Internal knowledge is also essential, focusing on helping employees harness digital technologies for innovation.

Recommendations include establishing hybrid project structures, building collectives, effective communication with employees, and cultivating an organisational culture that supports transformation (Mueller & Renken, 2017).

Engage managers and employees: Engaging employees in the digital transformation process is vital for its success. Managers should consider employees' concerns and actively involve them in adopting new technologies. Participation reduces resistance, enhances goal achievement, and fosters organisational commitment. Attracting and retaining individuals with digital expertise and business acumen is equally essential (Petrikina et al., 2017).

Grow IS capabilities: Information systems (IS) capability plays a significant role in digital transformation. It involves assembling and deploying IS-based resources effectively. IS capability positively influences digital transformation by enabling the redesign of business processes and the transformation of traditional offerings into digital ones (Nwankpa & Roumani, 2016).

Develop dynamic capabilities: In the face of digital disruption, organisations need dynamic capabilities to adapt. Dynamic capabilities allow organisations to identify and respond to opportunities, reconfigure resources, and build digital platform capabilities. Market intelligence capability is crucial for sensing environmental changes and responding effectively to industry shifts (Karimi & Walter, 2015).

Align business and IS with a digital business strategy: Organisations should align their strategies to accomplish digital transformation. A digital business strategy combines IS and business strategies, leveraging digital resources to create value. It emphasises digital leadership, agile and scalable digital operations, digitally enabled customer experiences, and emerging digital innovations. Achieving digital business strategy objectives often requires a digital transformation (Bharadwaj et al., 2013; Leischnig et al., 2017). Organisations should actively pursue aligning actions to reconfigure resources and redefine strategy to address environmental changes (Yeow et al., 2018).

2.4.3 THE CHALLENGE TO MANAGE DIGITAL INNOVATION

A rich body of management research (Nylén & Holmström, 2015) has investigated the relationship between technological innovation and radical change. This research highlights

how new technologies can profoundly challenge existing markets, posing a significant threat to established organisations. Consequently, the competencies of these established organisations often act as barriers to innovating, as noted by (Henderson, 2006).

In this context, it is essential to consider that while technology evolves, the underlying characteristics of digital technology may become less apparent. These characteristics, such as adaptability, scalability, and the ability to connect, often recede into the background as organisations struggle to integrate innovations with existing competencies (Orlikowski, 2000). To this end, Orlikowski (2000) has identified two limitations in the extant research on digital technology and organisations: The tendency to overlook the inherent properties of digital technology that facilitate and constrain organisational transformation, and insufficient attention to how these properties interact with organisational structures and processes over time (Orlikowski, 2000).

Characteristics of digital technology tend to fade into the background. To this end, extant research on digital technology and organisations suffers from two limitations according to (Harwood & Eaves, 2020; Hermanrud et al., 2023; Orlikowski, 2000).

- It tends not to open up the black box of technology fully. When working towards managing digital innovation, this is an essential first step; firms seeking to innovate their product and service offerings with digital technology need managers who are well-versed in the specific nature of digital technology (Harwood & Eaves, 2020; Hermanrud et al., 2023; Orlikowski, 2000).
- Research on technological innovation tends to adopt a macro-level perspective on its object of study, often resulting in high-level descriptions of strategic recommendations. To address this gap, the focus is on the key areas to be addressed when managing digital innovation processes as they unfold in practice (Harwood & Eaves, 2020; Hermanrud et al., 2023; Orlikowski, 2000).

Digitalisation has permeated every sector of society and industry. This widespread adoption has led companies and industries to confront intricate transition phases, introducing increased uncertainty into their prospects and potentially jeopardising their current competitive standing (Andersson & Rosenqvist, 2018). Simultaneously, digitalisation has unveiled many novel opportunities, offering organisations and businesses the chance to reposition themselves strategically regarding their operations and services (Andersson & Rosenqvist, 2018).

The information provided has been gathered from diverse sources and cited references to underscore the primary challenges linked to digitalisation. This compilation reflects the diverse array of challenges organisations face when navigating the digitalisation landscape, drawing on insights from various academic sources and research:

Understanding the nature of digital innovation: Digital technology has the potential to bring about radical change and challenge existing markets (Henderson, 2006). However, it requires a deep understanding of the specific characteristics of digital technology. Many previous studies have failed to fully explore the intricacies of technology (Orlikowski, 2000) Organisations need managers who are well-versed in the unique nature of digital technology to manage digital innovation effectively.

Taking a micro-level perspective: Traditional research on technological innovation often focuses on macro-level perspectives and high-level strategic recommendations. However, managing digital innovation requires a more detailed examination of the critical areas that arise while implementing digital innovation processes in practice (Andersson & Rosenqvist, 2018).

Embracing digitalisation across industries: Digitalisation has permeated all sectors and industries, creating challenges and opportunities. It has blurred industry boundaries, reshaped markets, and affected firms' strategies, structures, and management processes (Yoo et al., 2010). Organisations must adapt to the changing landscape to maintain their competitive position.

Challenges in platform management: Technical platforms play a crucial role in digitalisation processes, acting as intermediaries in service innovation. Managing these platforms involves complex patterns of cooperation and competition (Andersson & Rosenqvist, 2018). Companies need to navigate the shifting dynamics of platform leadership and intermediation.

Harnessing big data: Big data presents strategic, value, and operational challenges, including data sharing, privacy, and ethics (Andersson & Rosenqvist, 2018). Organisations must address issues related to data distribution, value creation, and the translation of data analytics into valuable services.

Adapting to user-centric systems: Changing consumer behaviour, such as the sharing economy, challenges traditional product-based business models. Organisations must

respond to customer demands for access over ownership, often through digital support systems. This shift impacts marketing operations and requires continuous customer engagement (Frenken & Schor, 2019).

Scaling digital pilots: Successful pilot projects often struggle to transform into scalable business models for larger markets (Andersson & Rosenqvist, 2018). Organisations must navigate uncertainties related to scalability and align their pilot successes with broader business strategies.

Transitioning to service-based models: Many industries are shifting from product-centric to service-based business models during digitalisation (Andersson & Rosenqvist, 2018). This transition requires new organisational structures, metrics, marketing strategies, and customer interactions.

Creating cross-industry collaborations: Digitalisation encourages network interdependencies that span industry boundaries. Collaborative innovation processes involving small and large companies become essential for sustainable digital transformation (Ehret & Wirtz, 2017).

Addressing political and institutional challenges: Digitalisation brings political and institutional challenges related to security, intellectual property, privacy, and trust (Andersson & Rosenqvist, 2018). These companies must engage with policymakers to influence regulations and policies that balance business interests with protecting individual rights.

In conclusion, the management of digital innovation is a multifaceted challenge that transcends internal organisational issues. It is a strategic and societal concern that requires a holistic approach to address the diverse challenges posed by digitalisation. Organisations must navigate these challenges effectively to stay competitive and thrive in the digital era.

2.4.4 DIGITAL INNOVATION PROCESS

Managing digital innovation presents a significant challenge, requiring a deep understanding of the unique properties of digital innovation processes (Yoo et al., 2010). This complexity becomes evident as organisations navigate the rapidly evolving landscape of digital innovation (Yoo et al., 2010). Such a rapid pace of digital innovation is facilitated by the adaptable nature of digital technologies, which can be easily reconfigured (Tiwana et al.,

2010). This pace of change becomes even more demanding when firms incorporate digital components into traditional products, creating hybrid or “smart” products.

The inherent generativity of digital technology further complicates the management and predictability of digital innovation processes (Avital & Te'Eni, 2009). These interconnected challenges underscore the need for organisations to develop strategies that account for the dynamic nature of digital innovation. Digital technologies constantly evolve towards higher processing capacity and lower cost. As digital technology becomes increasingly ubiquitous and affordable, hindrances to engaging in digital innovation are removed, thus enabling new constellations of actors to generate, develop, and fund novel digital products and services (Yoo et al., 2010).

These unique properties of digital innovation processes call for firms to challenge established views and assumptions about the role and configuration of their product and service portfolio, their relationships to the digital environment, and how organisational properties are configured to support innovation work.

2.5 DIGITAL TRANSFORMATION

Digital transformation appertains to adopting disruptive technologies to increase productivity and value creation. Digital transformation creates the opportunity for technology innovation, new business models, and cross-industry collaboration (Matt et al., 2015).

The expanding body of literature on digital transformation has illuminated the distinctive attributes of digital technologies, emphasising their adaptability and malleability (Kallinikos et al., 2013). Furthermore, existing literature recognises how these distinct properties of digital technologies create fresh prospects for establishing innovative infrastructures, products, and business models (Ancillai et al., 2023; Broccardo et al., 2023; Haefner et al., 2023; Madanaguli et al., 2023). Along this trajectory, they are reshaping the approaches to organising for innovation.

Digital business transformation disrupts businesses across all industries by breaking down barriers between people, businesses, and things. By overcoming these barriers, organisations can develop new products and services and find more effective business methods. Organisations achieve this by transforming processes and business models, empowering workforce productivity and innovation, and personalising customer experiences (Schwertner, 2017).

Digital transformation does not end with the implementation of new technology. Organisations should think beyond technology to embrace digital transformation. Only with a comprehensive renovation of an organisation can businesses realise the benefits of digitisation (Matt et al., 2015).

Digital technologies drive innovation and induce IT consumerisation, impacting the behaviour of customers and employees in organisations (Drechsler et al., 2020). This transformation, unique due to socio-technical inertia, leads to tensions between old and new organisational and technological elements as firms balance their past and adapt to the digitised environment (Gregory et al., 2015). Digital transformation, a response to IT consumerisation, involves resolving these tensions and adapting to changing environmental conditions shaped by digital innovation (Drechsler et al., 2020).

Digital innovation and transformation are intimately intertwined, with digital innovation often catalysing profound alterations in information systems, organisational structures, roles, and mindsets. These changes are contingent upon factors such as resistance to change and inertia (Gregory et al., 2015).
At its essence, the primary driving force behind digital transformation is digital innovation, fundamentally reshaping the corporate landscape by adopting customer-centric strategies and incorporating innovative business models (Gregory et al., 2015).

2.5.1 DRIVERS OF DIGITAL TRANSFORMATION

A recent comprehensive review of the emerging literature on digital transformation by Vial (2021). (Vial, 2021) provides an essential foundation for gaining a holistic understanding of digital transformation This review serves as a valuable starting point for further exploration of the intersection of digital innovation and the IT-induced transformation of organisations.

Vial (2021) states it is essential to recognise that organisations typically undergo evolutionary changes during environmental stability, but they may periodically embark on more radical and transformative organisational shifts when confronted with a rapidly changing external landscape.

From this perspective, it becomes apparent that organisational digital transformation is primarily instigated and propelled by factors originating in their immediate environment. These factors pressure organisations to secure essential resources vital for such organisations' survival. The upcoming sections explain some of these external factors, collectively called the "digital environment" in Figure 2.3, shedding light on their role and impact (Vial, 2021).

Figure 2.3 suggests three layers: strategy, structure, and technology. The approach transitions from conventional sequential production networks to vibrant, digitally interconnected environments propelled by inventive business frameworks. The structural layer evolves from vertical hierarchies to distributed network organisations enabled by new product development, indicating a shift towards flexibility. Technologically, it transitions from controlled enterprise architectures to generative digital platforms, promoting open and scalable IT environments for innovation.

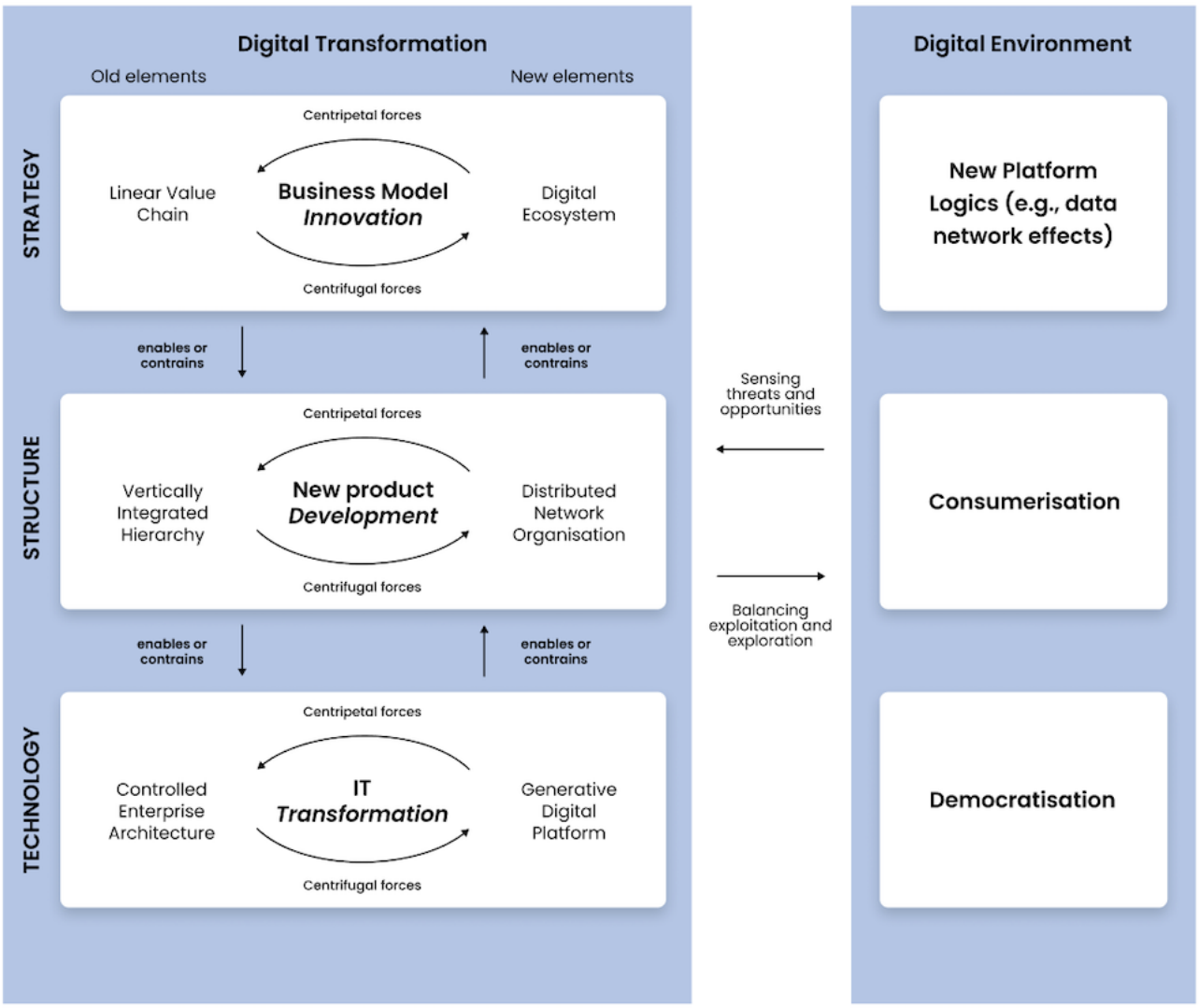


Figure 2.3 Drivers of digital transformation (reproduced from (Vial, 2021)

Figure 2.3 illustrates the digital transformation process, highlighting its impact on an organisation's strategy, structure, and technology. Traditionally, businesses followed a linear value chain and operated within vertically integrated hierarchies with controlled enterprise architectures. Digital transformation, however, introduces new elements that reshape these traditional models. Regarding strategy, it drives business model innovation by integrating digital ecosystems, allowing for more interconnected and dynamic business practices. Structurally, it necessitates shifting from hierarchical to distributed network organisations, enabling faster and more innovative product development. Technologically, it transforms IT systems to support new digital capabilities, adopting generative digital platforms that promote flexibility and scalability.

The digital environment fosters new platform logic, such as data network effects, which drive value creation and competitive advantage. It also leads to consumerisation, where consumer technology and expectations influence business practices, and democratisation, where access to information and technology is more widely available. Centrifugal forces push organisations outward from centralised models to more decentralised and interconnected structures. Navigating this transformation requires sensing threats and opportunities while balancing exploiting current capabilities with exploring new innovations. The figure encapsulates this evolution, emphasising the need for strategic, structural, and technological shifts to thrive in a digital landscape.

The model also addresses the digital environment, introducing new platform logic, consumerisation, and democratisation, emphasising data network effects, and shifting towards user-centric models. It is influenced by centrifugal forces promoting innovation and centripetal forces maintaining existing structures. Balancing current capabilities and exploring new opportunities is vital in navigating the digital landscape, intending to sense threats and seize opportunities (Vial, 2021).

2.6 THE RELATIONSHIP BETWEEN AN AIRLINE ORGANISATION AND DIGITAL INNOVATION STRATEGY

Digital innovation strategy brings digital technologies into the core of innovation planning. In previous years, digital innovation focused on implementing and adopting information technologies, like new digital technology systems and knowledge management systems, including data and developmental algorithms ontology. Airline organisations following this

path are in a much better competitive position should these rules be applied. Various studies indicate that the availability of digital data is a critical foundation for any organisation's digital innovation strategy (Chae, 2019).

2.6.1 DIGITAL ENABLERS FOR AN AIRLINE ORGANISATION

At the core of original possibilities, the digitally orientated customers are no longer solely interested in the destination, travelling from point A to point B, but also how the airline organisation makes customers feel accepted and appreciated throughout the journey. Accordingly, airline organisations must implement new initiatives to drive value faster than before, invest in technology and improve engagement that would naturally lead to increased profits in improving the digitally orientated customer’s experience. Bearing in mind that most customers book their tickets digitally, airline organisations are in a position to customise their travel offerings.

Furthermore, airline organisations should consider positioning themselves as e-commerce retailers by drawing inspiration from successful models like Amazon to develop an effective digital strategy. By adopting a suitable digital revenue strategy, airlines can enhance their services and revenue streams (Avram, 2017).

Digital technology's miniaturisation and widespread accessibility have streamlined innovation building blocks. A key aspect of digital transformation is the increased availability of technology. However, airline organisations face the challenge of swiftly acquiring and deploying viable business models to execute their planned digital strategies (Saarikko et al., 2020).

Saarikko et al. (2020) recommend five critical elements for organisations to become digitally conscious:

Start with the basics and build the advantages: Digital transformation is related to artificial intelligence, machine learning or data, thereby necessitating investment, time, and the appointment of the requisite employees before advantages can be realised. Digital transformation is a socio-cultural process rather than a technical achievement, encompassing many elements outside the technical realm. That facet does not suggest that technology is insignificant but that organisational ethos and philosophy are also change elements rather than technological augmentations only (Ancillai et al., 2023; Bahoo et al., 2023; Saarikko et al., 2020).

Implement a strong brand affiliation: Organisations with a stable brand name have an advantage when implementing digital innovation. Participating in an organisational environment might alleviate risk and create an upfront advantage, whereby reputable organisations gain rapid entry into technological knowledge and digital business models. In contrast, lesser organisations with unknown brand awareness can utilise their technical partner's potential to ascertain a position to build and scale up their contribution (Ancillai et al., 2023; Bahoo et al., 2023; Saarikko et al., 2020).

Participate in standardisation plans: Digital innovation can merge many digitised technologies that are comparatively mature and easy to implement. However, such standardisation is still more complex than this. The goal of digital transformation depends on an organisation's ability to obtain, implement, and support various technologies simultaneously without failure. Standardisation is not only a technological matter; it also comprises a meaningful strategic element that should interest an airline's senior management (Ancillai et al., 2023; Bahoo et al., 2023; Saarikko et al., 2020).

The importance of data ownership and ethics: The comprehensive development of data and information is not a significant element of digital transformation; working with digitised products, services, and automated/online business models is inevitable. With uncountable connected data points, airline organisations have an excellent opportunity to deliver connectivity and personalised solutions and capture a more significant part of the aviation industry. Digitised services can be used concurrently for organisational and customer purposes; airline organisations can create unmatchable offerings that accommodate the organisation and the customer and create numerous value propositions. The ethical dilemma introduces multiple challenges. First, customers may agree to share individual information with airline organisations, which does not permit anyone to combine data from numerous organisations or accumulate a complete picture of customers' activities. Second, knowledge and information have substantial damaging threads should the information be mismanaged. Improved mindfulness of the accountabilities of information management is a breakpoint concerning an airline organisation's digital maturity (Ancillai et al., 2023; Bahoo et al., 2023; Saarikko et al., 2020).

Be accountable for change and advocate organisation-wide buy-in: By executing Internet of Things (IoT) solutions, airline organisations decided to end conventional ways and move from direct value chains towards digital networks. However, a change like this involves

a solid vision and deliberating the standard norms of an airline organisation, including current business processes, standards, and principles. Senior management must create digital transformation efforts rooted in middle and lower management to reduce outcome vagueness and infuse all organisational aspects. Elevating digital awareness can develop an airline organisation's aptitude to control digital technology and transformation (Belle & Dyk, 2019).

2.7 IMPACT OF DIGITAL INNOVATION ON AIRLINE ORGANISATIONS

2.7.1 DATA CHALLENGE

The following content derives from a comprehensive analysis of the challenges and opportunities presented by data usage in the aviation sector, particularly in the context of digital transformation and customer experience enhancement. Each area corresponds to a specific aspect of this analysis and serves as a structured guideline to explore the critical aspects of data utilisation and digital transformation in the aviation sector, enabling a deeper understanding of the challenges and possible avenues for improvement.

The aviation sector is very competitive and uses data for a smooth customer experience. Quality data availability uses the IoT to ease the customer experience and build a competitive advantage while confirming that the travel service offering is secure for customers and customer information (Lamb, 2018).

Availability and data quality: Collecting and managing data require comprehensive IT infrastructure, servers and digital technology. Inadequate information and communications technology (ICT) infrastructure can limit digital innovation strategy for airline organisations. Implementing the correct data infrastructure can be a significant investment, but the cost is becoming more affordable as broadband infrastructure becomes more accessible than before. The more data, the higher the pressure on information infrastructure and technology. Ensuring adequate access to big data means creating infrastructure and security measures for airline organisations to benefit from data availability. Many of these measures are still in the early stages of maturity (Keller, 2016).

Interoperability: Big data also means great capacity and agility; as additional information is generated it becomes more complex to obtain valuable knowledge. Hale (2017) advocates that "approaches to implementing critical, enabling IT infrastructure capabilities must be flexible, reconfigurable, and updatable. Establish accessibility and interoperability among

disparate, heterogeneous tools, models, and other data sources for critical, enabling capabilities. It seems less complicated than it is but much more challenging to achieve within the available technology and tools. Current digital technology platforms might be substituted at a high-cost, and airline organisations might push against the standard format (Keller, 2016).

Industry collaboration: Data sharing within the airline industry might be difficult due to a lack of collaboration. Baker and Mahmood (2012) indicate that difficulties could arise from governance and standards or an industry-wide understanding of confronting important data complexities. The promise of big data has already shown potential for future innovations in data distribution in the aviation industry.

Possible solutions for the data challenge: Evolving system-thinking and engineering processes and structures Hale (2017) and on-demand computing Keller (2016) are potential answers to big data's methodological complexities. Numerous software solutions could be key role players in creating these data platforms. Focusing more on a business model modification instead of concentrating only on technical resolutions might be beneficial (Chen et al., 2013).

2.7.2 SECURITY

As digital innovation moves towards IoT and big data environments, it requires tremendous data security and privacy. The risk of data loss or data leakage can have a harsh impact on the brand and confidence of an organisation (Rao & Selvamani, 2015).

Data security: Cybersecurity dangers are very likely to intensify alongside the expansion of digitalisation. Dependency on digital devices and connected networks constantly expands data transmission, emphasising the risk of information theft. Typically, people are a vulnerability in the security risk, irrespective of technical platforms and solutions. Phishing and cyber-attacks are everyday actions in the current connected world and are significant risks for retrieving sensitive information (Lamb, 2018).

Balancing cybersecurity with local and international security: The aviation industry is mindful of security within the cyber space. With IoT technology, airline organisations hold more identity and personal data about their customers, helping to maintain data security and establish an appealing target for data breaches (Rao & Selvamani, 2015).

Possible solutions: According to Sun et al. (2014), the following suggestions can address security challenges. Solutions include continuous monitoring, incorporating machine learning systems, implementing reaction strategies to reduce the threat of data breaches, and sharing information throughout the industry to increase security awareness. Airline organisations should define cybersecurity methods, actions and plans and involve employees in cybersecurity training and risk assessment plans.

2.7.3 HUMAN ELEMENTS IN ENTERPRISES

Employees' "fragile" technical competencies can be resolved in numerous ways (Baig et al., 2017). Recommendations include utilising the capability of technical associates and using outsourced assistance rather than internal solutions.

Transformation of the workforce: Nevertheless, Baig et al. (2017) warn: "Organisations should resist the urge to cast every decision about new technologies as a binary choice between developing technology from scratch and buying it from a vendor. Instead, organisations should frame these decisions in terms of a development spectrum that ranges from proprietary one-off solutions to open platforms that a network of developers can build on, to using algorithms created by a partner or even a customer."

Resistance to change: Roleplayers across industries indicate aversion to change and absence of the right organisational and governance model, as obstacles to digitisation. Hesitancy to change may come from the management structure, and employees are an essential factor. Abollado et al. (2017) indicate that resistance to change among staff originates from the concern that organisations might manipulate information to observe employees. Staff might fear new digital technologies being implemented to replace them. Senior management must ensure that the adoption of digital technologies empowers workers, enabling them to carry out their tasks better and more efficiently, more productively, and more ergonomically (Abollado et al., 2017).

Organisational structure: If resistance to change originates from the airline organisation's business structure, improved organisational structures might be considered. Zheltenkov et al. (2020) emphasise implementing digital transformation standards and supporting digital initiatives, leading to potential solutions.

Possible solutions: Baig et al. (2017) mention the following possible solutions for challenges to organisational changes: Ensure that digitalisation and automation within an airline organisation support employees and implement succession planning and training employees to identify digital champions to help steer digital transformation. Airline organisations should avoid clumping all digital specialists together or spreading them too widely throughout the airline, and implement agile, digitally innovation-focused airline organisational structures.

2.7.4 SOCIAL OUTCOMES

The IoT provides airline organisations with an incomparable advantage in enabling customers with a comprehensive and flexible service, including adaptability and a personalised travel experience

Customer involvement and interaction: Lamb's (2018) Lamb (2018) examination of customer engagement highlights several key elements. These elements encompass customer empowerment, active listening to customer feedback, striving to delight the customer, gaining a deep understanding of customer preferences, and fostering trust. While collaboration between various stakeholders to share information and enhance the customer experience is a commendable approach, it does not automatically guarantee customer compliance.

An important challenge in the realm of the Internet of Things (IoT) revolves around employees' reluctance to trust the use of their personal data, as identified by Zheltenkov et al. (2020) (Zheltenkov et al., 2020). The advancement of technology knowledge introduces new research methodologies and data analysis techniques, which may encounter resistance from individuals who are hesitant to embrace these changes, as observed in the study by Ambur et al. (2016) (Ambur et al., 2016).

Even though different parties concur with distributing information for an improved customer experience, it does not guarantee that customers will conform. An essential test for the IoT is employees' lack of trust in personal data usage (Zheltenkov et al., 2020). As technology acumen creates new research methods and data analysis, people might resist these changes (Ambur et al., 2016).

Possible solutions: Lamb (2018) suggests the following solutions to social outcomes: Airline organisations should prioritise employee and customer experiences from development and implementation to execution and gather data from more representative resources to prevent unfair algorithms. The airline organisation must be transparent on how customer data is used

and create and investigate data to share individual experiences about how technology improves customer experience.

2.7.5 THE CHALLENGE OF GOVERNANCE AND REGULATIONS

Aviation is global; therefore, international recommendations and standard rules restrain the regulation of the industry. Due to a complete deregulation process, airline organisations can conduct aviation services anywhere as long as local and international regulations are met (Tjørhom, 2010).

Legal regulations and standards: Regulatory accountability for civil aviation in South Africa resides under the South African Civil Aviation Authority (SACAA) (Ruwantissa, 1998). According to Lamb (2018), (Lamb, 2018) regulations “may slow the process of digital innovation in aerospace, but failure to consider them would jeopardise the safety considerations that are part of aviation's foundation”.

Possible solutions: Lamb (2018) suggests the following solutions to governance and regulatory challenges: Airline organisations should create structures for using information in discussion with organisations and the public, government and legislature. A focus on governmental and aviation organisational involvement and community participation would guarantee general regulations are transparent and fair.

2.7.6 INVESTMENT

Traditionally, obstacles to entering the aviation industry are excessively high. However, the industry can be disrupted if digitally advanced newcomers according to their strategic priorities.

Competition: The IoT will increase data availability and technological accessibility generated by the aviation industry, and given the industry's capital-intensive nature, the cost associations are expected to increase for the airline organisation operators in the process of transformation toward [the] IoT ecosystem” (Nwankpa & Merhout, 2020). Considering the high rate of digitalisation combined with the risk from new entrants, intellectual investment is vital to ensuring a return on investment from digital innovation (Nwankpa & Merhout, 2020).

Understanding investment: A known challenge to digitalising for airline organisations is to find the optimal digital answer, highlighting the advantages of digital innovation and finding

the correct technology partner. It remains challenging for airline organisations to understand how and where to invest (Nwankpa & Merhout, 2020).

A possible solution to the investment question: Lamb (2018) suggests the following solutions to social outcomes: Find digital leaders within the airline organisation and create agile departments to create minimum viable products - airline organisations should embrace a systems thinking strategy. Airline organisations should establish clear operational savings, effectiveness, revenue growth and innovation goals and measure the relevant outcomes. Airline organisations should focus on investing proactively in the correct digital technology drivers.

2.8 CONCLUSION

Digital innovation refers to the introduction of new technologies or the use of existing technologies in novel ways to create value, such as enhancing customer experiences or developing new business models. It focuses on the use of digital tools and platforms to improve processes, products or services. On the other hand, digital transformation is a broader, strategic process that involves the comprehensive integration of digital technologies into all areas of a business, fundamentally changing how the business operates and delivering value to customers. It does not only entail new technologies but also transforming an organisation's culture, operations, and strategy to leverage digital innovations effectively.

This chapter provided a thorough examination of the airline industry's embrace of digital innovation, focusing on enhancing operational efficiency and enriching the customer experience amid the challenges of the digital age. It highlighted the strategic importance of digital tools, including mobile technologies, big data, and AI in fostering competitive advantage and operational resilience. The analysis also delves into critical challenges such as cybersecurity, privacy concerns, and the need for continuous adaptation to technological advancements. It emphasises the strategic approach required for successful digital transformation, involving organisational commitment, investment in technology, and fostering a culture of innovation.

Chapter 2 frequently mentioned the terms digital innovation and digital transformation. It is important to make a clear distinction between the two terms to understand their differences and importance.

3 THEORETICAL FRAMEWORK

3.1 INTRODUCTION

This study addresses the challenge of formulating and executing a digital innovation strategy within the airline industry, with a focus on optimising business potential. It aims to explore how digital innovation can impact customer-facing outcomes and business-facing benefits in airline organisations. In addition, the study seeks to highlight the internal areas, systems and processes airline organisations should implement in building a digital innovation strategy. It emphasises the importance of aligning technology with business strategy and marketplace trends and stresses that digital innovation should contribute to an organisation's growth, transformation, and customer base without disrupting its core values. Ultimately, the research aims to provide strategic planning frameworks for adopting digital innovation to overcome challenges and extract its inherent value in the airline industry.

This chapter aims to evaluate and contrast various theoretical constructs in digital innovation. Due to significant advances in information technology, digital innovation has emerged as a fundamental element in the contemporary socio-economic environment. Brynjolfsson and McAfee (2014) state that applying theoretical models is essential for comprehending and elucidating this emergent phenomenon, as they provide a systematic approach to examine and interpret the processes integral to digital innovation. Theoretical constructs provide a framework for elucidating the mechanisms and dynamics underlying digital innovation. In addition, these theoretical structures aid in forecasting and identifying future trends and patterns based on an analysis of both historical and current data (Rogers, 2003). Using these theoretical perspectives permits a nuanced examination of digital innovation and facilitates the development of rigorous, data-driven strategies to promote its advancement (Christensen, 2013).

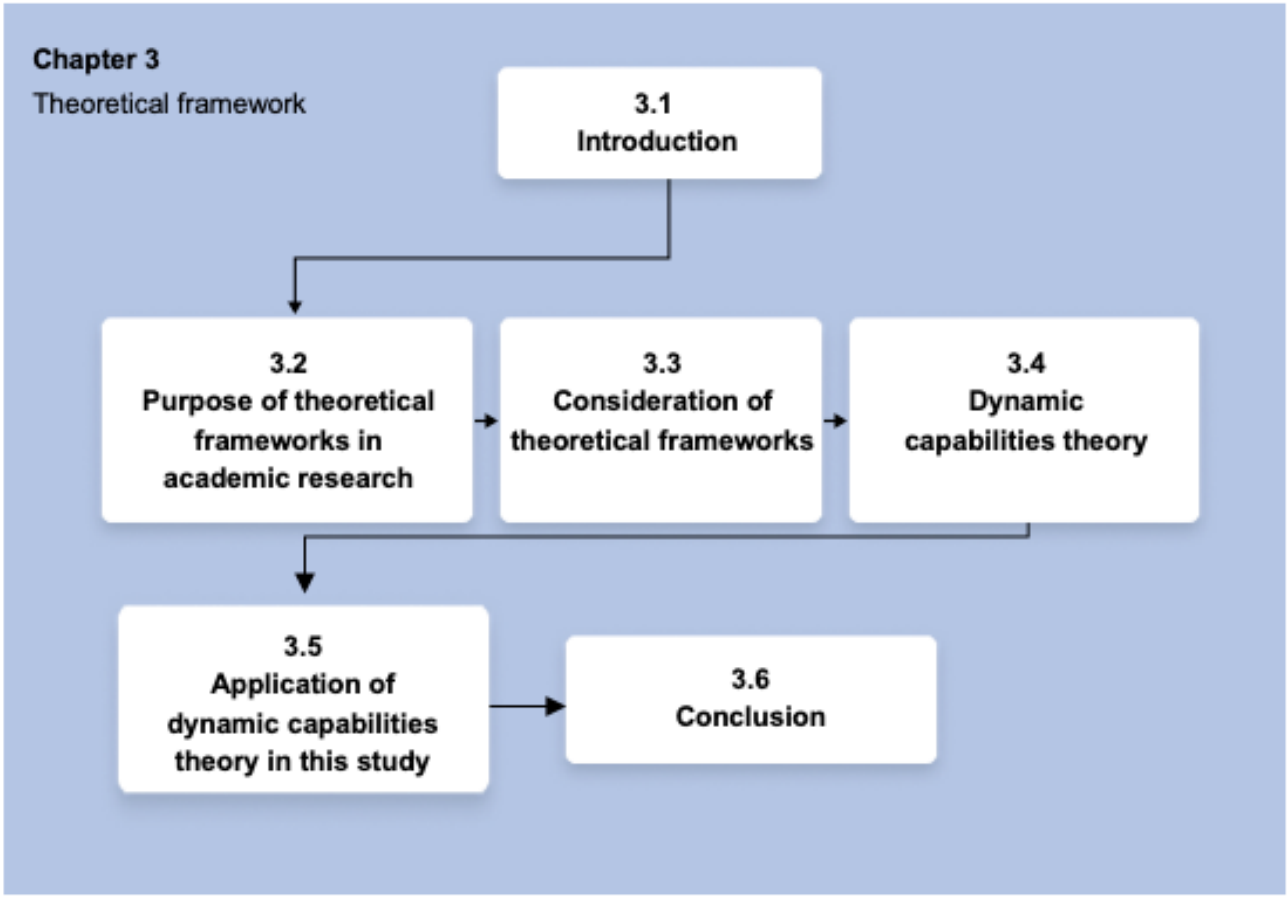


Figure 3.1 Overview of Chapter 3

3.2 PURPOSE OF THEORETICAL FRAMEWORKS IN ACADEMIC RESEARCH

Theoretical frameworks play a central role in reasoning and interpretation processes, guiding our observational endeavours and subsequent comprehension of those observations (Charmaz, 2014). These structures help researchers bridge the distance between abstract concepts and concrete occurrences, thus converging theoretical hypotheses with empirical facts (Creswell & Creswell, 2017). The primary objective of incorporating theoretical constructs into academic research is formulating a generalised assertion that clarifies the interconnectedness of diverse phenomena (Yin, 2014). Therefore, this endeavour enables a comprehensive understanding of the interaction between and interdependence among the changes occurring within these phenomena (Flyvbjerg, 2006).

Incorporating theory into research primarily seeks to formulate a general statement articulating the interrelationships between various phenomena, thereby facilitating a comprehensive understanding of how changes within these phenomena are interrelated (Sunday, 2008). Holt et al. (2014) explain that in research, theory has been adopted as an invisible object and is a component of human thought; theory denotes knowledge in uncertain

circumstances. The significance of a theory varies according to the extent of the global perspective (Holt et al., 2014).

Theoretical frameworks are crucial in guiding academic research, providing researchers with a lens through which to interpret their findings and structuring the entire research endeavour (Anfara Jr & Mertz, 2014). These frameworks are the foundation of an investigation, anchoring the research questions, methodology, and analysis. A theoretical framework is a structure supporting a theory in a research study. It gives the investigation a clear focus and direction (Creswell & Creswell, 2017). Moreover, a framework specifies what is to be studied, how it is to be studied, and why it is examined in a specific manner. As it influences the selection and interpretation of data, the framework is a crucial component of research design (Yin, 2014).

Theoretical frameworks also establish a connection with prior knowledge. They connect a study to established theories, facilitating a broader comprehension of the research problem (Williams et al., 1995). For instance, if a study were to investigate social inequalities in education, it could use the theoretical framework of social constructivism to guide its analysis, thereby ameliorating the deficit between the collected data and existing theories on social stratification.

In addition, theoretical frameworks are essential to preserving the rigour of academic research. They ensure that a study is grounded in existing academic discourse and contributes meaningfully to the scholarly conversation (King et al., 2021). A well-defined theoretical framework can enhance the credibility of a study, thereby making its findings more persuasive and reliable.

In conclusion, theoretical frameworks are essential to academic research. They provide direction, facilitate interpretation, connect research to existing theories, and increase a study's credibility. They are indispensable for constructing and conducting rigorous, meaningful research (Eisenhardt, 1989; Zhang et al., 2023).

3.3 CONSIDERATION OF THEORETICAL FRAMEWORKS

Based on its purpose, this study has several theoretical perspectives, each significantly relevant to digital innovation. The chosen theories are entrenched in the discourse on

innovation and digital strategies within organisational settings. The diffusion of innovation theory (Section 3.3.1) explains how new ideas, products or technologies spread and are adopted by individuals or groups over time, while the innovation value chain theory (Section 3.3.2) focuses on the process of creating, delivering, and capturing value from innovations within an organisation or industry. Open innovation theory (Section 3.3.3) focuses on the idea that organisations can benefit from both internal and external sources of innovation by collaborating with external partners, customers, and stakeholders to drive innovation and create value. Dynamic capabilities theory (Section 3.3.4) relates to an organisation's ability to adapt, change, and reconfigure its resources and processes in response to changing external circumstances and competitive environments. It emphasises an organisation's capacity to learn, innovate, and effectively manage change to achieve long-term competitive advantage.

These theories offer perspectives for discerning the factors influencing digital innovation and understanding how organisations strategise and adapt. The upcoming sections explore these influential theories, demonstrating their relevance to the focus of digital innovation.

3.3.1 DIFFUSION OF INNOVATION THEORY

The diffusion of innovation theory (DOI) proposed by Rogers (2003) attempts to explain how, why, and at what rate new ideas and technologies diffuse. This theory can help explain how digital technologies or solutions proliferate within a market or an organisation in the context of digital innovation. The DOI theory can be used to analyse the factors influencing the adoption of a new digital product, system or service and to forecast the adoption rate, characteristics of early adopters versus late adopters, and the barriers to widespread adoption. The DOI theory begins with the innovation process. An innovation might include a concept, method or entity perceived as novel by prospective adopting organisations, emphasising the need for change and adaptation. The inherent characteristics of the innovation significantly contribute to the explanation for varying adoption rates. Dibra (2015) distinguishes the characteristics of an innovation that serve as determinants for its uptake across various social strata. An innovation that can be substantiated poses less uncertainty to an organisation considering its adoption, allowing the organisation to learn through its implementation and exploration.

In the context of technological innovation, the diffusion of innovation (DOI) theory is frequently regarded as a significant paradigm for understanding change. According to this model, the innovation is modified and disseminated in a way accessible to various adopter levels

(Rogers, 2003). In addition, the DOI theory significantly emphasises the function of communication and professional networking in innovation adoption (Wejnert, 2002). Essentially, the DOI theory captures the process by which individuals and organisations assimilate a novel concept, strategy or philosophy (Rogers, 2003).

3.3.2 INNOVATION VALUE CHAIN THEORY

Innovation value chain theory views innovation as a sequential, three-phase process involving idea origination, conversion, and diffusion. In the context of digital innovation, the innovation value chain theory can serve as a valuable framework for interpreting the process by which ideas for digital solutions are conceived, developed, and disseminated within an organisation (Chesbrough, 2003). It may have implications for determining the efficacy of an organisation's strategy for nurturing digital innovation (Damanpour, 1991). Scholars widely recognise that we have entered an era commonly referred to as the Age of Innovation (Brynjolfsson & McAfee, 2014). Organisations need to comprehend the function and influence of innovation in an environment characterised by a proliferation of novel ideas and developments. Innovation is widely acknowledged as a critical catalyst for initiating change, enhancing procedures, and boosting performance across diverse sectors and institutions (Tidd & Bessant, 2020). Given this context, it is unsurprising that corporate leaders and primary decision-makers are devoting a growing quantity of resources to collecting data and intelligence on innovation (Chesbrough, 2003). Such measures are frequently accompanied by an analysis of the innovation strategies utilised by other organisations to enhance their innovative capacities (Smit, 2015). This study underscores the pivotal role of harmonising structural and process agility within airline organisations to achieve efficacy in digital innovation, enabling the organisation to reap the rewards of innovative practices. Existing research has identified a correlation between an organisation's culture and its propensity to foster innovation (Smit, 2015).

3.3.3 OPEN INNOVATION THEORY

According to the theory of open innovation, organisations should utilise internal and external ideas as well as internal and external routes to market to promote technological advancement (Chesbrough, 2003). This theoretical framework promotes collaboration with, among others, technology organisations, customers, and online communities to facilitate the development and implementation of digital solutions (Bogers et al., 2019). It may reveal how opening up the innovation process can accelerate the development of digital technologies and create new opportunities (Chesbrough, 2003). Open innovation (OI) can be defined as a decentralised innovation methodology predicated upon the intentional administration of knowledge

exchange across organisational frontiers, employing both monetary and non-monetary mechanisms in congruence with the organisation's prevailing organisational model presents a variety of confrontations for the management of human resources immersed in innovation (Bogers et al., 2019). The management of innovation moves away from being primarily dictated by organisational rules and administrative frameworks to being significantly influenced by the organisation's competencies and capacities, placing innovation and creativity at the heart of the organisation's ethos (Chesbrough & Appleyard, 2007). This facet implies that professionals engaging in open innovation (OI) activities and teams must familiarise themselves with and improve their open innovation-specific skills (Bogers et al., 2019), which, in turn, allows them to draw inspiration and contribute effectively to realising OI's benefits (Podmetina et al., 2018). For an airline organisation to embrace digital innovation, it is essential to apply the theory of open innovation to transform the entire organisation into an innovative entity that would be difficult for rivals to replicate.

3.3.4 DYNAMIC CAPABILITIES THEORY

Dynamic capability theory suggests that the ability of an organisation to integrate, build, and reconfigure internal and external competencies is essential to attaining a competitive advantage (Teece et al., 1997). Regarding digital innovation, this theory could be used to analyse how the ability of an organisation to develop new digital capabilities and transform existing ones impacts its competitiveness (Soto Setzke et al., 2023). It suggests research into the role of learning, adaptability, and strategic management in promoting digital innovation. Organisations must adhere to a distinct trajectory or pathway of competency enhancement at a specific temporal juncture (Helfat et al., 2009). This trajectory not only delineates the accessible choices for the organisation in the present moment but also establishes constraints surrounding its potential internal repertoire in the future. Consequently, organisations periodically engage in enduring, quasi-irreversible commitments to domains of expertise (Helfat & Peteraf, 2003).

Organisations across sectors strive for agility to penetrate their markets faster with innovative products and solutions responsive to market demands (Ellonen et al., 2009). The framework for dynamic capabilities was developed to assist managers in sorting and prioritising the constant flow of contradictory data they encounter while striving for a competitive edge. The objective is not temporary efficacy, as seen in conventional management approaches, but rather the long-term maintenance of 'evolutionary adaptability' (Teece, 2007). To achieve this,

the organisation must develop the capacity to respond quickly and successfully to risks and possibilities in the organisation's ecosystem (Teece et al., 1997).

Each theory under consideration offers a distinct perspective, augmenting comprehension of digital innovation. These theories highlight distinct aspects of the innovation process, including the diffusion of emerging technologies, the various phases of innovation, and the crucial role of organisational adaptability. By incorporating these theories into this study, one can achieve a more sophisticated and nuanced comprehension of digital innovation.

3.3.5 CHOICE OF THEORY FOR THIS STUDY

The study adopted the theory of dynamic capability as the theoretical foundation for this investigation because of its focus on the ability of organisations to adapt their operations and competencies systematically in rapidly changing environments. Dynamic capability theory emphasises the iterative process of sensing, seizing, and transforming, which aligns closely with the continuous nature of digital innovation. Specifically, the theory's perspective on sensing opportunities and threats in the digital realm, seizing digital technologies, and transforming existing capabilities into new configurations offers a robust scaffold for examining how organisations not only adjust to but also influence the trajectory of digital advancements.

Using this theory, the study explores how organisations use digital technologies to reshape their capabilities and secure a competitive edge. It reveals how digital innovation drives organisational change, providing insights into its role in a digitally disrupted environment.

3.4 DYNAMIC CAPABILITIES THEORY

As this study delved into the dynamic realm of digital innovation in contemporary business, it chose to adopt the dynamic capabilities theory as a guiding theoretical framework. This choice is rooted in the theory's systematic approach, ideal for comprehending how organisations adapt and develop competencies within the ever-evolving digital landscape. By employing this framework, the research aims to uncover the strategic implications of digital innovation, with a particular focus on its transformative potential for organisations and their ability to maintain a competitive edge in this dynamic environment. The upcoming sections present a more detailed description.

3.4.1 OVERVIEW

How organisations achieve and maintain competitive advantage is the central question in strategic management. In response to this question, the dynamic capabilities theory comprehensively examines the fundamental processes by which organisations generate value (Teece et al., 1997).

In today's high-technology sectors, such as semiconductors, information services, and software, which are characterised by global competition, the need for an all-encompassing framework to comprehend the acquisition of competitive advantage has grown (Eisenhardt, 1989). However, traditional strategic approaches frequently fail to maintain a significant competitive advantage in these sectors, especially when digital innovation is the focus.

Successful international market participants are identified by rapid responsiveness, rapid and adaptable product innovation—particularly in the digital domain—and an adequate management capacity to coordinate and redeploy internal and external competencies (Teece, 2007). Nonetheless, industry observers have remarked that organisations can amass a substantial stockpile of technological assets while lacking diverse operational capabilities (Helfat et al., 2009), especially those required to drive digital innovation.

The concept of dynamic capabilities arose to emphasise two crucial elements that previous strategic discourses did not emphasise as much. The term dynamic indicates the ability to renovate and calibrate competencies per the evolving organisational landscape (Eisenhardt & Martin, 2000). Therefore, it becomes essential when variables such as time-to-market, the timeliness of initiatives, fast-paced technological advancement, and the uncertainties endemic to open competition and market conditions are operational (Zahra et al., 2006).

Conversely, capabilities highlight the crucial function of strategic management in modifying, integrating, and reconfiguring internal and external organisational skills, resources, and functional proficiencies to meet the demands of a changing environment (Helfat & Peteraf, 2003).

3.4.2 CRITIQUES OF DYNAMIC CAPABILITIES THEORY

Dynamic capabilities theory has influenced strategic management, providing insights into how firms adapt and thrive in changing environments. However, the theory has faced several criticisms and limitations.

One major critique is the vagueness and ambiguity of the concept. Critics argue that dynamic capabilities are often defined in broad and sometimes contradictory ways, making it difficult to pinpoint what constitutes a dynamic capability and how it can be measured. The theory has been described as tautological and lacking practical value because of its abstract nature (Sunder M & Ganesh, 2021).

Another significant issue is the lack of empirical grounding. Although dynamic capabilities have been widely discussed conceptually, a relative paucity of empirical studies validates the theory. This lack of empirical evidence has led to questions about the applicability and usefulness of the theory in real-world settings. Furthermore, the constructs of dynamic capabilities are often under-specified, making it challenging to operationalise and test them empirically (Barreto, 2010).

The theory has also been criticised for focusing on high-level, abstract constructs without providing clear guidance on how dynamic capabilities influence firm performance. This has led to difficulties understanding how firms can develop and deploy these capabilities effectively. Critics have called for more detailed and specific descriptions of the processes and routines that constitute dynamic capabilities (Kurtmollaiev, 2020). Another limitation is the overemphasis on large, well-established firms, with less attention given to how small and medium-sised enterprises (SMEs) and startups can cultivate and benefit from dynamic capabilities. These smaller firms' unique challenges and contexts are often overlooked, limiting the theory's generalisability and relevance across different types of organisations (Kuuluvainen, 2012).

Lastly, the role of individual agencies within the dynamic capabilities framework is frequently underexplored. The theory focuses on organisational routines and processes while neglecting the impact of individual actions and decisions. This oversight can lead to an incomplete understanding of how firms develop and utilise dynamic capabilities (Helfat et al., 2009).

While dynamic capabilities theory offers valuable insights into strategic management, its practical application is hindered by vagueness, lack of empirical evidence, under-specified constructs, an overemphasis on large firms, and insufficient consideration of individual

agency. Addressing these critiques could enhance the theory's robustness and utility in diverse organisational contexts.

3.4.3 HIERARCHY OF CAPABILITIES IN STRATEGIC MANAGEMENT

The hierarchy of capabilities in strategic management essentially reflects an organisation's adaptability and potential (Eisenhardt & Martin, 2000). The hierarchical model starts with routine capabilities, namely the basic elements that drive an organisation's day-to-day operations (Teece et al., 1997). However, their inherent simplicity and vulnerability to imitation limit their capacity to maintain a competitive edge over the long term (Winter, 2003).

Augier and Teece (2009) indicate that identifying opportunities requires environmental monitoring and a collaborative organisational culture promoting a decentralised authority structure. Capabilities associated with responding to identified opportunities and threats include investments in innovative technologies and creating flexible organisational models (Amit & Schoemaker, 1993).

Lastly, transforming capabilities ensure the alignment of organisational elements with the strategy. These are especially important when a new organisational model necessitates a significant organisational redesign or a company must maintain alignment with its changing environment. When rooted in a culture that values adaptability and experimentation, these skills can serve as a solid foundation for future benefits (Easterby-Smith et al., 2009).

3.4.4 THE DYNAMIC CAPABILITIES FRAMEWORK AS A SYSTEM

The dynamic capabilities framework primarily relies on resources and strategy as its core components. Both tangible and intangible resources meet specific criteria, making them valuable, rare, unique, and irreplaceable (Barney, 1991). These assets offer long-lasting competitive advantages, but their non-traceability poses challenges as regards acquisition.

The other component is strategy, which entails exhaustive analyses and actions to resolve high-stakes problems and counter rivals (Bersudsky et al., 2011). A well-conceived strategy consists of perceptive diagnoses, governing policies, and specific action plans, frequently resulting from trial and error.

While the resource-oriented perspective has impacted strategic management, it does not account for the need for resource regeneration in changing environments (Priem & Butler, 2001). The dynamic capabilities framework overcomes this limitation by integrating capabilities, resources, and strategies to form a system that improves competitive advantage. This system should align internal resources, tasks, and objectives with the ethos and strategic plan of the organisation.

The dynamic capabilities approach is notably relevant in today's fast-paced digital era, where digital competence is required to combine digital technologies with professional skills (Bogers et al., 2019). Therefore, a company's dynamic capabilities indicate its capacity to adapt to and influence organisational environments.

The framework emphasises specialisation or the added value obtained when resources are used collectively instead of individually (Teece, 2010). Indicative of their interdependence, the efficacy of a company's dynamic capabilities determines how quickly its strategy can organise its resources. Despite their theoretical distinction, these three components overlap in practical contexts, highlighting their collective importance for sustaining competitive advantage.

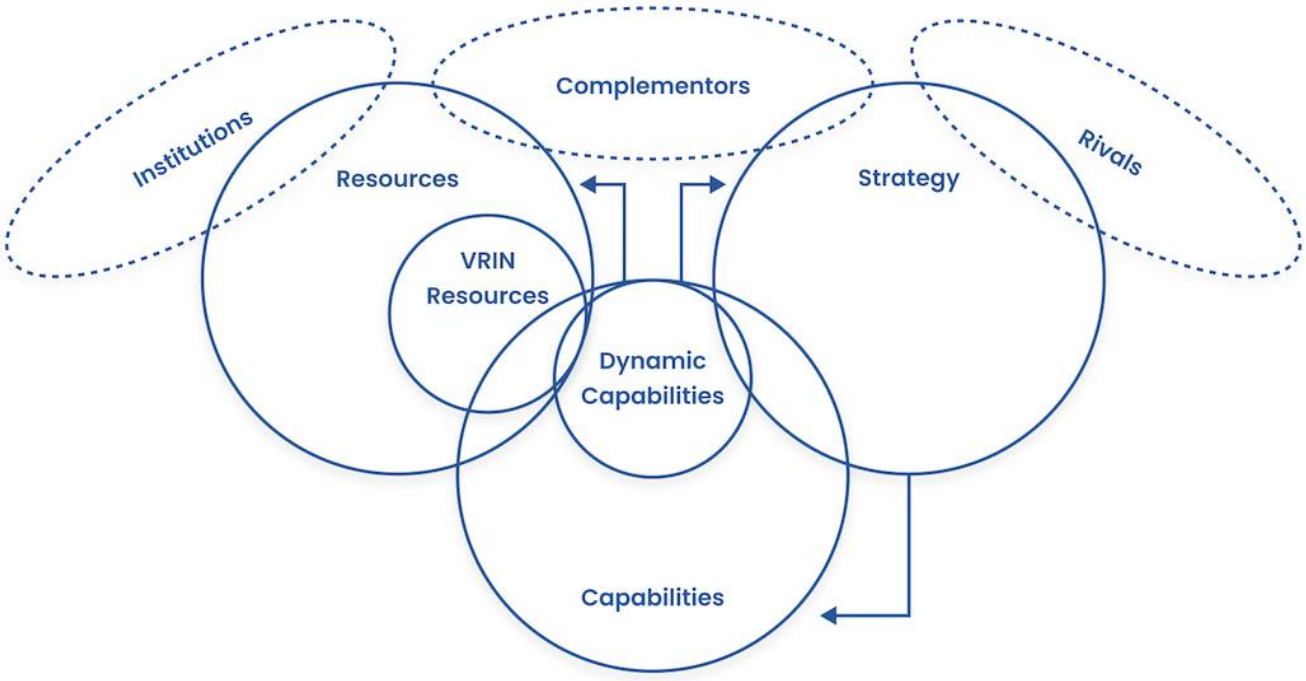


Figure 3.2 Dynamic capabilities framework as a system (reproduced from Teece, 2017) (Teece, 2017).

The dynamic capabilities framework as a system (reproduced from Teece, 2017) shows that dynamic capabilities bridge the deficit between a firm's resources and capabilities. This connection is crucial for forming an effective strategy, influenced by external factors such as institutions, complements, and rivals.

The arrows likely suggest a feedback loop or interaction between dynamic capabilities and the firm's resources and capabilities. Complementary institutions and rivals are shown as external to the firm's internal processes yet still influential to strategic considerations.

3.4.5 THE RELATIONSHIP BETWEEN ORGANISATIONAL MODELS AND DYNAMIC CAPABILITIES

Dynamic capabilities foster organisational models by enabling organisations to implement, evaluate, and fine-tune these models rapidly, primarily via management's architectural design, asset orchestration, and learning functions (Eisenhardt & Martin, 2000). This article examines the critical role of dynamic capabilities in organisational model innovation and the significance of organisational design for organisational models and dynamic capabilities (Helfat et al., 2009).

Management's ability to design and refine organisational models is a crucial characteristic of dynamic capabilities, applicable to both the construction of the initial model and the replacement and recombination of model elements (Helfat et al., 2009). An innovative company's first step is to identify consumers with unmet needs and who are willing and able to pay for a solution. According to Amit and Zott (2001), a successful organisational model should provide a customised solution that adequately covers expenses and ensures a satisfactory profit.

Chesbrough and Rosenbloom (2002) indicate that developing an organisational model requires in-depth comprehension of customer needs and familiarity with existing models. Creating a new organisational model in highly competitive economies is complex but not impossible (Afuah & Tucci, 2003). Emerging technologies such as the Internet of Things (IoT) might spark a new generation of organisational model innovation (Westergren & Holmström, 2012). The IoT enables physical objects to sense and communicate their status, creating opportunities for measuring consumer product usage and potentially moving to a usage-based rental model (Porter & Heppelmann, 2014). The sizable data generated by IoT sensors

represent a novel form of intellectual capital that organisations can leverage for internal innovation, external collaboration, and marketing and sales opportunities (Bughin et al., 2017).

3.4.6 THREE PRIMARY ELEMENTS OF COMPETENCIES IN DYNAMIC CAPABILITIES

The dynamic capabilities theory aims to clarify the foundations of organisational competitive advantage, thereby allowing entities to survive in fiercely competitive markets. Sensing, seizing, and transforming are the three primary dimensions of dynamic capabilities, and each plays a crucial role in an organisation's ability to navigate and flourish in complex, competitive markets (Augier & Teece, 2009; Helfat et al., 2009).

Sensing

(Zahra et al., 2006) Zahra et al. (2006) state that for organisations to identify and shape opportunities effectively, a continuous process of monitoring and exploring across technologies and markets is essential. This procedure necessitates a substantial investment in research and a thorough comprehension of consumer requirements and technological possibilities. Developing sensing capabilities requires a comprehensive understanding of latent demand, the structural transformation of industries and markets, and the responses of suppliers and rivals (Bogers et al., 2019). As opportunities abound, organisations must be capable of identifying novel prospects and trends, deciding which technologies to pursue, and identifying the most promising market segments to target (Helfat & Peteraf, 2015).

Seizing

In the context of dynamic capabilities theory, seizing refers to the mobilisation of resources to resolve identified opportunities and take advantage of them (Teece, 2007). This stage typically entails strategic decision-making, such as creating new organisational models or modifying existing ones, to respond to changing market conditions and exploit opportunities for competitive advantage (Helfat & Peteraf, 2015). In addition, seizing requires considerable investments in developing new capabilities and altering organisational structures, as well as a commitment to particular technologies and markets (Zahra et al., 2006). Therefore, effective grasping is critical to determining a company's ability to leverage dynamic capabilities for sustained competitiveness.

Transforming

Under dynamic capabilities theory, transformation is the self-renewal phase, during which organisations anticipate future opportunities and conceptualise new organisation model philosophies (Helfat & Peteraf, 2015). This stage entails incorporating these novel concepts into the existing framework, necessitating a significant organisational transformation to update the platform lifecycle (Zahra et al., 2006). Transformation also involves restructuring and reconfiguring resources and capabilities to address emergent market and technological trends, thereby ensuring the longevity and competitiveness of the organisation (Teece, 2007).

Figure 3.3 illustrates Teece's Dynamic Capabilities Framework, adapted for an airline's strategic approach to maintaining competitiveness and innovation in a dynamic environment. The framework is divided into three core dynamic capabilities: Sense, Seize, and Transform, each of which contributes to the airline's overall strategy. Together, dynamic capabilities and strategy establish and refine an organisational model that oversees the organisation's metamorphosis. In an ideal scenario, this transformation would generate substantial profits, allowing the organisation to maintain and expand its capabilities and assets (Helfat & Peteraf, 2015).

Sense: Identify Opportunities

- Technological Possibilities: The airline organisation continuously monitors the aviation industry and related technological fields to identify new technological possibilities. This could include advancements in aircraft technology, passenger service systems, automation, artificial intelligence for operations, and customer service enhancements.
- Technology Development: The airline invests in the development of new technologies tailored to its needs. This might involve developing proprietary software for booking and scheduling, enhancing in-flight entertainment systems, or innovating fuel-efficient aircraft designs.

Seize: Design and Refine Business Model; Commit Resources

- Anticipate Competitor Reactions: The airline organisation anticipates how competitors might react to its new technologies and services. For example, if the airline introduces a new customer loyalty program powered by AI, it considers how other airlines might

respond with their own offerings and strategizes accordingly to maintain a competitive edge.

- Defend Intellectual Property: The airline ensures that its technological innovations and business processes are protected by patents, trademarks, and other intellectual property rights. This protects its competitive advantages and prevents competitors from copying successful innovations.

Transform: Realign Structure and Culture

- Align Existing Capabilities: The airline organisation realigns its existing capabilities to support new technological implementations and strategic goals. This might involve retraining staff to use new technology, restructuring departments to better integrate new processes, or enhancing existing systems to support new functionalities.
- Invest in Additional Capabilities: The airline organisation invests in new capabilities required to maintain and enhance its competitive position. This could include purchasing new aircraft with advanced technology, investing in renewable energy sources for sustainability, or acquiring new software systems to improve operational efficiency.

Integration of Dynamic Capabilities into Strategy

The airline organisation's strategy is developed and refined based on the dynamic capabilities framework. By continuously sensing opportunities, seizing them through well-designed business models and resource commitments, and transforming the organisation to align with new capabilities, the airline ensures that its strategy is robust and adaptable. This integration helps the airline remain competitive, innovate continuously, and respond swiftly to market changes and technological advancements.

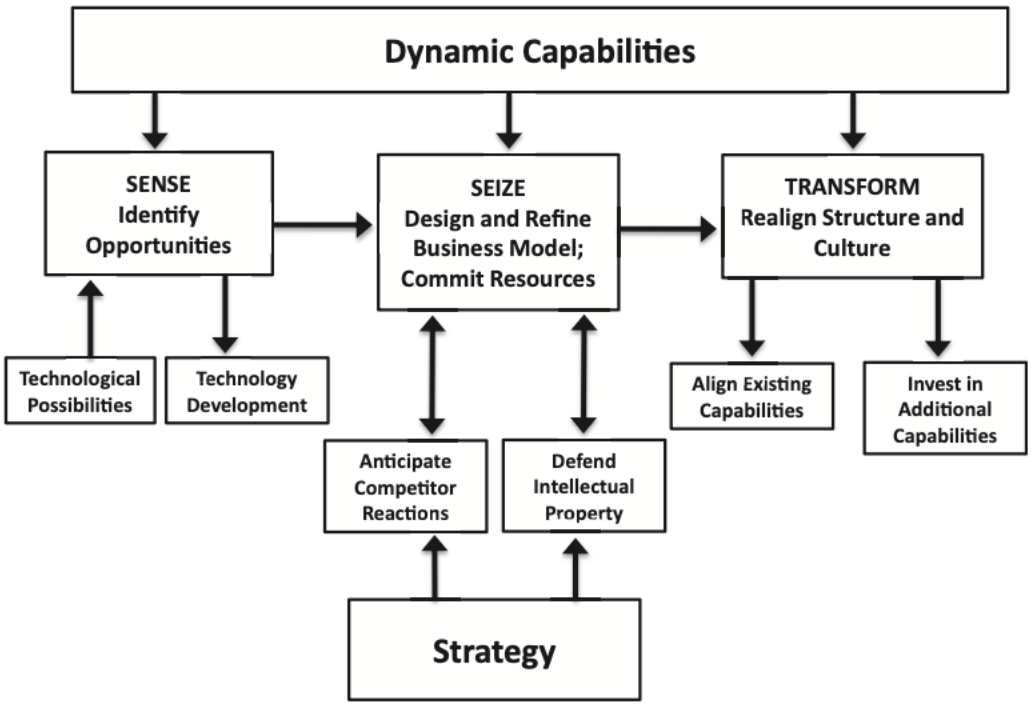


Figure 3.3 Dynamic capability elements (reproduced from Teece, 2017) (Teece, 2017).

This process entails gathering and filtering technological, market, and competitive intelligence from internal and external sources within the organisation, interpreting the information, and identifying actionable implications (Teece, 2007). This organization-wide approach to Dynamic Capabilities Framework emphasises the integration of dynamic sensing, seizing, and transforming capabilities into the strategic planning process. By continuously identifying technological possibilities, anticipating competitor reactions, defending intellectual property, and realigning and investing in new capabilities, the organisation ensures that it remains competitive and resilient in a rapidly changing environment. This comprehensive approach allows for sustained innovation and strategic agility, enabling the organisation to thrive in the face of uncertainty and disruption. For an airline organisation, adopting Teece's Dynamic Capabilities Framework means constantly identifying new technological opportunities, anticipating and preparing for competitor reactions, protecting its innovations, and continuously realigning and investing in capabilities to stay ahead in the industry. This comprehensive approach allows the airline organisation to enhance passenger experiences, improve operational efficiency, and maintain a competitive edge in a rapidly evolving market.

3.4.5.1 EMPLOYEE FEEDBACK ON DIGITAL INNOVATION STRATEGY USING TEECE'S DYNAMIC CAPABILITIES FRAMEWORK

Figure 3.4 utlisesTeece's Dynamic Capabilities Framework to evaluate employee feedback on the digital innovation strategy within an airline organization. This framework is structured into three core dynamic capabilities: Sense, Seize, and Transform, which collectively contribute to the overall strategic approach.

Sense: Identify Opportunities

- Recognizing the Need for Technology Upgrades, New Tools, and Process Improvements: Employees highlight the importance of staying updated with technological advancements and suggest areas where new tools and process improvements can enhance efficiency.
- Understanding Potential Challenges and Business Value: Feedback from employees indicates a need to thoroughly understand the challenges associated with implementing new technologies and their potential impact on business value. Employees emphasise the importance of addressing these challenges to maximize the benefits of digital innovation.

Seize: Design and Refine Business Model; Commit Resources

- Leveraging Technologies to Enhance Processes and Customer Experiences: Employees provide insights into how digital technologies can be utilized to streamline operations and improve customer interactions. They often suggest practical ways to implement these technologies based on their experiences and observations.
- Allocating Resources and Developing Strategies to Capitalize on Opportunities: Employee feedback often includes recommendations on how resources should be allocated to support digital initiatives. They emphasise the need for strategic planning to ensure that the organisation can effectively capitalize on new opportunities brought by digital innovation.

Transform: Realign Structure and Culture

- Implementing Business Transformations to Ensure Efficiency and Customer Experience: Employees discuss the necessity of making structural changes within the organisation to support digital transformation. They focus on how these changes can enhance operational efficiency and improve the overall customer experience.
- Adjusting Strategies to Manage Costs and Risks: Feedback includes suggestions on how to manage the costs and risks associated with digital transformation. Employees

highlight the importance of flexible strategies that can adapt to changing market conditions and technological advancements.

Strategy

Employee feedback is crucial in shaping the overall strategy. By incorporating insights and recommendations from employees, the organisation can develop a more robust and effective digital innovation strategy. This feedback helps to ensure that the strategy is aligned with the practical realities of the workplace and addresses the needs and concerns of those who are directly involved in its implementation.

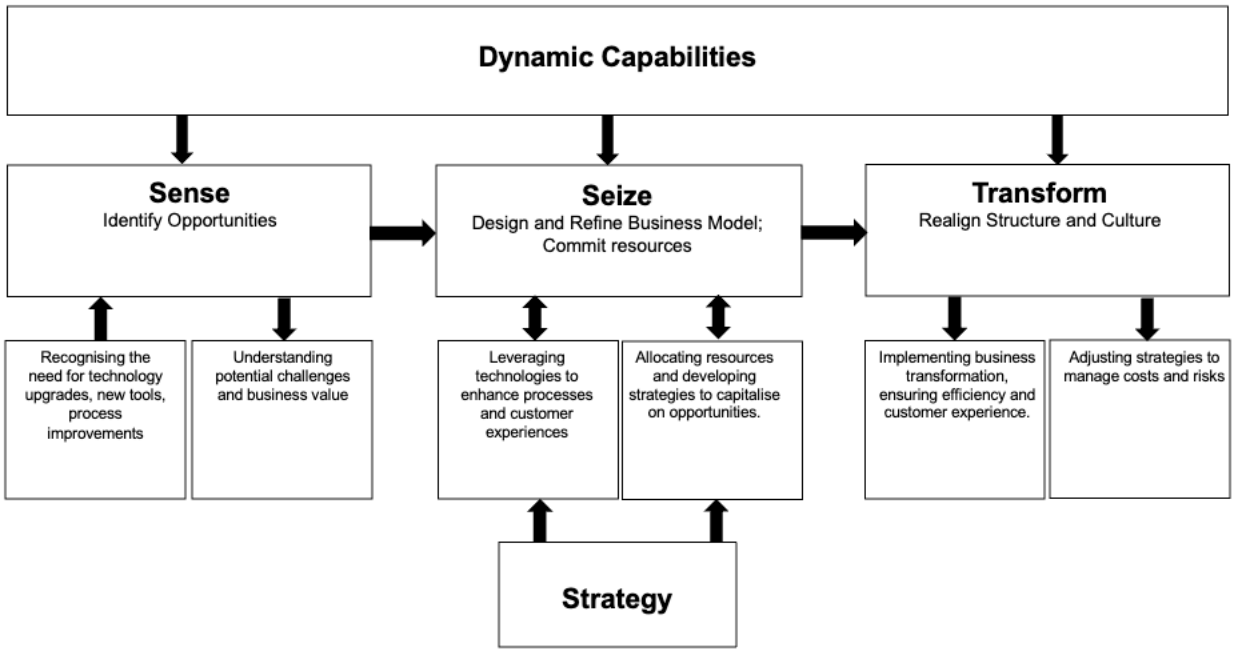


Figure 3.4 Employee Feedback on Digital Innovation - Teece's Dynamic Capabilities Framework (reproduced from Teece, 2017) (Teece, 2017).

The use of Teece's Dynamic Capabilities Framework to analyse employee feedback provides a structured approach to understanding how employees perceive and contribute to the digital innovation strategy. By focusing on the capabilities to sense, seize, and transform, the organisation can better align its strategic initiatives with the dynamic and evolving needs of its workforce and the broader industry. This approach ensures that the digital innovation strategy is both comprehensive and responsive to the insights and experiences of employees, ultimately leading to more successful and sustainable implementation.

3.4.5.2 SUPPLIERS FEEDBACK ON DIGITAL INNOVATION STRATEGY USING TEECE'S DYNAMIC CAPABILITIES FRAMEWORK

Figure 3.5 uses Teece's Dynamic Capabilities Framework to analyse supplier feedback on the digital innovation strategy within an airline organization. This framework is structured into three core dynamic capabilities: Sense, Seize, and Transform, which collectively contribute to the overall strategic approach.

Sense: Identify Opportunities

- Recognizing the Need for Technology in Business Practices, Enhancing Customer Experience: Suppliers emphasise the importance of identifying and implementing new technologies that can improve business practices and enhance the customer experience. Their feedback highlights the need for the airline to stay updated with technological advancements to remain competitive.
- Focus on Brand and Product Development Aligns with Sensing: Suppliers often provide insights into market trends and customer preferences, suggesting areas where the brand and product development should be focused to meet evolving demands. This alignment with sensing ensures that the airline can anticipate and respond to market opportunities effectively.

Seize: Design and Refine Business Model; Commit Resources

- Embracing Automation to Improve Business Processes: Suppliers suggest the adoption of automation technologies to streamline operations and increase efficiency. Their feedback indicates that automation can reduce costs and improve the speed and accuracy of business processes.
- Customer Interactions Also Represent Seizing: Suppliers recognise the importance of customer interactions in seizing opportunities. They suggest leveraging these interactions to gather valuable feedback and insights that can inform strategic decisions and enhance the customer experience.

Transform: Realign Structure and Culture

- Continuously Adapting and Integrating New Technologies: Suppliers emphasise the need for the airline to continuously adapt and integrate new technologies to stay ahead

in the market. Their feedback highlights the importance of maintaining a flexible and innovative approach to technology adoption.

- Evolving the Brand and Product Offerings Relates to Transforming: Suppliers provide insights into how the airline can evolve its brand and product offerings to remain relevant and competitive. They suggest that transforming these elements is crucial for meeting customer expectations and achieving long-term success.

Strategy

- Supplier feedback is integral to shaping the overall strategy. By incorporating insights and recommendations from suppliers, the organisation can develop a more robust and effective digital innovation strategy. This feedback helps to ensure that the strategy is aligned with the practical realities of the supply chain and addresses the needs and concerns of those who are directly involved in its implementation.

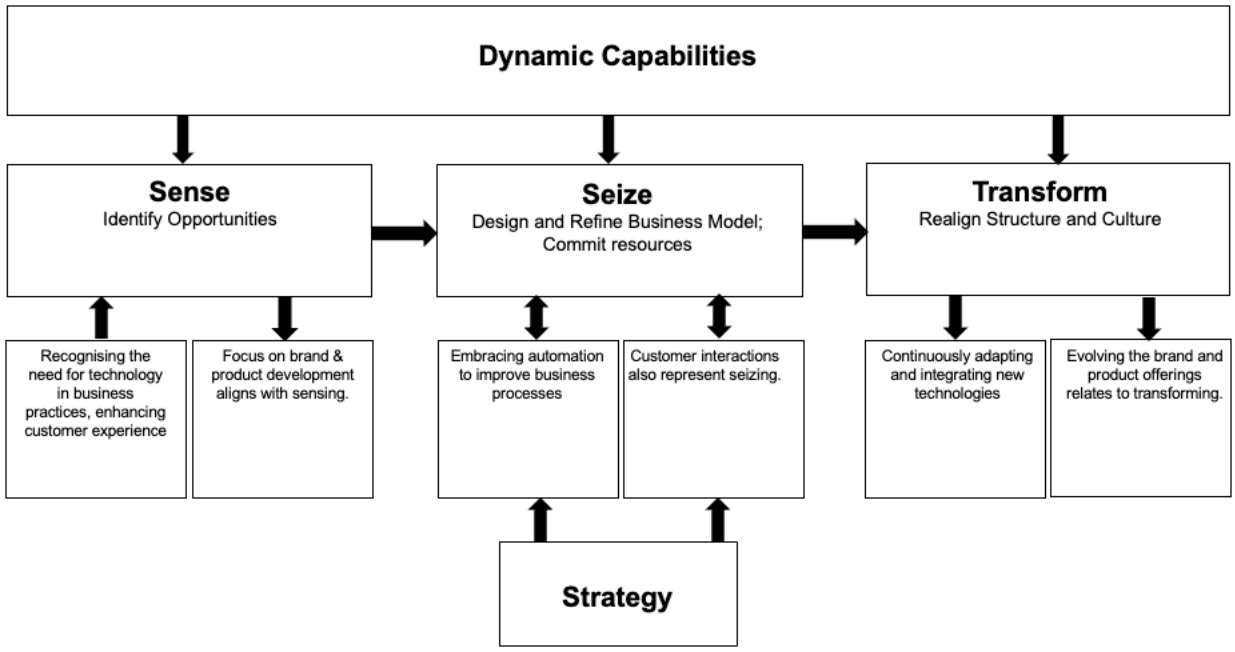


Figure 3.5 Supplier Feedback on Digital Innovation - Teece's Dynamic Capabilities Framework (reproduced from Teece, 2017) (Teece, 2017).

Using Teece's Dynamic Capabilities Framework to analyse supplier feedback provides a structured approach to understanding how suppliers perceive and contribute to the digital innovation strategy. By focusing on the capabilities to sense, seize, and transform, the organisation can better align its strategic initiatives with the dynamic and evolving needs of its suppliers and the broader industry. This approach ensures that the digital innovation

strategy is both comprehensive and responsive to the insights and experiences of suppliers, ultimately leading to more successful and sustainable implementation.

3.4.5.3 CUSTOMER'S FEEDBACK ON DIGITAL INNOVATION STRATEGY USING TEECE'S DYNAMIC CAPABILITIES FRAMEWORK

Figure 3.6 uses Teece's Dynamic Capabilities Framework to analyse customer feedback on the digital innovation strategy within an airline organization. This framework is structured into three core dynamic capabilities: Sense, Seize, and Transform, which collectively contribute to the overall strategic approach.

Sense: Identify Opportunities

- Recognizing the Potential of Disruptive Technologies: Customers highlight the importance of the airline identifying and leveraging disruptive technologies to enhance their travel experience. They emphasise the need for the organisation to stay ahead of technological trends that can significantly improve service delivery.
- Digital Solutions to Enhance Service Quality Aligns with Sensing: Customers provide feedback on the effectiveness of digital solutions in enhancing service quality. They suggest that the airline should focus on adopting technologies that directly impact and improve their overall travel experience.

Seize: Design and Refine Business Model; Commit Resources

- Adopting Digital Solutions to Bring About Disruption: Customers emphasise the importance of adopting innovative digital solutions that can disrupt traditional service models, offering more convenience and better experiences. They highlight the need for the airline to be proactive in implementing technologies that set new industry standards.
- Improving Service Quality Represents Seizing: Customers identify improving service quality as a critical area where the airline can seize opportunities. They provide insights into specific areas of the service experience that can be enhanced through better technology integration and process improvements.

Transform: Realign Structure and Culture

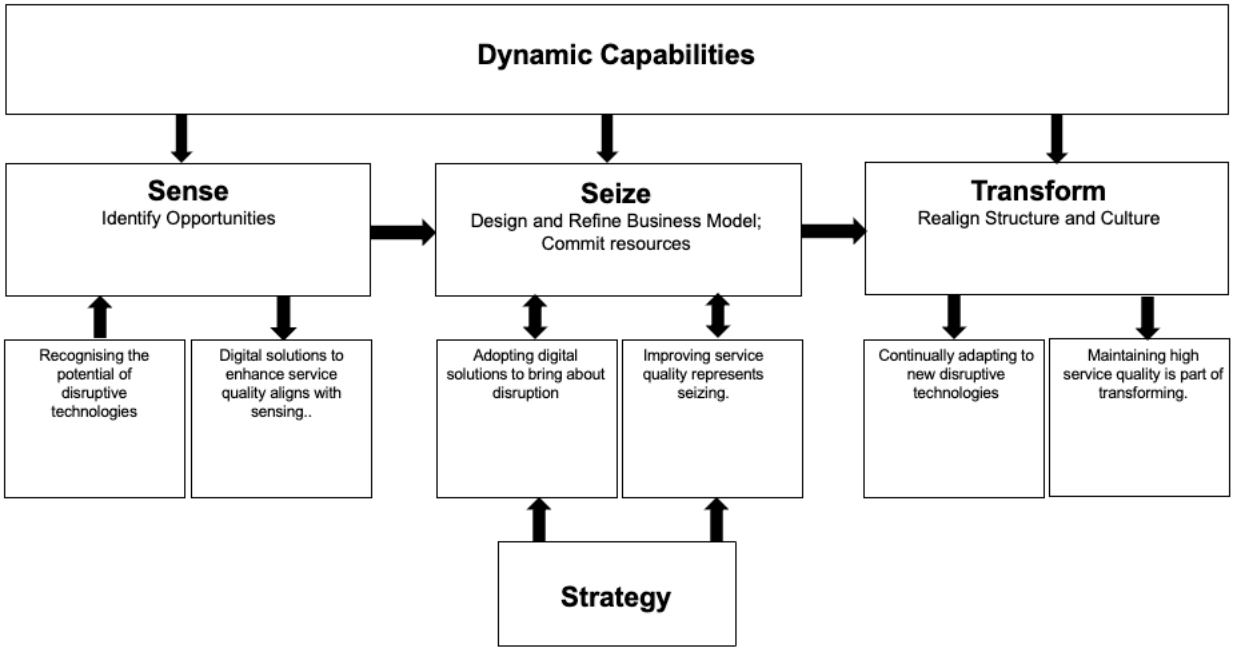
- Continually Adapting to New Disruptive Technologies: Customers stress the necessity for the airline to continuously adapt to new technologies to remain competitive and

meet their evolving needs. They appreciate when airlines are flexible and innovative in integrating new tech solutions.

- Maintaining High Service Quality is Part of Transforming: Maintaining and enhancing service quality is crucial in the transformation process. Customers value consistent, high-quality service and suggest that the airline should prioritize this as part of its transformation efforts.

Strategy

- Customer feedback is crucial in shaping the overall strategy. By incorporating insights and recommendations from customers, the organisation can develop a more robust



and effective digital innovation strategy. This feedback helps ensure that the strategy aligns with customer needs and enhances their overall travel experience.

Figure 3.6 Customer's Feedback on Digital Innovation - Teece's Dynamic Capabilities Framework (reproduced from Teece, 2017) (Teece, 2017).

Using Teece's Dynamic Capabilities Framework to analyse customer feedback provides a structured approach to understanding how customers perceive and contribute to the digital innovation strategy. By focusing on the capabilities to sense, seize, and transform, the organisation can better align its strategic initiatives with the dynamic and evolving needs of its customers. This approach ensures that the digital innovation strategy is both

comprehensive and responsive to customer insights and experiences, ultimately leading to more successful and sustainable implementation.

3.4.7 STRATEGIC DECISION-MAKING: SELECTING ARCHITECTURES FOR PRODUCTS AND ORGANISATIONAL STRUCTURES

At the core of dynamic capabilities is an organisation's capacity to evolve, refine, improve, and, if necessary, replace organisational models (Teece et al., 1997). Decisions regarding value capture are essential to the structural formulation of an organisation. A business's organisational model requires a distinctive, difficult to replicate strategic architecture to ensure viability and efficacy (Amit & Zott, 2012). Although developing successful organisational models might involve an artistic element, the likelihood of success can be increased when organisations: (1) investigate a variety of alternatives; (2) possess a comprehensive understanding of user needs; (3) conduct an in-depth analysis of the value chain to identify the most cost-effective and rapid methods of customer satisfaction delivery; and (4) adopt a neutral or relative efficiency perspective when making outsourcing decisions (Chesbrough, 2010). Effective organisational models result in favourable cost structures and compelling customer value propositions. Moreover, such models enable innovators to capture a substantial portion of the value generated by innovation, which includes social value, ensuring that the company covers at least its capital costs (Teece, 2010).

3.4.8 LEVERAGING DYNAMIC CAPABILITIES AND COORDINATION FOR COMPETITIVE EDGE

According to Eisenhardt and Martin (2000), an organisation's competitive advantage in swiftly changing technological environments depends on its dynamic capabilities. These capabilities determine a company's capacity to create and accumulate intangible assets, which might lead to economic profits (Eisenhardt & Martin, 2000). The dynamic capabilities framework emphasises the impact of past performance on present and future outcomes while also emphasising the role of management in fostering innovation and freeing the organisation from outmoded processes (Teece, 2007).

Sirmon et al. (2007) state that asset orchestration processes are crucial to identifying valuable combinations within the organisation, across enterprises, and with external institutions. Coordination and integration of knowledge-based and non-tradable assets generate unique value that is difficult to replicate on the market (Sirmon et al., 2007). Due to the scarcity of

expertise in these areas, leveraging complementary aspects and managing specialisation effectively can be challenging (Sirmon et al., 2007).

The dynamic capabilities framework acknowledges that a company's trajectory is influenced by its past yet not constrained by it (Eisenhardt & Martin, 2000). Management decisions, such as investments, can substantially affect a company's trajectory. The framework recognises the co-evolution of the organisation and its environment yet still highlights the limited margin for error in the context of rapid technological change and intense competition (Eisenhardt & Martin, 2000).

The dynamic capabilities framework seeks to identify the key factors and relationships necessary for generating and utilising intangible assets to achieve superior organisational performance (Teece, 2007). Addressing the challenges of accumulating tangible and intangible assets, implementing change, and overcoming decision biases is necessary for sustained success (Eisenhardt & Martin, 2000). To establish and maintain a competitive advantage, it is necessary to simultaneously develop and implement capabilities for perceiving, seizing, and transforming/reconfiguring, as indicated in Figure 3.4.

Figure 3.7 describes a strategic framework divided into three core stages: sensing, seizing, and managing threats/transforming, each with its own subprocesses and focus areas, highlighting the importance of agility and adaptation in the business environment.

In the sensing stage, a company is expected to be vigilant in detecting shifts in the market and identifying potential opportunities. This proactive stance is supported by processes aimed at internal Research and Development (R&D) and the careful selection of technologies, ensuring that the company remains at the competitive edge. By utilising analytical systems, a company can scan and interpret the market, understanding the nature and potential timelines of emerging opportunities.

Transitioning to seizing, the company then takes the insights gained from the sensing stage to capitalise on identified opportunities. This involves pivoting towards entrepreneurial business models and leveraging scientific and technological advancements to foster innovation. Recognising and targeting new market segments, tailoring innovations to meet

customer needs, and delineating mini business models are all part of this stage, along with selecting business protocols that align with these new initiatives.

The final stage, managing threats/transforming, is focused on the organisation's response to external threats and its transformation to maintain a competitive stance. It entails adopting new economic models and procedures and designing incentives to stay ahead in the market. Building loyalty and commitment among stakeholders, adapting governance structures, decentralising operations, and continually adjusting both tangible and intangible assets are key to this phase. The concept of co-specialisation suggests the development of specialised, mutually beneficial roles or partnerships, whereas the knowledge management factor underscores the need to manage organisational knowledge effectively to support continuous change.

The overarching concept of dynamic capabilities is placed at the top of the diagram, signalling the need for the organisation to continually develop and adapt its capabilities in response to environmental changes. In addition, the selected micro-foundation element at the bottom suggests underlying principles or structures fundamental to the strategy's execution.

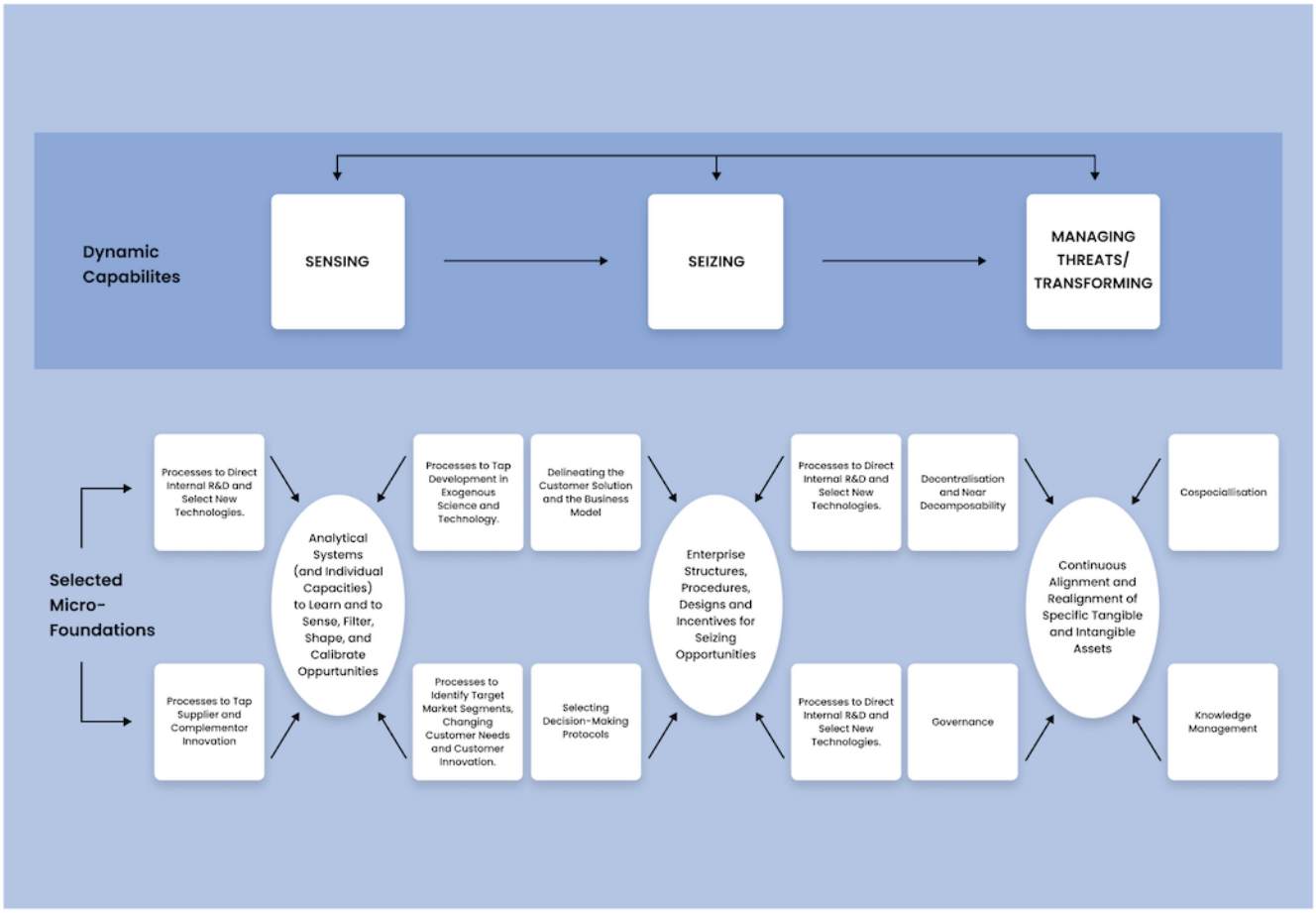


Figure 3.7 The fundamentals of dynamic capabilities and organisational performance (reproduced from Teece, 2007) (Teece, 2007)

This framework advocates for a strategic approach that involves continuous environmental monitoring, seizing opportunities through innovation and entrepreneurship, and agile transformation to manage threats while simultaneously realigning the organisation's assets and capabilities to thrive in a dynamic business landscape.

3.5 APPLICATION OF DYNAMIC CAPABILITIES THEORY IN THIS STUDY

The present study utilised dynamic capabilities as the central theoretical framework for this investigation, as mentioned in Section 3.3.5, because of its relevance to assessing and integrating data from online questionnaires targeted at employees, suppliers, and customers of airline organisations. This theory is particularly valuable because it offers a systematic approach, allowing for the analysis and interpretation of how airline organisations can cultivate and adjust their capabilities amid the rapidly changing digital landscape.

The study applied the dynamic capabilities framework to deconstruct and understand the rich data harvested from the questionnaires and data analysis. By so doing, the researcher could identify patterns, glean insights that reflect the current digital competencies of the airline organisation, and pinpoint areas where adaptation and innovation were necessary. For employees, in particular, this could mean developing training programs that enhance their digital literacy and agility. For suppliers, it might involve streamlining digital supply chain processes to improve efficiency and responsiveness. As regards customers, leveraging dynamic capabilities could lead to enhancing digital touchpoints and personalising customer experiences. Ultimately, by applying this framework, the study analysed actionable strategies that would enable the airline organisation to remain competitive and responsive in the digital era, thereby ensuring that the insights gained from various stakeholders were translated into meaningful organisational improvements. Chapter 4 discusses the latter in detail.

3.6 CONCLUSION

In conclusion, the study emphasises the significance of dynamic capabilities as the theoretical foundation for exploring digital innovation within the airline industry. It theorises that by applying this framework, organisations can analyse and interpret the evolving digital landscape to maintain a competitive edge. By leveraging insights from the comprehensively analysed datasets targeted at employees, suppliers, and customers, the study aimed to identify current digital competencies and innovation needs within airline organisations. Applying the dynamic capabilities theory facilitated the development of strategies to enhance digital literacy, streamline supply chain processes, and personalise customer experiences. This approach is poised to translate stakeholder insights into meaningful organisational improvements, ensuring that airline organisations remain competitive and responsive in the digital era. Chapter 4 explains The detailed application and implications of this theory for the airline industry will be explained in the subsequent chapter.

4 RESEARCH METHODOLOGY

4.1 INTRODUCTION

Research is not only a process of collecting information and data, as is often advised. Instead, research pertains to responding to unanswered questions or generating ideas that do not currently exist. The detection and invention of knowledge are at the heart of research. Good research is methodical because it is planned, organised and has a clear goal (Goddard & Melville, 2007).

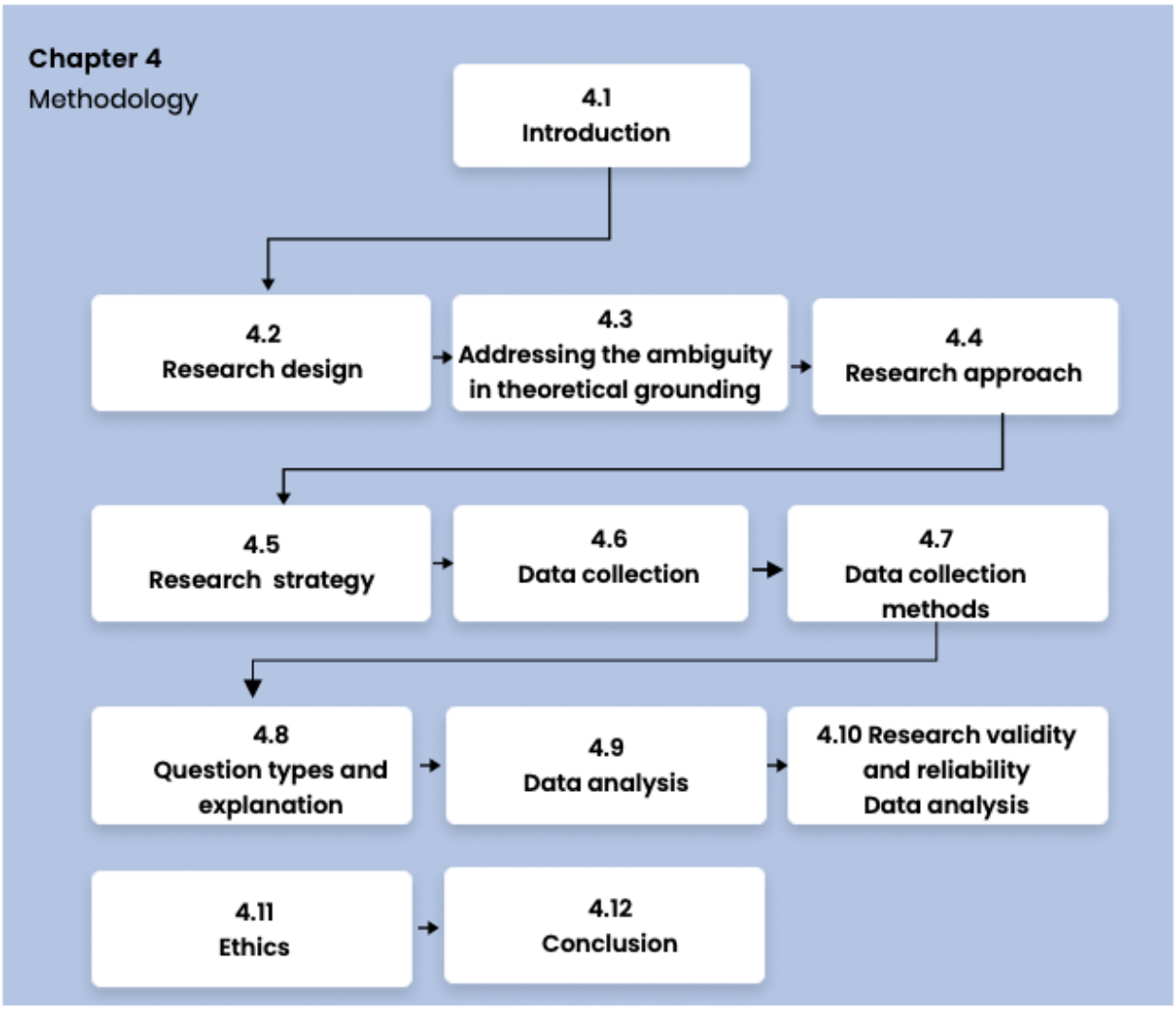


Figure 4.1 Overview of Chapter 4

The research question for this study focused on an airline organisation as the case study environment, leading to the primary research question:

What are the elements of a digital innovation strategy framework for an airline organisation towards creating business value?

The primary research question lends itself to the following secondary research questions for this study:

Secondary Research Question 1: What are the critical digital innovation strategy opportunities?
Secondary Research Question 2: How do you achieve business value by implementing digital innovation?
Secondary Research Question 3: What challenges impact digital innovation in an airline organisation?

The chosen research questions are pivotal for constructing a digital innovation strategy framework specifically tailored for an airline organisation. They are designed to deconstruct the multifaceted nature of digital innovation by identifying key opportunities, determining the methodologies for harnessing these innovations to yield business value and understanding the challenges that might hinder their implementation within the airline industry. These questions are instrumental in guiding the present research to provide comprehensive insights into how airline organisations can navigate the digital landscape strategically to achieve sustained business growth and competitiveness.

4.2 RESEARCH DESIGN

Research is a systematic investigation or inquiry whereby data are collected, analysed, and interpreted to understand, describe, predict or control a phenomenon or empower individuals in such frameworks (Kankam, 2019; Mackenzie & Knipe, 2006). All research is based on some fundamental conventions about establishing good research and what research methodologies are suitable. It is essential to know these assumptions to manage and assess research (Cleveland & Haddara, 2023; Myers, 1997).

Philosophy is central to the research process as it opens researchers' minds to various possibilities, which can improve their research skills and develop their knowledge in utilising the suitable methodology (Bonney et al., 2020; Holden, 2004). Research science requires philosophy to be regarded as a fundamental consideration to the question, "why research?". Researchers must also consider that the question of "what" to research might impact methodological choice significantly (Cleveland & Haddara, 2023; Myers, 1997). Therefore,

their philosophical analysis also produces a view of the research problem. Researchers should contemplate that philosophical views might prevent them from investigating a specific research problem, as the appropriate methodology might be unsuitable to the known problem (Cleveland & Haddara, 2023; Myers, 1997). Another critical observation is that flexibility in what to research is obtained through a transitional philosophical stance, allowing researchers to combine philosophy, methodology, and research (Holden, 2004).

Ontology is the branch of philosophy that deals with the nature of being, existence, and reality. In research, ontology concerns what constitutes reality and what can be known about it. It involves the identification and categorization of the entities that exist within a particular domain of inquiry (Niiniluoto et al., 2004). Ontological assumptions underpin research design and methodology by shaping how researchers perceive and define the nature of the phenomena under investigation. Different ontological perspectives can lead to different interpretations and understandings of research findings (Niiniluoto et al., 2004).

Epistemology is the study of knowledge - its nature, origin, and limits. In research philosophy, epistemology addresses how we come to know what we know and the justification for our beliefs (Ponterotto, 2005). It involves examining the methods and validity of acquiring knowledge. Different epistemological positions can influence the choice of research methods and the interpretation of data. The epistemological stance adopted by researchers significantly affects how they design their studies and analyse their data (Ponterotto, 2005).

Axiology is the branch of philosophy that deals with values, including ethics and aesthetics. In the context of research, axiology concerns the role of values in the research process and the ethical considerations that guide research practices. It addresses questions about what is valuable and why, influencing decisions about what is worth studying and how research should be conducted (Rooney, 2016). Axiological considerations ensure that research is conducted responsibly, with respect for the rights and dignity of participants, and with attention to the broader implications and impact of the research findings (Rooney, 2016).

The research philosophies mostly related to information systems research are positivism, interpretivism, and pragmatism (Kankam, 2019; Mackenzie & Knipe, 2006).

Positivists accept that reality is accurately assumed and can be defined by quantifiable assets unconnected to/detached from the researcher. Positivist studies typically attempt to query

philosophy to improve the prognostic understanding of phenomena (Cleveland & Haddara, 2023; Myers, 1997). Positivism is often called the scientific method or science research. Positivism “can be applied to the social world on the hypothesis that the social world can be investigated similarly to the ordinary world, that there is a process for studying the social world that is value-free, and that explanations of a causal nature can be provided” (Cleveland & Haddara, 2023; Myers, 1997). Positivists intend to challenge a philosophy or define knowledge by examination and measurement to determine and manage elements surrounding them (Kankam, 2019; Mackenzie & Knipe, 2006).

Interpretive researchers hypothesise that access to certainty is only achieved through social structures such as language, awareness and shared values. Interpretive research primarily strives to comprehend phenomena about the significances that people assign to them, and interpretive methods of research in IS are "aimed at producing an understanding of the context of the information system, and the process whereby the context influences the information system influences and is influenced by the context" (Cleveland & Haddara, 2023; Myers, 1997). Interpretivist methodologies in research aim to comprehend “the world of human experience”, proposing that “reality is socially constructed”. The interpretive researcher is inclined to count on the participant’s opinion of the condition being studied and understand the effect of their experiences on the research (Kankam, 2019; Mackenzie & Knipe, 2006).

Goldkuhl (2017) and Schreieck et al. (2023) mention pragmatism as a part of research and state that pragmatism is actions and change. Humans act in this world and form part of a society that engages in ongoing action in a consistently changing world. However, there does not seem to be a clear and familiar description of pragmatism in IS research (Goldkuhl, 2008; Schreieck et al., 2023). The main concept of pragmatism is that knowledge should improve action; the purpose of scientific knowledge is that it should make a substantial difference. This relation can be summarised as knowledge for the sake of action (Goldkuhl, 2008; Schreieck et al., 2023). However, this is not the only explanation of the role of knowledge vis-a-vis action. This has led to many theories on actions, activities and practices (Goldkuhl, 2008; Schreieck et al., 2023).

In this study, the relevance of Burrell and Morgan (2019) framework is particularly significant as it provides a foundational understanding of the philosophical underpinnings that guide the research. Categorisation of sociological theories into four paradigms—functionalism,

interpretivism, radical humanism, and radical structuralism—offers a comprehensive lens through which the philosophical stance of this study can be articulated and justified (Burrell & Morgan, 2019).

The study adopts an interpretive paradigm, which aligns with exploring the intricate dynamics of digital innovation strategies in the airline industry. This paradigm emphasises understanding the subjective experiences and meanings constructed by participants, which is crucial for capturing the depth and complexity of the research problem. The interpretive approach directly influences the choice of qualitative research methods employed in this study, such as semi-structured interviews and thematic analysis.

By grounding the research in an interpretive paradigm, the study ensures that the data collection process is designed to elicit rich, contextual insights from diverse stakeholders, including employees, customers, and suppliers. This approach is essential for understanding the nuanced perspectives on digital innovation and its impact on organisational agility and strategic alignment. Furthermore, the interpretive stance informs the data analysis techniques, which focus on identifying patterns and themes that reflect the participants' experiences and viewpoints. This method allows the research to contribute meaningfully to theoretical and practical knowledge in digital innovation (Burrell & Morgan, 2019).

In summary, integrating Burrell and Morgan (2019) framework into the thesis situates the study within a broader philosophical discourse and provides a clear rationale for the methodological choices. This alignment enhances the coherence and rigour of the research, ensuring that the findings are robust and relevant to the ongoing discourse on digital innovation strategies in the airline industry.

4.3 ADDRESSING THE AMBIGUITY IN THEORETICAL GROUNDING

The philosophical stance of this research is clarified by detailing the main research philosophies relevant to information systems research - positivism, interpretivism, and pragmatism.

Positivism:

Positivism assumes that reality is objectively measurable and can be quantified independently of the researcher. This approach aligns with scientific methods aiming to enhance predictive

understanding of phenomena (Cleveland & Haddara, 2023; Myers, 1997). Positivist studies seek to establish causal relationships and test hypotheses through empirical measurement.

Interpretivism:

Interpretive research posits that reality is socially constructed and can only be understood through social structures such as language, consciousness, and shared values. It aims to comprehend phenomena by understanding the meanings people assign to them, focusing on the context and the interaction between the information system and its environment (Cleveland & Haddara, 2023; Myers, 1997).

Pragmatism:

Pragmatism emphasises action and change, advocating that knowledge should drive practical action. This approach values the utility of scientific knowledge in making significant differences in practice. Pragmatism does not have a single definition in IS research but broadly focuses on knowledge for the sake of action, aiming to produce practical outcomes that enhance societal well-being (Goldkuhl, 2008; Schreieck et al., 2023).

Incorporating this detailed philosophical analysis clarifies the theoretical grounding of the research study and addresses around ambiguity. It ensures that the research methodology is well-justified and aligns with the research objectives, thereby enhancing the overall rigor and credibility of the study.

4.4 RESEARCH APPROACH

Quantitative research, as the name states, deals with quantifiable features (also called parameters, variables or elements). Before it is measured, the feature must be well-defined (Bergsjo, 1999; Guraya et al., 2023). Conversely, *qualitative research* is a process of realistic investigation that is usually less conspicuous than quantitative analyses and does not influence a research method. The plans are the methods social scientists use to build knowledge and conduct their research to understand society (Bergsjo, 1999; Guraya et al., 2023).

Mixed methods research is another methodology and is a method that gathers, examines, and mixes qualitative and quantitative methods in a single research study or a series of studies (Creswell et al., 2006; Kopcha et al., 2020). Mixed methods research is compatible with qualitative and is consistent with qualitative research (Creswell et al., 2006; Kopcha et al., 2020).

The mixed-method research design exhibits a range of configurations and dimensions, encompassing a field of strength dependent upon the consolidation of qualitative and quantitative research approaches to data collection, data analysis, methodologies, and findings (Almeida, 2018; De Silva, 2011).

4.5 RESEARCH STRATEGY

Several interpretive strategies exist in the realm of research strategy, each tailored to different research objectives and contexts (Takona, 2024). For instance, the focus group methodology involves group discussions to gather insights and perspectives on a specific topic, enabling researchers to explore the distinctions between participant viewpoints (Thelwall & Nevill, 2021). The survey strategy employs structured questionnaires or interviews to collect quantitative data from a larger sample, allowing for statistical analysis and generalizability of findings. In contrast, ethnography is characterised by immersive, long-term participant observation within a specific social or cultural group, facilitating an in-depth understanding of their practices and behaviours (Thelwall & Nevill, 2021). Lastly, case study methodology entails an intensive investigation of a single instance or a few cases, enabling researchers to delve deeply into a particular phenomenon or context, often providing rich and contextually relevant insights (Kiger & Varpio, 2020; Yin, 2012). These interpretive strategies offer diverse tools for researchers to address their research questions and objectives effectively.

A case study is one of the most frequently used research methods. Nonetheless, it does not have a reasonable sociological research approach since it does not have distinct and structured procedures (Yin, 2012). Developing researchers who intend to utilise case studies typically become disordered as a case study and distinguished from other research.

Yin (2002) defines a case study as an inquiry into a recent event in its natural setting, especially when the lines between the event and its environment are indistinct, and the researcher has limited influence over both the event and its context. Consequently, researchers want an original “comprehensive research strategy”, namely a case study (Yin, 2012). Based on this meaning, from the Yinian perspective, a case study is a firsthand review that examines a case, following the preceding description by addressing the “how” or “why” questions about the phenomenon of significance. Yin (2012) explains the case study as instrumental in program assessment.

This study adopted a focused approach, utilising a single case study research strategy that involved collecting and analysing data from a South African-based airline organisation. By concentrating on this specific context, the analysis aimed to make precise and insightful inferences about digital innovation within the airline industry. Therefore, the choice of the case study method was instrumental in delving into the distinctive attributes, ramifications, and tailored recommendations pertaining to this study's unique research focus.

4.6 DATA COLLECTION

Researchers obtain data from various resources to portray the case under research. Yin (2012) suggests the consolidation of quantitative and qualitative evidence-based sources because these sources can be identified as similarly influential (Yazan, 2015).

However, the effectiveness of data collection is contingent on the suitability of the methods employed. Data lacking clarity, reliability or precision might be rendered unusable, impeding researchers' ability to derive meaningful insights and draw valid conclusions. Thus, ensuring the identification, dependability, and accuracy of the collected data is paramount in achieving research objectives (Yazan, 2015).

Despite the importance of effective data collection, researchers often encounter various challenges throughout the process. These challenges may include issues related to access, validity or reliability of data sources, as well as logistical constraints, such as time and resource limitations. In response to these challenges, efforts have been made to refine and optimise data collection processes. Researchers continually analyse and adapt their methodologies to overcome obstacles and enhance the efficiency and efficacy of data collection endeavours (Elswick et al., 2016).

By addressing these challenges and employing suitable data collection strategies, researchers can enhance the quality and reliability of their findings, ultimately contributing to the advancement of knowledge in their respective fields.

4.7 DATA COLLECTION METHODS

In academic and scientific research, the process of data collection figures prominently, serving as the indispensable foundation upon which to construct the formation of meaningful insights, conclusions, and informed hypotheses and meticulously refine them over time (Yazan, 2015; Yin, 2012). Based on the research approach, a mixed-method research

strategy was used for this study. This approach aided as the study's most aligned research approach since mixed methods gather, examine, and mix qualitative and quantitative data in a single research study.

Effective data collection is crucial because data lacking identity, reliability, and precision hinders research. Over the years, researchers have faced challenges in this area, prompting efforts to streamline the process (Elswick et al., 2016). Data sampling is a significant approach to address these challenges; hence, this section explores the role and importance of data sampling in research, highlighting its ability to enhance efficiency and credibility in data collection. The primary data collection method used in this study was an online questionnaire. This method was selected because the researcher collected data from participants from across the country and used the airline organisation's offerings. An online questionnaire allows a researcher to obtain information from many respondents without being in the same location. In this study, online questionnaires were distributed to employees, suppliers and customers of the airline organisation.

This research study utilised three web-based questionnaires to collect extensive data from various segments of the airline organisation. The initial step involved analysing the demographic characteristics of the participants, including their job responsibilities, experience, department affiliation, and geographical location. Such thorough profiling served as the foundation for grasping the diverse viewpoints and contexts within the organisation.

Subsequently, open-ended questions were presented to explore the organisation's digital innovation strategy. These questions enabled the respondents to express their insights, experiences, and opinions freely without being constrained by predetermined response options, thereby yielding rich and comprehensive insights. The final phase involved the inclusion of Likert scale rating questions to quantify respondents' perceptions, attitudes, and beliefs concerning digital innovation. This structured approach assisted the study in understanding the intensity and direction of the respondents' sentiments, facilitating the identification of patterns of consensus or disagreement within the organisation regarding digital innovation strategies. This multifaceted survey approach, incorporating demographic information, open-ended inquiries, and Likert scale assessments, enabled the study to gain a thorough and detailed comprehension of digital innovation strategies within the airline organisation.

Three types of questionnaires were employed to gather data for this research study:

- Web-based questionnaire for employees of the airline organisation.
- Web-based questionnaire for customers of the airline organisation.
- Web-based questionnaire for suppliers involved in digital innovation activities specific to the airline organisation.

Regmi et al. (2017) state that six rational elements must be present to take advantage of the benefits of online questionnaires (Regmi et al., 2017). According to Regmi et al. (2017), these elements include:

- An online questionnaire that is welcoming and user-friendly for participants.
- Choosing applicable participants.
- Safeguarding against various responses from the same source.
- Valuable, proficient, and responsible data management.
- Considering ethical requirements:
    - The participant's consent
    - The participant's privacy
    - The participant's right not to participate or withdraw their answers.
- Testing the online questionnaire with colleagues and friends before distributing it to participants.

According to Myers (2019), a semi-structured interview has pre-determined questions, but following these questions in detail is not essentially required, resulting in the potential creation of new questions. Hence, one of the collection methods for this study was semi-structured interviews, which allowed the researcher to prepare questions yet diverge from them if required. This style provides for some uniformity across the semi-structured interviews and allows for the improvised questions to collect original information.

During this study, semi-structured interviews were held with executive managers in the airline organisation who were part of the strategic decision-making process. This style provided the researcher with uniformity across the semi-structured interviews and allowed for the improvised questions to collect original information (Myers, 2019).

In academic research, data collection is the cornerstone of deriving meaningful insights and constructing informed hypotheses (Yazan, 2015; Yin, 2012). In this study, online questionnaires were distributed to three distinct groups: airline organisation employees, suppliers, and customers. In addition, semi-structured interviews, as suggested by Myers

(1997), allowed flexibility in the question formulation and were conducted with executive managers involved in strategic decisions within the organisation.

4.7.1 Target population

The research study had a specific target population, namely employees of the airline organisation, suppliers engaging with the airline organisation and customers of the airline organisation.
This population comprised employees working for an airline organisation located in South Africa. At that time, the aviation company boasted a substantial workforce, exceeding 1000 employees. The workforce contained a diverse range of roles, including C-suite executives, general and mid-level managers, and operational staff.

In addition to the internal workforce, the research study also considered suppliers actively engaged with the airline organisation, particularly within the digital and IT sectors. This collaboration with suppliers was a key aspect of the study's scope. Furthermore, the research study engaged with customers who had interacted with the airline organisation in various capacities. Some of these customers had prior experience using the airline's services, while others were potential new customers.

Notably, the research particularly emphasised customers' digital proficiency within this target population. It considered individuals who were both digitally advanced, having a good grasp of digital technologies, and those who were digitally inexperienced, meaning they had limited familiarity with digital tools and platforms. This dual focus on digital expertise was a significant aspect of the research during its implementation.

4.7.2 Sampling method

In logical analysis, definite cases or events are used to conclude entire classes of objects or events. Therefore, researchers detect a sample and then establish the population from which the example has been taken (Leedy & Ormrod, 2010). The core objective of goal-directed sampling is to concentrate on specific population features, allowing researchers to answer the research questions. Instead, the goal differs depending on the sampling technique (Leedy & Ormrod, 2010).

The present study also considered other sampling methods, namely convenience and purposive sampling. Convenience sampling encompasses the researcher using a population that is easily accessible, willingly available, and reasonable (Elfil & Negida, 2017). Further, convenience sampling is specific, whereby participants are selected for ease of access, geographical limitations and the population's inclination to participate (Etikan, 2016).

Purposive sampling is more cautious than convenience sampling as it explores qualities, qualifications, experience, and knowledge. Like convenience sampling, it is also non-random and seeks available and willing participants (Etikan, 2016).

This study employed a multi-faceted approach to gather data and insights. First, online questionnaires were distributed to various groups, including employees of the airline organisation, suppliers associated with the airline organisation, and customers who have engaged with the airline organisation.

In addition, semi-structured interviews were conducted to gain a deeper understanding of the airline organisation's digital innovation strategy. These interviews followed a purposive sampling method, deliberately selecting participants who held critical roles in shaping the company's digital innovation strategy (Elfil & Negida, 2017). Specifically, the interviews exclusively involved members of the executive management team (Exco). Due to their positions, these individuals held significant influence and responsibility in determining the airline organisation's digital direction. Their perspectives and insights were invaluable in shedding light on the strategic decisions driving digital innovation within the organisation.

4.8 QUESTION TYPES AND EXPLANATION

For this study, three types of questions were posed to three sample groups, i.e., employees of the airline organisation, suppliers of the airline organisation and customers of the airline organisation.

Employee feedback: Explored internal perspectives on organisational processes, culture, and performance, including job satisfaction, leadership perception, and training needs.

Supplier feedback: Assessed product/service quality, communication effectiveness, and satisfaction with business relationships.

Customer feedback: Examined satisfaction levels, preferences, and experiences with the airline's products/services, covering flight experiences, customer service interactions, and overall satisfaction.

By employing these tailored question types, the researcher obtained comprehensive feedback from each group, facilitating informed decision-making and strategic planning to enhance organisational effectiveness within the aviation industry.

4.8.1 DEMOGRAPHIC QUESTIONS

Demographic questions collect specific data about individual characteristics, such as age, gender, income, education, ethnicity, and employment status. In the context mentioned, these questions target three distinct groups: employees, suppliers, and customers of an airline organisation.

4.8.1.1 Segmentation and Analysis

Demographic questions assist with segmenting each group based on various individual characteristics. For instance, understanding the age distribution among airline employees could shed light on workforce maturity or the need for training programs tailored to specific age groups. Segmentation and analysis are vital for extracting insights from data. Demographic questions, such as age distribution among airline employees, aid in segmenting groups and identifying workforce needs. Other criteria like location or experience level offer additional perspectives. Through rigorous analysis and using statistical methods and qualitative frameworks, researchers uncover patterns and trends. This process generates actionable insights for informed decision-making and strategy development, enriching understanding of the research topic.

4.8.1.2 Tailored Strategies

Comprehending demographics can aid airlines in creating personalised marketing and service strategies for customers. For instance, promotions for business travel might target a different age or income bracket than promotions for leisure travel. Tailored strategies leverage demographic insights to personalise marketing and service approaches for airlines. Understanding demographics enables the creation of targeted campaigns that resonate with specific customer segments. By aligning strategies with the preferences and needs of different demographic groups, airlines can enhance customer engagement, satisfaction, and loyalty. This approach allows for more efficient resource allocation and maximises the impact of marketing efforts, ultimately driving business growth and competitiveness in the dynamic aviation industry.

4.8.1.3 Supply Chain Insights

Understanding supplier demographics provides airlines with crucial insights into supply chain stability, diversity, and challenges. Analysing factors such as supplier size, location, and industry experience reveals the dynamics of the supply network.

This analysis highlights geographic dispersion risks, informs risk management strategies, and prompts diversification efforts. By addressing capacity constraints and skill gaps, airlines optimise procurement, enhance resilience, and drive operational efficiency amidst market uncertainties.

4.8.1.4 Diversity and Inclusion

Demographic data from employees can help airlines assess the effectiveness of their diversity and inclusion policies. It can highlight areas of success or indicate where further efforts are needed. Employee demographic data aids airlines in evaluating diversity and inclusion initiatives. Analysis reveals representation across various groups, highlighting areas for improvement. By correlating data with employee feedback, tailored strategies address specific needs. This fosters an inclusive culture, enhances engagement, and boosts organisational success and reputation in a competitive market.

4.8.1.5 Feedback and Improvements

Correlating demographic data with feedback or performance metrics enables airlines to identify targeted areas for improvement tailored to specific groups. For instance, if analysis reveals consistent customer dissatisfaction among certain age groups, airlines can delve deeper into the underlying reasons and implement tailored strategies to address their unique preferences and concerns.

By leveraging demographic insights, airlines can refine their services, enhance customer satisfaction, and drive loyalty. This approach fosters a responsive and customer-centric culture, positioning airlines for sustained success in a competitive market landscape.

4.8.2 OPEN-ENDED QUESTIONS

Open-ended questions are queries that do not have predefined answers or choices. Instead, they allow respondents to answer in their own words, providing qualitative insights and

allowing for in-depth and individualised responses. For this study, such questions were directed at employees, suppliers, and customers of an airline organisation.

Employees were asked open-ended questions about digital innovation to describe their understanding. For the analysis of the open-ended questions, a tool called *MonkeyLearn* was used (www.monkeylearn.com). *MonkeyLearn* has become a valuable tool in academia for text analysis, visually depicting keyword frequency within a given text. Generated by parsing text and scaling words according to their usage, these representations quickly convey significant themes, trends, and patterns. While not a substitute for detailed text analysis, word clouds offer an immediate, engaging snapshot of large textual datasets, serving as a practical starting point for qualitative data exploration.

A word cloud generator displays the frequency of each word in the text and assigns a significance score to every word. This score is determined by multiplying the relative word frequency with the IDF (a score that evaluates the distinctiveness of a word).

MonkeyLearn is a platform that uses machine learning to analyse text data.
Machine learning models trained on labelled data determine relevance scores in text analysis. These models can consider factors such as the frequency of specific words or phrases, the context in which they appear, the relationship between different parts of the text, and other complex patterns in the data.

A relevance score of one (1) might typically indicate a high level of relevance, as scores are often normalised to a scale between nil (0) and one (1) (or sometimes minus one [-1] to one [1]). In text classification or sentiment analysis, a score of one (1) could represent a solid match for a particular category or sentiment.

The following information explains the purpose of open-ended questions as part of this study.

Depth of insight: Open-ended questions allow respondents from each group (employees, suppliers, customers) to share detailed opinions, experiences, and perspectives. This action provides a depth of insight that might be missed with closed-ended questions.

Identification of nuances: Especially in complex industries like airlines, employees might have unique observations about daily operations, suppliers might share challenges in their collaboration, and customers might express specific preferences or concerns.

Flexibility in responses: Respondents are not limited by set answer choices. They can communicate freely, which can lead to unexpected and valuable insights.

Idea generation: Open-ended questions can provide suggestions and innovative solutions to employees and suppliers. For customers, they can reveal new service ideas or areas of improvement.

Emotional insights: Further, these questions can capture the emotional aspects of respondents' experiences. For instance, an airline customer might share a personal story related to their travel, or an employee might express job satisfaction or dissatisfaction more emotionally.

Contextual understanding: Such questions can provide context to quantitative data. For instance, if there is a spike in negative feedback from customers during a particular month, open-ended responses can aid in understanding the reasons behind this trend.

In their article, *"*Enterprise Design Thinking: An Investigation on User-Centered Design Processes in Large Corporations*",* Kwon et al. (2021) leveraged the capabilities of *MonkeyLearn* for their research analysis, specifically employing it for the word cloud generation. This application of *MonkeyLearn* provided the scholars with visual data summaries, revealing patterns and highlighting prominent themes within their research data. The utility of such tools in research underscores the increasing relevance of machine learning in data analysis within academic studies.

In summary, when posed to an airline organisation's employees, suppliers, and customers, open-ended questions provide a richer, more nuanced understanding of their experiences, needs, and suggestions, complementing the quantitative data gathered through closed-ended questions.

4.8.3 LIKERT SCALE QUESTIONS

A Likert scale represents a category of rating scales commonly employed in survey instruments or questionnaires to ascertain participants' sentiments and degrees of concurrence. Likert scale questions are a psychometric response scale commonly employed in questionnaires to elicit respondents' preferences or level of agreement with a statement or set of assertions. These inquiries commonly offer a range of choices, spanning only

“disagree" to "strongly agree”, enabling respondents to express their sentiments or thoughts on a spectrum.

The sections below deconstruct the purpose of Likert scale questions:

Quantitative analysis: When posed to an airline's employees, suppliers, and customers in this study, the Likert scale questions provided quantitative data that could be easily measured, averaged, and statistically analysed (Leedy & Ormrod, 2010).
Uniformity and comparison: Likert scales ensure a consistent response format. This uniformity made it easier to compare perceptions across different groups, like contrasting the satisfaction levels between employees and customers (Leedy & Ormrod, 2010).
Degree of feeling: Leedy and Ormrod (2010) recognise that Likert scales capture more than binary responses; they measure the intensity of respondents’ feelings. Consequently, they can be particularly useful for an airline to evaluate nuanced responses regarding employee job satisfaction or customer opinions about services offered.
Identifying trends: By using the Likert scale, airlines can identify patterns in perceptions. For instance, if many suppliers leant towards "dissatisfaction" regarding communication clarity, it indicated an area requiring improvement (Leedy & Ormrod, 2010).
Facilitating decision-making: Leedy and Ormrod (2010) concur that the quantitative insights derived from Likert scale questions are instrumental in informing the decision-making process. For an airline, favourable scores related to safety perceptions from employees and customers could endorse existing safety measures.
Comprehensive feedback: Leedy and Ormrod (2010) further affirm a Likert scale provides a systematic approach to sentiment analysis across a spectrum of topics versus the singular insights from open-ended questions. Such insights can be particularly valuable for an airline seeking to gauge overall satisfaction, comfort levels, or alignment with company policies among its employees, suppliers, and customers.

The Likert scale is a valuable tool across a myriad of contexts and scenarios. For this study, specific Likert scale queries were formulated to glean the respondents’ ratings about subjects related to digital innovation.

In the five-point Likert scale questionnaire, responses can be divided into three categories. Responses 1 and 2 can be classified as “detractors”, indicating opposing views or dispositions

toward the issue. A response of 3 can be labelled as “neutral”, representing respondents with neither positive nor negative sentiments. Responses 4 and 5 are considered “promoters”, reflecting those with a positive perception or attitude.

These categories were represented formally in the data analysis breakdown as follows:
Detractors: Respondents who selected 1 or 2 on the Likert scale.
Neutral: Respondents who selected 3 on the Likert scale.
Promoters: Respondents who selected 4 or 5 on the Likert scale.

When analysing data from a Likert scale, measures of central tendency like the mean, median, and mode are used to better understand respondents' attitudes and preferences.

Mean (Average)
The mean is the average value of a set of numbers. A Likert scale is the sum of all the responses, with each response multiplied by its value and divided by the total number of responses.
Usage in Likert Scale: The mean allocates an average score for a particular statement to respondents. For instance, if a statement on airline service quality has options ranging from 1 (strongly disagree) to 5 (strongly agree), a mean score of 4.2 would indicate a generally positive sentiment towards the service quality.

Median
The median is the middle value in a list of numbers. A list with an odd number of entries is the central number; a list with an even number of entries is the average of the two middle numbers. The median provides a central data point, minimising the effect of outliers or extreme values. For example, if most respondents chose either 4 (agree) or 5 (strongly agree), but a few selected 1 (strongly disagree), the median might be more representative of the general sentiment than the mean.

Mode
The mode is the number that appears most frequently in a set of numbers.
Usage in Likert scale: The mode identifies respondents' most common response or sentiment. If, for instance, the majority selected 3 (neutral) for a statement about in-flight meals, then the mode will be 3, indicating that most respondents had a neutral opinion.

When applied to a Likert scale table, the mean provides an average sentiment, the median gives the central sentiment, and the mode reveals the most commonly expressed sentiment.

In principle, Likert scale questions, when directed at the various stakeholders of an airline organisation, offered a structured and quantitative way to capture sentiments, making it easier to analyse, compare, and derive actionable insights.

4.9 DATA ANALYSIS

This study employed a mixed-method approach, integrating the data collected from online questionnaires and semi-structured interviews. In addition, content analysis played a pivotal role in examining textual data, further enriching the research insights.

4.9.1 Quantitative Data Analysis

The data gathered through online questionnaires, which primarily consisted of structured and closed-ended questions, was analysed quantitatively. Statistical tools, such as Microsoft *Excel*, were utilised for data processing (Romano et al., 2021). The study employed descriptive statistics to summarise and quantify the participants' responses, including means, frequencies, and standard deviations. Inferential statistical techniques explored the relationships between the variables and test research hypotheses, where applicable.

The quantitative data analysis in this study employed a systematic approach to extract valuable insights, test hypotheses, and provide a quantitative perspective on digital innovation within the airline organisation. The findings from this analysis were instrumental in contributing to a well-rounded understanding of the research subject.

4.9.2 Qualitative Data Analysis

Qualitative data analysis was pivotal in this study, complementing the quantitative and content analysis methods. The researcher collected rich narrative data through semi-structured interviews to delve into the participants' perspectives on digital innovation within the airline organisation.

The analysis process involved transcribing interviews and adopting a thematic analysis approach (Braun & Clarke, 2023). This approach identified recurring themes and patterns in interview transcripts, providing a deeper understanding of participants' viewpoints and experiences. The qualitative data analysis contributed valuable insights into the human

aspects of digital innovation, unveiling attitudes, motivations, challenges, and perceptions. These insights enriched the research findings and offered a holistic perspective, addressing both quantitative and qualitative dimensions of digital innovation within the airline industry.

4.9.3 Content Analysis

The study employed content analysis to examine textual data from various sources, including reports, documents, and written communications related to digital innovation within the organisation (DeJulio et al., 2020). This method involved systematically reviewing and categorising textual content to extract valuable insights and trends. Microsoft *Excel* was used to facilitate this content analysis, enabling the organisation and analysis of the textual data.
Content analysis was an essential component of this study, enabling the systematic examination and extraction of valuable insights from the textual data related to digital innovation within the airline organisation. This methodological approach enhanced the depth and comprehensiveness of the research findings, contributing to a holistic understanding of the challenges and opportunities associated with digital innovation in the airline industry.

4.9.4 Integration of Findings:

The integration of the findings from quantitative, qualitative, and content analysis allowed for a comprehensive understanding of the research problem. By comparing the results obtained from these different data sources and analytical methods, researchers can triangulate findings, enhance the validity of conclusions, and gain a multifaceted perspective on digital innovation in the airline organisation.

In summary, this mixed-method approach, which incorporated content analysis and utilised tools like Microsoft *Excel*, facilitated a thorough exploration of the research topic (Creswell & Creswell, 2017). The approach enabled this study to gain valuable insights from diverse data sources, offering a comprehensive view of the challenges and opportunities associated with digital innovation in the airline industry.

4.10 RESEARCH VALIDITY AND RELIABILITY

Validity and reliability are fundamental to the integrity and utility of research findings. Validity refers to the degree to which a research study accurately reflects or assesses the specific concept the researcher is attempting to measure. There are several types of validity that researchers must consider. Construct validity assesses whether a test or instrument measures the concept it intends to measure and is subdivided into convergent and

discriminant validity (Heale & Twycross, 2015). Internal validity refers to the extent to which the results of a study can be attributed to the interventions or variables tested rather than to other factors, ensuring that the study's design and methods have effectively isolated the variables of interest (Kimberlin & Winterstein, 2008). External validity pertains to the extent to which the findings of a study can be generalised to other settings, populations, or times (Andrade, 2018).

Reliability, on the other hand, refers to the consistency of a measure. A research instrument is considered reliable if it produces consistent results under consistent conditions. Test-retest reliability measures the stability of a test over time, ensuring that the same test yields similar results at different times (Kimberlin & Winterstein, 2008). Inter-rater reliability assesses the degree to which different raters or observers consistently estimate the same phenomenon (Heale & Twycross, 2015). Internal consistency measures the extent to which items on a test measure the same construct or concept, often assessed using Cronbach's alpha (Arslan, 2020).

To ensure validity and reliability, researchers should follow rigorous procedures throughout the study design and data collection processes. Pilot testing can help identify potential problems in the research design and methods (Noble & Smith, 2015). Using standardised data collection procedures minimises reliability variability (Arslan, 2020). Ensuring that all researchers and observers are well-trained reduces variability in data collection, enhancing inter-rater reliability (Bolarinwa, 2015). Replicating studies in different settings and with different populations helps verify the external validity of the findings (Drost, 2011).

Both validity and reliability are essential for the credibility and generalisability of research outcomes. Validity ensures that the research accurately measures what it intends, while reliability ensures consistency across different instances.

4.11 ETHICS

Various elements from individual contributors to the study's effect on the industry must be acknowledged to conduct accountable and ethical research. Standard ethical research should focus on five critical standards, namely (a) regard for persons, (b) independence, (c) defence of exposed populations, (d) generosity, and (e) righteousness (Wester, 2011). The researcher needs to deliberate on decision-making from the inception of the research idea to ensure the research is conducted diligently and yields enduring results. Wester (2011) specified that moral concerns regarding the research process must be heeded.

Ethically reliable research must ensure the protection of human rights. These include the admission of the research study, privacy, discretion, fairness, protection from damage, and autonomy. Engagement with participants is vital in research regardless of ethical methods and data-collecting tools. There must be an involvement in the participants' accounts if the independent meaning of the content is known (Hewitt, 2007).

This study complied with the detailed ethical considerations. The semi-structured interviews were conducted ethically, and the online questionnaire was created and distributed while heeding the ethical guidelines. The study followed all privacy and confidentiality guidelines for the interviewees and respondents to the online questionnaire. No distinctive identifiers, such as names, passports or identification numbers, were recorded.

The researcher asked only questions applicable to this study. All forms of ethical clearance were requested and obtained in line with the departmental requirements of the University of Pretoria. This study will store the interviews, research questions, and answers on a password-protected local computer and a password-protected account in the cloud. The participants were required to give informed consent and permission to participate in this study through semi-structured interviews and online questionnaires.

4.12 CONCLUSION

This chapter outlined the comprehensive study focused on developing a digital innovation strategy framework for an airline organisation. It began by defining research as a quest for answering unanswered questions or generating new ideas, emphasising the methodical nature of good research. The primary research question seeks to identify elements of a digital innovation strategy that create business value for an airline; the sub-questions explore critical opportunities, strategies for achieving business value, and challenges faced in digital innovation.

The study employed a mixed-method research design, combining quantitative and qualitative approaches to gather, analyse, and integrate data from online questionnaires and semi-structured interviews with employees, suppliers, and customers of a South African-based airline organisation. This methodological approach aimed to provide a holistic understanding of digital innovation in the airline industry, addressing the research questions through the lenses of different stakeholders.

Ethical considerations were thoroughly addressed to ensure the protection of the participants' rights and the integrity of the research process. The chapter also discussed the importance of philosophical underpinnings in research, the role of different research philosophies (positivism, interpretivism, and pragmatism), and the strategic selection of data collection methods and analytical techniques to enhance the research's validity and reliability.

In conclusion, Chapter 4 presented the study's detailed and methodical approach to investigating digital innovation within the airline industry, highlighting the potential for strategic insights and recommendations that can foster sustained business growth and competitiveness in a rapidly evolving digital landscape.

PART 3

5 DATA ANALYSIS: ONLINE QUESTIONNAIRES

5.1 INTRODUCTION

Chapter 5 presents a methodological framework for analysing digital innovation strategies in an airline organisation using a mixed-methods survey approach. The study initially profiled participant demographics across various divisions to understand diverse organisational perspectives. Thereafter, it employed open-ended questions for qualitative analysis, followed by Likert scale questions for a quantitative assessment of attitudes towards digital innovation. This comprehensive approach aims to provide a detailed understanding of digital innovation within the airline organisation.

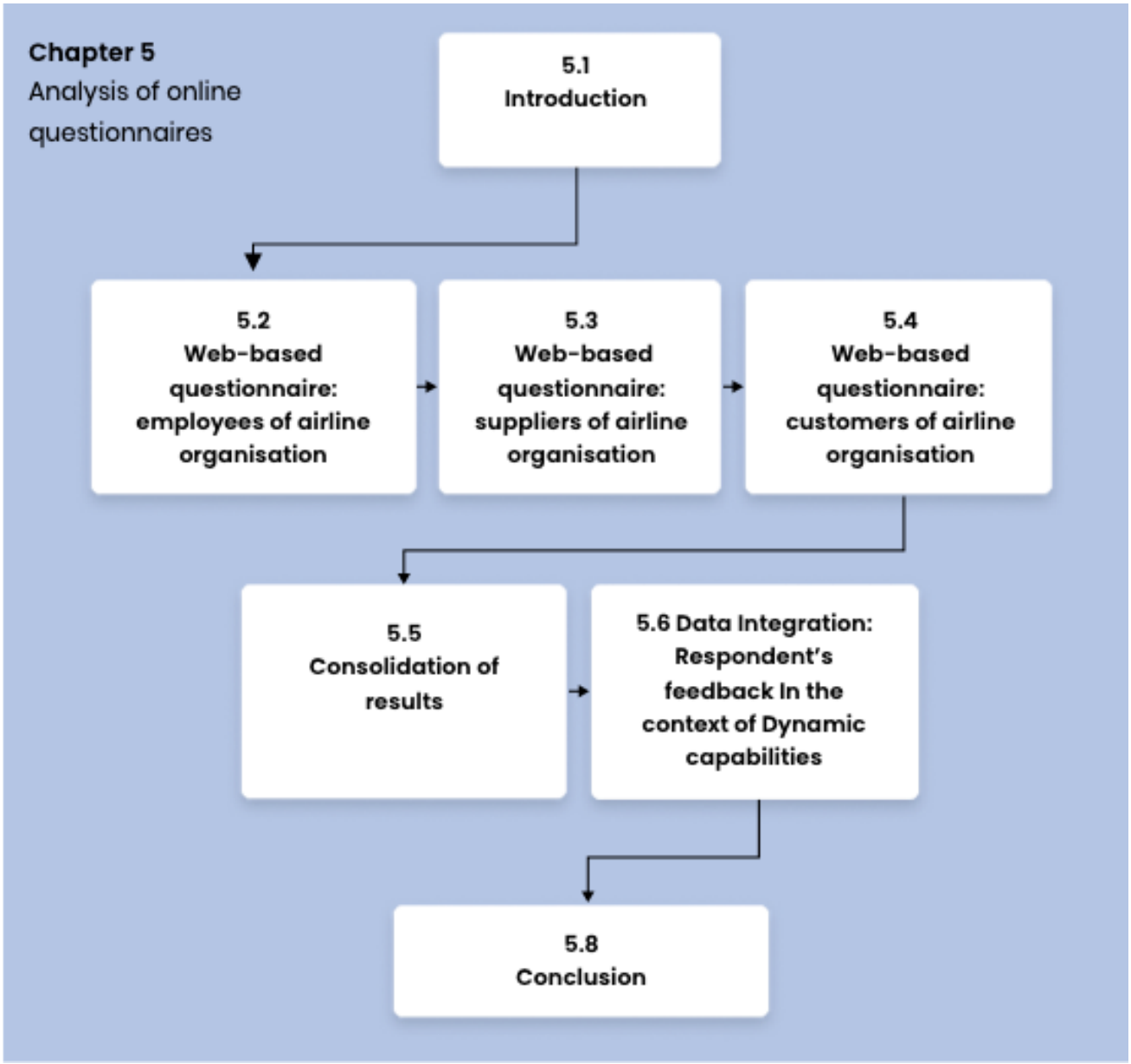


Figure 5.1 Overview of Chapter 5

This research study employed three web-based questionnaires to gather comprehensive data from different divisions within the airline organisation. Examining the demographic characteristics of the participants, including employment responsibility, experience, departmental affiliation, and geographic location, was the first step in the analysis process. This comprehensive profiling laid the groundwork for comprehending the variety of perspectives and contexts within the organisation.

Then, open-ended questions designed to probe the organisation's digital innovation strategy were posed. These questions allowed the respondents to articulate their insights, experiences, and opinions freely without the constraints of predefined response options, thus yielding nuanced and exhaustive insights.

The final phase comprised Likert scale rating questions to quantify the respondents' perceptions, attitudes, and beliefs regarding digital innovation. This structured approach provided insight into the intensity and direction of the respondents' sentiments and aided in identifying patterns of organisational accord or disagreement regarding digital innovation strategies. This multi-method survey approach, which combined demographic, open-ended, and Likert scale inquiries, enabled a comprehensive and detailed understanding of digital innovation strategies within the airline organisation.

Three questionnaire types were used in this research study:

Web-based questionnaire: Employees of the airline organisation
Web-based questionnaire: Customers of the airline organisation
Web-based questionnaire: Suppliers engaging with the airline organisation specific to digital innovation

5.2 WEB-BASED QUESTIONNAIRE: EMPLOYEES OF AIRLINE ORGANISATION

This section indicates the three types of questions proposed to employees of the airline organisation in the questionnaire. The subsequent section defines the distinct categories of questions posed in the questionnaire designed for employees of the airline organisation. These categories were created to capture a well-rounded perspective on digital innovation strategies within the organisation.

The questionnaire was sent to 571 employees (including 360 cabin and cockpit crew), with 58 participating; therefore, the response rate to the questionnaire was approximately 9.85%. Due to their involvement in daily flight operations, the cabin crew and cockpit crew's responses to the survey were low, i.e., although questionnaires were sent to 360 cabin and cockpit crew, only ten responses were received from this group. If the 360 cabin and cockpit crew were excluded, the response rate of the survey would be 26.99% (58 of 211).

5.2.1 DEMOGRAPHIC QUESTIONS

The initial section of the questionnaire was designed to establish the demographic profile of the participants, encompassing three critical aspects of their professional status within the organisation.

Table 5.1 presents data on the participants' work experience, expressed in terms of years. This quantitative representation of occupation in the organisation offers valuable insights into the depth of the participants' professional experience and maturity, which could potentially influence their perceptions of digital innovation strategy. Understanding the range of work experience, i.e., whether it is more skewed towards less experienced or more experienced employees, provided a context for the subsequent analysis of the responses.

These demographic data tables collectively laid the foundation for an analysis of the participants' responses, offering context and a means to segment and compare responses across different demographic categories. This detailed examination enabled a more comprehensive and in-depth understanding of how digital innovation strategy was viewed across various layers of the airline organisation.

Table 5.1 shows that the airline organisation has a diverse workforce in terms of experience. Over half of the respondents have work experience of between 11 and 40 years, reflecting a significant presence of experienced employees. Conversely, 26% of the respondents have less than ten years of experience, representing newer entrants to the organisation. Moreover, 20% of the overall employee base comprises experienced persons with more than 31 years of work experience.

Table 5.1 Participants' work experience

Participants' work experience	Number of responses	Percentage
<5 years	7	12.1%
5–10 years	8	13.8%
11–20 years	18	31%
21–30 years	13	22.4%
31–40 years	8	13.8%
41 years and above	4	6.9%
Total	58	100%

This range of experience among the workforce suggests varied perspectives influencing the perception and implementation of digital innovation strategies.

Table 5.2 details the specific job categories of the participants, effectively portraying their functional roles within the organisation. Through identifying the range and distribution of functions—from front-line staff to managerial and executive positions—the researcher gained a sense of the diverse professional perspectives, thereby contributing to an understanding of the digital innovation strategy within the organisation. This variable could illuminate the variance in perceptions and attitudes since individuals with different roles might interact with and experience digital innovation differently.

The main difference between a specialist role and a management role is that a specialist concentrates on a specific domain or area of expertise. The individual has deep knowledge in a particular field or skill, and their main contribution revolves around that expertise, whereas in a management role, employees focus on organising, leading, and supervising teams or departments; they focus more on people, processes, and strategy than specific technical or domain-specific expertise.

The data in

Table 5.2 reveal that individuals occupying roles at the management level and higher, extending up to the director level, represent 50% of the questionnaire's respondents.

Table 5.2 Employees' work function

Participants' job categories	Role level	Number of responses	Percentage
Director	Management	1	1.7%
Executive	Management	9	15.5%
Senior Manager	Management	4	6.9%
Manager	Management	15	25.9%
Specialist	Specialist	8	13.8%
Supervisory	Specialist	2	3.4%
Senior administrative	Specialist	1	1.7%
Administrative	Specialist	4	6.9%
Airline Pilot	Specialist	7	12%
Training Captain	Specialist	1	1,7%
Cabin Crew	Specialist	2	3,4%
Engineer	Specialist	1	1,7%
Junior Engineer	Specialist	1	1,7%
Analyst	Specialist	1	1,7%
Customer service	Specialist	1	1,7%
Total		58	100%

This significant proportion underscores the advanced level of expertise and leadership representation among the participants in the study.

Table 5.3 provides a breakdown of the departments within which the participants operate. Recognising the departments' representation is crucial as it acknowledges the unique departmental contexts and cultures, which may shape how digital innovation is perceived, adopted, and implemented. Departmental differentiation allows for analysing whether specific departments are more receptive or resistant to digital innovation based on their operational requirements and challenges.

Table 5.3 indicates that the Flight Operations department had the highest level of participation in the questionnaire, with more than a third participating.

Table 5.3 Department of Employment

Department where participants are employed	Number of responses	Percentage
Call Centre	4	6,9%
Compliance	3	5,2%
Finance	4	6,9%
Flight Operations	20	34,5%
Ground Operations	5	8,6%
Human Resources	1	1,7%
IT & Innovation	7	12,1%
Marketing and Commercial	5	8,6%
Technical Maintenance	3	5,25%
Ticket Sales	1	1,7%
Training	3	5,2%
Management	1	1,7%
Fleet planning	1	1,7%
Total	**58**	**100%**

This level of participation could underline the particular interest or need for digital innovation within airline operations, encompassing areas such as airports. Nevertheless, the balanced participation from other departments suggests a well-rounded representation, contributing to a comprehensive view of digital innovation needs across the entirety of the organisation. The scores for management were low because management employees participated in the survey by indicating the department where they function.

5.2.2 OPEN-ENDED QUESTIONS: EMPLOYEES OF THE AIRLINE ORGANISATION

The following figures present a graphical representation of the outcomes of the open-ended questions. In these visualisations, the relative height of the textual elements corresponds to the frequency of mentions for the respective most utilised phrases ascertained during the

interview process. Beneath each portrayed stage, a collection of pertinent keywords is counted. The compilation of this keyword assortment was facilitated through the web-based application *MonkeyLearn* Word Cloud Generator, employing the transcribed data from the interviews.

The question raised concerning Figure 5.2 was open-ended: *"How do you describe or define digital innovation?"*

In Figure 5.2, employees described digital innovation from the questionnaires with three main words: technology, process, and business. This suggests that employees view digital innovation as a blend of new tools (technology), new ways of working (process), and business transformation.

Figure 5.2 How employees describe digital innovation.

The focus on these aspects indicates a pragmatic understanding of how digital innovation can reshape an organisation’s operations and potentially offer a competitive edge.

Table 5.4 provides information on the word count and relevance of specific words used by employees to describe their understanding of digital innovation. The table indicates the count and relevance of each word, indicating the frequency and importance of these words in employees' descriptions of digital innovation.

The breakdown of the word count and relevance includes:

- *Technology* was mentioned 15 times and had a relevance score of 1. This suggests that employees associate digital innovation with the use of technology.
- *Process* was mentioned 11 times and had a relevance score 0.74. This indicates that employees perceive digital innovation as involving specific processes or procedures.
- *Business* was mentioned nine times and had a relevance score 0.62. This suggests that employees view digital innovation as having implications for business operations or strategies.
- Other words mentioned include *efficiency*, *digital*, *customer experience*, *use of technology*, *ability*, and *customer data*, each with varying counts and relevance scores.

Table 5.4 Word count and relevance for digital innovation understanding.

Word	Count	Relevance
technology	15	1
process	11	0.74
business	9	0.62
efficiency	7	0.49
digital technology	5	0.42
customer experience	4	0.34
use of technology	3	0.29
ability	3	0.23
customer	3	0.23
data	3	0.23

Based on the word count and relevance analysis in Table 5.4, one can conclude that employees primarily associate digital innovation with technology and processes and their impact on business operations. The mention of *customer experience* and *use of technology* also suggests that employees recognise the importance of digital innovation in enhancing customer experiences and leveraging technology for innovation.

It is important to note that this interpretation is based solely on the information provided in Table 5.4 and might not capture the full context or nuances of employees' descriptions of digital innovation.

In Figure 5.3, the word cloud highlights the pivotal role of digital innovation across sectors like aviation, finance, customer service, technology, efficiency, process optimisation, and data-driven decision-making.

The question raised concerning Figure 5.3 was open-ended: *"How are your work functions related to digital innovation?*

Figure 5.3 Employees work function related to digital innovation

Many have transitioned to web-based tools for daily tasks and data analysis, while communication tools like *WhatsApp* significantly improve customer engagement. Some feel certain regulatory entities lag in digital innovation, suggesting areas for improvement.

Table 5.5 provides information on the word count and relevance of specific words related to employees' work functions regarding digital innovation. The table shows the count and relevance of each word, indicating the frequency and importance of these words in employees' descriptions of how their work functions are related to digital innovation.

The breakdown of the word count and relevance for Table 5.5 indicates the following:

- The word *digital innovation* was mentioned nine times and was relevant to Score 1, suggesting that employees perceive digital innovation as closely related to their work functions.

- The word *customer* was mentioned four times with a relevance score of 0.39, indicating that employees recognise the role of innovation in their work functions in digital innovation.
- Other words mentioned include, *information*, *system*, *use of technology*, *business insight*, *crew*, *marketing*, and *objective*, each with varying counts and relevance scores.

Based on the word count and relevance analysis in Table 5.5, it can be inferred that employees perceive their work functions as closely tied to digital innovation. The mention of *customer*, *information*, and *system* suggests that employees recognise the importance of digital innovation in managing customer information and utilising technology systems. The mention of *business insight*, *crew*, *marketing*, and *objective* indicates that employees regard digital innovation as relevant to various aspects of their work functions, such as gaining insights, managing crew operations, and achieving marketing objectives.

Table 5.5 Word count and relevance for employees' work function related to digital innovation.

Word	Count	Relevance
digital innovation	9	1
customer	4	0.39
information	3	0.3
system	3	0.3
use of technology	2	0.3
business insight	2	0.26
crew	2	0.2
information	2	0.2
marketing	2	0.2
objective	2	0.2

Again, it is essential to note that this interpretation is based solely on the information provided in Table 5.5 and may not capture the full context of employees' descriptions of how their work functions are related to digital innovation.

Digital innovation in the aviation industry is centred on enhancing efficiency and customer experience. It streamlines operations, minimises errors, and differentiates companies in a competitive landscape. These innovations save time, reduce costs, and boost customer loyalty.

The question raised concerning Figure 5.4 was open-ended: *"What business value can an Airline organisation obtain by implementing a digital innovation strategy?"*

Figure 5.4 Business value that derives from digital innovation.

The prevailing opinion is that digital tools are crucial in setting businesses apart, potentially determining their market success or failure, as highlighted in Figure 5.4.

Table 5.6 Word count and relevance: Business value from provides information on the word count and relevance of certain words related to the benefits of digital innovation. The table shows the count and relevance of each word mentioned by the participants in response to open-ended questions about digital innovation.
Below is the breakdown of the word count and relevance for Table 5.6:

- *Customer experience* was mentioned seven times and had a relevance score of 1. This suggests the participants perceive customer experience as a significant benefit of digital innovation.

- *Efficiency* was mentioned seven times and had a relevance score of 0.85. This indicates that participants recognise the potential for digital innovation to improve operational efficiency.
- *Process* was mentioned seven times, with a relevance score of 0.85. This suggests that participants see digital innovation to streamline and optimise processes.
- Other words mentioned include *better customer experience*, *ability*, *business*, *cost*, and *employee*, each with varying counts and relevance scores.

Table 5.6 Word count and relevance: Business value from digital innovation

Word	Count	Relevance
digital innovation	7	1
airline	7	0.85
efficiency	7	0.85
customer	6	0.73
experience	6	0.73
process	6	0.73
passenger	5	0.6
hassle	4	0.48
customer experience	3	0.48

Following the participants' responses, the word count and relevance analysis in Table 5.6 highlight the importance of customer experience, efficiency, and process improvement as crucial benefits associated with digital innovation.

Figure 5.5 explains that digital innovation is paramount for businesses, emphasising efficiency, streamlining processes, and enhancing customer experiences. It reduces human errors, optimises resource management, and ensures a competitive edge by staying updated with industry changes. Benefits encompass cost and time savings, rapid access to accurate information, improved communication, and increased productivity. These innovations facilitate internal operations (like HR and finance) and external interactions, making processes more straightforward, cost-effective, and accessible.
The question asked and explained in Figure 5.5 was: *"Please describe what the benefits of digital innovation are in your opinion."*

Figure 5.5 Benefits of digital innovation

The overarching objective is to modernise businesses, making them more agile and responsive to market needs, thus providing superior customer service.

Based on the provided information,
Table 5.7 exhibits the word count and relevance scores for specific words related to digital innovation, as interpreted below:

- The phrase *customer experience* appears six times and has a relevance score of 1. This suggests that customer experience is a significant focus when discussing digital innovation.
- The words *efficiency* and *process* both appear seven times and have a relevance score of 0.99. This indicates that efficiency and process improvement are critical considerations in digital innovation.
- The phrase *better customer experience* appears three times and has a relevance score of 0.59. This suggests that there is a recognition of the importance of enhancing the customer experience through digital innovation.

- The words *ability*, *business*, *cost*, and *employee* each appear three times and have a relevance score of 0.41. This indicates that these factors are also considered relevant in the context of digital innovation, although to a slightly lesser extent.

Table 5.7 Word count and relevance: Benefits of digital innovation

Word	Count	Relevance
customer experience	6	1
efficiency	7	0.99
process	7	0.99
better customer expereience	3	0.59
ability	3	0.41
business	3	0.41
cost	3	0.41
employee	3	0.41

Overall, the table suggests that customer experience, efficiency, process improvement, and the ability to enhance business operations are essential considerations when discussing digital innovation. These findings highlight the focus on improving customer satisfaction and operational effectiveness through digital innovation initiatives.

5.2.3 LIKERT SCALE QUESTIONS: EMPLOYEES OF THE AIRLINE ORGANISATION

Using the Likert scale model, the following questions were posed to the employees and the airline organisation. Table 5.8 indicates the detailed findings and outcomes of the questionnaire.

Table 5.8 Descriptive statistics of employee opinions on digital innovation in their airline organisationTable 5.8 represents responses to a series of statements about digital innovation within an airline organisation. The respondents were asked to rate their level of agreement with each statement on a scale of 1 to 5, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree".

In addition to the count of responses at each scale level, the table provides descriptive statistics, including the mean, median, mode, and standard deviation for each statement. The mean provides an average score for each statement, the median gives the midpoint score, the mode shows the most frequent score, and the standard deviation indicates how much the scores vary from the mean.

Upon examining the results, it becomes evident that there exists a consensus among the respondents regarding the belief that digital innovation contributes to business value (mean = 4.66), enhances customer satisfaction (mean = 4.59), constitutes a continual implementation process (mean = 4.53), and enhances customer communication (mean = 4.45).

The respondents strongly disagreed with the statement, "Digital Innovation is a once-off strategic implementation" (mean = 1.86), indicating a consensus that digital innovation should be an ongoing effort rather than a one-time strategy. Conversely, statements about the high-cost of digital innovation (mean = 3.17), the organisation's structure being beneficial for obtaining value from digital innovation (mean = 3.76), and the speed of implementation across digital platforms being essential (mean = 4.19) received more varied responses, as indicated by higher standard deviations.

Based on the results, the respondents generally perceive digital innovation within their airline organisation positively. Below are the statements with the highest mean scores, indicating substantial agreement:

- “Your airline organisation has a digital innovation strategy" (mean = 4.66)
- "Digital innovation adds business value to the organisation" (mean = 4.59)
- "I have been exposed to digital innovation functions within my organisation" (mean = 4.53)
- "There is a high-cost element linked to digital innovation" (mean = 1.86)

Table 5.8 Descriptive statistics of employee opinions on digital innovation in their airline organisation

Descriptive Statistics									
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode	Std. Deviation
Your airline organisation has a digital innovation Strategy.	0	0	17	31	10	3.88	2.5	4	0.68
Digital innovation adds business value to the organisation.	0	0	2	16	40	4.66	2.5	5	0.55
I have been exposed to digital innovation functions within my organisation.	0	5	9	28	16	3.95	2.5	4	0.89
There is a high-cost element linked to digital innovation.	1	12	28	10	7	3.17	2.5	3	0.96
I believe my organisation is structured correctly to obtain value from digital innovation.	0	2	17	32	7	3.76	2.5	4	0.71
Digital innovation is a technology function.	0	4	8	35	11	3.91	2.5	4	0.78
Digital innovation is a people and process function.	0	5	5	31	17	4.03	2.5	4	0.86
Digital innovation consists of technology, organisational culture, processes, and data.	0	0	6	20	32	4.45	2.5	5	0.68
Digital innovation creates increased market share.	0	0	10	29	19	4.16	2.5	4	0.70
Digital innovation leads to customer satisfaction.	0	0	4	16	38	4.59	2.5	5	0.62
Digital innovation attracts potential new customers.	0	0	4	25	29	4.43	2.5	5	0.62
Digital innovation improves customer communication.	0	1	5	19	33	4.45	2.5	5	0.73
Digital innovation is a once-off strategic implementation.	24	23	6	5	0	1.86	2.5	1	0.93
Digital innovation is a continuous implementation process.	0	1	2	20	35	4.53	2.5	5	0.65
Your organisation invests in technology to grow the digital innovation strategy.	0	1	13	36	8	3.88	2.5	4	0.65
Your organisation follows an agile approach to obtain digital value.	0	3	20	30	5	3.64	2.5	4	0.72
The speed of implementation across digital platforms is essential in the organisation.	0	1	7	30	20	4.19	2.5	4	0.71
Digital innovation implementation follows a customer-centric approach.	0	1	10	35	12	4	2.5	4	0.68
Organisational culture is vital to the success of a digital innovation strategy.	0	1	4	32	21	4.26	2.5	4	0.66
The lack of IT resources is a threat to the success of digital innovation.	0	3	7	18	30	4.29	2.5	5	0.88
Budget constraints towards implementing a digital innovation framework are a tangible risk.	1	5	10	31	11	3.79	2.5	4	0.91
Data security is a risk as cybersecurity is complex, dynamic, fast-changing, and expensive.	0	3	10	31	14	3.97	2.5	4	0.79
Agile transformation is the heart of a digital framework.	1	1	10	36	10	3.91	2.5	4	0.76
Scaling is essential for any successful digital transformation initiatives.	0	0	11	32	15	4.07	2.5	4	0.67
Your organisation has a meaningful and actionable problem statement based on customers' needs.	0	2	21	28	7	3.69	2.5	4	0.73

These results suggest that employees believe their organisation has a digital innovation strategy, perceive digital value to the business, and have been exposed to digital innovation functions. However, there is some disagreement and uncertainty regarding the costs associated with digital innovation.

Table 5.9 details the provided questions and response options when respondents were asked to indicate their level of agreement or disagreement with specific statements about digital innovation within their airline organisation. The interpretation of the responses entails:

Your Airline organisation has a digital innovation strategy:

- No (0) respondents disagreed with the statement.
- Seventeen (17) respondents were neutral, indicating neither agreement nor disagreement.
- Forty-one (41) respondents agreed with the statement, indicating they believed their airline organisation had a digital innovation strategy.

Digital Innovation adds business value to the organisation:

- No (0) respondents disagreed with the statement.
- Two (2) respondents were neutral.
- Fifty-six (56) respondents agreed that digital innovation contributed to their organisation's business value.

I have been exposed to digital innovation functions within my organisation:

- Five (5) respondents disagreed with the statement, indicating they had not been exposed to digital innovation functions within their organisation.
- Nine (9) respondents were neutral.
- Forty-four (44) respondents agreed with the statement, indicating they had been exposed to digital innovation functions within their organisation.

There is a high-cost element linked to digital innovation:

- Thirteen (13) respondents disagreed with the statement, indicating that they did not believe a high-cost element was associated with digital innovation.
- Twenty-eight (28) respondents were neutral.
- Seventeen (17) respondents agreed with the statement, indicating that they believed a high-cost element was linked to digital innovation.

Table 5.9 Employee perceptions of digital innovation within their airline organisation

Question	Disagree	Neutral	Agree
Your airline organisation has a digital innovation strategy	0	17	41
Digital innovation adds business value to the organisation	0	2	56
I have been exposed to digital innovation functions within my organisation	5	9	44
There is a high-cost element linked to digital innovation	13	28	17
I believe my organisation is structured correctly to obtain value from digital innovation	2	17	39
Digital innovation is a technology function	4	8	46
Digital innovation is a people and process function	5	5	48
Digital innovation consists of technology, organisational culture, processes, and data	0	6	52
Digital innovation creates increased market share	0	10	48
Digital innovation leads to customer satisfaction	0	4	54
Digital innovation attracts potential new customers	0	4	54
Digital innovation improves customer communication	1	5	52
Digital innovation is a once-off strategic implementation	47	6	5
Digital innovation is a continuous implementation process	1	2	55
Your organisation invests in technology to grow the digital innovation strategy	1	13	44
Your organisation follows an agile approach to obtaining digital value	3	20	35
The speed of implementation across digital platforms is essential in the organisation	1	7	50
Digital innovation implementation follows a customer-centric approach	1	10	47
Organisational culture is vital to the success of a digital innovation strategy	1	4	53
The lack of IT resources is a threat to the success of digital innovation	3	7	48
Budget constraints towards implementing a digital innovation framework is a tangible risk	6	10	42
Data security is a risk as cybersecurity is complex, dynamic, fast-changing and expensive	3	10	45
Agile transformation is the heart of a digital framework	2	10	46
Scaling is essential for any successful digital transformation initiatives	0	11	47
Your organisation has a meaningful and actionable problem statement based on customers' needs	2	21	35

Based on these responses, one can conclude that most respondents believe their airline organisation has a digital innovation strategy, digital innovation adds business value, and they have been exposed to digital innovation functions within their organisation.

Figure 5.6 provides an executive overview of the survey results regarding the employees' opinions about digital innovation in their airline organisation. The figure simplifies the responses by consolidating the categories of "Agree" and "Totally Agree" (Likert scale ratings of 4 and 5) into a green bar while combining the categories of "Disagree" and "Totally Disagree" (Likert scale ratings of 1 and 2) into a red bar. The "Neutral" category (Likert scale rating of 3) is represented by an amber bar.

The analysis of Figure 5.6 indicates a generally positive perception of the presence and value of a digital innovation strategy within the airline organisation. The green bars, representing agreement, are generally higher than the red bars, indicating disagreement.

However, it is essential to note some level of disagreement and uncertainty, as indicated by red and amber bars. This disagreement might be related to the perceived costs associated with digital innovation, for example, the red bar for the statement, *"Digital innovation is a once-off strategic implementation",* is seen as a positive response to the statement.

Figure 5.6 Executive overview: Employee feedback.

Overall, Figure 5.6 provides a visual summary of the questionnaire results, highlighting the positive perception of digital innovation in the airline organisation while acknowledging the presence of differing opinions and uncertainties regarding costs.

5.3 WEB-BASED QUESTIONNAIRE: SUPPLIERS OF AIRLINE ORGANISATION

This section defines the three distinct categories of questions posed in the questionnaire designed for the suppliers of the airline organisation. These categories were created to capture a well-rounded perspective on digital innovation strategies within the organisation.

The questionnaire was sent to 12 suppliers of the Airline organisation, including various companies and vendors, whereby the leading roleplayers from the suppliers participated in the survey. All 12 suppliers to whom the questionnaire was sent responded, indicating a 100% response rate.

5.3.1 DEMOGRAPHIC QUESTIONS

The initial section of the questionnaire was designed to establish the demographic profiles of suppliers, encompassing three critical aspects of their organisation and dealings with the airline organisation.

The data in Table 5.10 provide an overview of the varying sizes of suppliers of the airline organisation. These supplier sizes are determined based on the total number of employees currently employed by such suppliers. This quantitative analysis provides insights into the scope and scale of the supplier companies, which could be integral to determining their maturity regarding digital innovation, both of their own companies and their experience with the airline organisation regarding digital innovation.

These demographic data tables collectively lay the groundwork for analysing suppliers' responses, providing the necessary context and the ability to classify responses across diverse demographic groups. This evaluation promotes a more detailed comprehension of how suppliers, distributed across various layers of the airline organisation, perceive digital innovation strategies.

Table 5.10 provides information on the sizes of the supplier companies within the airline organisation. The table presents the number of responses for each organisation size category and their corresponding percentages.

The organisation sizes are categorised as follows:

- Less than 100 employees
- 100–499 employees
- 500–999 employees
- 1000–10,000 employees

Based on the table, the distribution of supplier companies' sizes within the airline organisation is as follows:

- 41.67% of the supplier companies have less than 100 employees.
- 25% of the supplier companies have 100–499 employees.
- 0% of the supplier companies have 500–999 employees.
- 33.33% of the supplier companies have 1000–10,000 employees.

This information provides insight into the scope and scale of the supplier companies involved in the airline organisation.

Table 5.10 Suppliers' organisation sizes

Organisation size	Number of responses	Percentage
Less than 100 employees	5	41.7%
100–499 employees	3	25%
500–999 employees	0	0%
1000–10 000 employees	4	33.3%
Total	12	100%

The detail in Table 5.10 helps determine the suppliers' capacity, reliability, and performance, which can be crucial in assessing their maturity regarding digital innovation and its impact on the airline organisation's digital innovation efforts.

Table 5.11 provides information on the organisational structure of the supplier companies within the airline organisation. The table presents the number of responses for each organisational structure category and their corresponding percentages.

The organisational structure categories are as follows:

Traditional: The phrase "traditional organisational structure" describes the hierarchical framework numerous institutions have conventionally employed to delineate their roles, duties, and interpersonal dynamics. Such a structure is typically represented as a pyramid, marked by an expansive base that incrementally constricts as it ascends to the apex.

Agile: An agile organisational structure can be characterised as a dynamic and adaptable system that prioritises collaboration, responsiveness, and empowerment over conventional hierarchical approaches. The agile framework prioritises the formation of cross-functional teams capable of promptly adjusting to dynamic circumstances, as opposed to a hierarchical approach.

Traditional/conventional: A conventional organisation operates with a hierarchical structure whereby decision-making is centralised at the top, and roles are delineated across various departments. Communication follows a formal top-down approach, and the organisation relies on established procedures and strict regulations to maintain order and predictability.

Digital: A digital organisational structure is a business framework that prioritises digital technologies and capabilities to enhance operations, decision-making, and customer engagement. This structure often features flatter hierarchies, cross-functional teams, and a focus on agility, innovation, and data-driven strategies. Emphasising digital tools and platforms, it aims to respond swiftly to market changes and leverage digital transformation for competitive advantage.

Exponential: Utilising technology and external networks in an exponential organisational structure facilitates accelerated growth. The focal points of this concept are scalability, adaptability, and a decentralised methodology. With a strong emphasis on agility and innovation, it adeptly manoeuvres through the rapidly evolving landscape of the digital era.

Based on Table 5.1, the distribution of organisational structures among the supplier companies within the airline organisation is as follows:

- 0% of the supplier companies have a traditional organisational structure.
- 50% of the supplier companies have an agile organisational structure.
- 25% of the supplier companies have a traditional/conventional organisational structure.
- 8.33% of the supplier companies have a digital organisational structure.
- 8.33% of the supplier companies have an exponential organisational structure.

Table 5.11 Suppliers' organisations' structures

Organisation structure	Number of responses	Percentage
Traditional	0	0%
Agile	6	50%
Traditional/conventional	3	25%
Digital	1	8.3%
Exponential	1	8.3%
The traditional structure for a technology vendor, but undergoing digital transformation metamorphosis	1	8.3%
Total	12	100%

This information provided insight into the diversity of organisational structures among supplier companies. It suggests that many have adopted agile and digital organisational structures, often associated with flexibility, adaptability, and innovation. The presence of traditional and traditional/conventional structures indicates a blend of more traditional structures within the supplier network.

Table 5.12 provides information on the industry of operation for the supplier companies within the airline organisation. The table presents the number of responses for each industry category and their corresponding percentages. Table 5.12 presents data on the distribution of responses based on different organisational structures.

- Information technology received the highest number of responses, with nine out of 12 responses constituting 75% of the total.
- Design and advisory, financial institution, and aviation each received one response, representing 8.3% of the total responses for each category.
- In total, there were 12 responses, accounting for 100% of the data collected.

Table 5.12 Suppliers' industry

Organisational structure	Number of responses	Percentage
Information technology	9	75%
Design and advisory	1	8.3%
Financial institution	1	8.3%
Aviation	1	8.3%
Total	12	100%

Overall, the majority of responses were related to the information technology sector, while the other sectors had a smaller representation in the dataset.

Table 5.13 provides information on the suppliers' products and services within the airline organisation. The table presents the number of responses for each product or service category and the corresponding percentage.

The industry categories are as follows:
Information technology: Focuses on developing, managing, and maintaining computer systems, software, and networks for data processing and distribution.
Design and advisory: Offers expert guidance and creative services in design, consulting, and strategic planning across various industries.
Financial institution: Comprises entities like banks, credit unions, and investment organisations that provide financial services loans and manage monetary transactions.
Aviation: Involves airline operations, aircraft maintenance, and airport management and encompasses the manufacture and design of aircraft and air transport services.

Table 5.12 details how the supplier companies are distributed across various industry sectors within the airline organisation, as outlined:

- 75% of supplier companies operate in the information technology industry.
- 8.3% of supplier companies operate in the design and advisory industry.
- 8.3% of supplier companies operate in the financial institution industry.
- 8.3% of t supplier companies operate in the aviation industry.

This information provides insight into the diversity of industries represented within the supplier network. Most suppliers operate in the information technology industry, which aligns with the importance of technology and digital innovation in the airline organisation. The presence of

suppliers from design and advisory, financial institutions, and aviation industries suggests a range of expertise and perspectives in supporting the airline organisation's digital innovation efforts.

The product and service categories listed in Table 5.13 are as follows:

Software as a Service (SaaS): Offers cloud-based software accessible via the internet on a subscription model, eliminating the need for local installation and maintenance.
Hosting and infrastructure: Provides the technology and services needed to host and manage websites, applications, and data storage, often through cloud-based solutions.
Design services: Brand Design creates a unique visual identity, Business Design designs operational strategies, Experience Design optimises user interactions, and Product Design focuses on user-focused product creation.
Messaging and Platform as a Service (PaaS): Messaging offers digital communication platforms for individuals and systems, while PaaS provides a cloud environment for building, delivering, and managing web-based applications without the need to manage the underlying infrastructure.

The table illustrates the breakdown of products and services provided by suppliers in the context of the airline organisation, as follows:

- 58.33% of the suppliers offer software as a service.
- 25% of the suppliers offer hosting and infrastructure services.
- 8.33% of the suppliers offer brand design, business design, experience design, and product design services.
- 8.33% of the suppliers offer messaging solutions and platforms as a service.

Table 5.13 Suppliers' products and services

Products and services	Number of responses	Percentage
Software as a Service	7	58.3%
Hosting and infrastructure	3	25%
Brand design, business design, experience design, product design	1	8.3%
Messaging solutions and Platform as a Service	1	8.3%
Total	12	100%

This information provides insight into the range of products and services suppliers within the airline organisation provide. Most offer software as a service, indicating the importance of software solutions in supporting digital innovation efforts. The presence of hosting and infrastructure services suggests the need for reliable and scalable technology infrastructure. The availability of design services and messaging solutions highlights the focus on user experience and communication in the digital innovation strategy.

5.3.2 OPEN-ENDED QUESTIONS: SUPPLIERS OF THE AIRLINE ORGANISATION

The open-ended questions were posed to the supplier network within the airline organisation, with a specific focus on digital innovation. These questions, unrestricted by nature, were designed to probe the suppliers' understandings, perspectives, and personal interpretations of digital innovation.

The open-ended questions aimed to encourage suppliers to express their thoughts freely, offering insights into their comprehension of the role, potential, and challenges of digital innovation in their operations and the broader industry. The intent was to evaluate their current understanding and get a sense of forward-looking perspectives on how digital innovation might shape the airline industry's future.

Figure 5.7 indicates the prominence of the words *business*, *software*, and *development* in the word cloud provides insight into the core areas of focus and activity for the airline organisation. *Business* likely reflects the expansive scope of the airline organisation's operations, encompassing both *Business to Consumer* and *Business to Business* segments, underscoring a wide-reaching market strategy. The emphasis on *software* suggests that much of the organisation's transformative efforts revolve around digital solutions. This is evident in their endeavours to automate processes and develop their internal customer relationship management (CRM) system, indicating a significant investment in digital tools to enhance operations and customer engagement. Meanwhile, the term *development* accentuates their proactive stance on innovation. Instead of relying on off-the-shelf products, the airline organisation undertakes the initiative to craft tailored solutions, catering to their specific needs and possibly even to more specialised sectors within the aviation industry.
The open-ended question asked of suppliers, related to Figure 5.7, was, *“What elements of digital innovation do you concentrate on within your organisation?”*

Figure 5.7 Elements of focus from suppliers on digital innovation

The airline organisation appears to be a business-driven entity that heavily leans into software-centric development to advance its organisational objectives and serve its diverse clientele.

Table 5.14 provides information on the word count and relevance of elements of focus on digital innovation from suppliers. The table presents the count of occurrences for each element and their corresponding relevance scores.
Table 5.14 also includes each element's word count and relevance score.
The relevance score indicates the importance or significance of each element in the context of digital innovation. A score of 1 represents high relevance, while below 1 indicates lower relevance.

Based on Table 5.14, the following can be observed:

- The element with the highest word count is *Business*, with a count of four.
- The elements *Customer of Tomorrow*, *Brand*, and *Product* have a word count of two each.
- The remaining elements have a word count of one each.

All elements have a relevance score of 1, indicating that they are considered necessary for digital innovation.

Table 5.14 Word count and relevance for elements of focus from suppliers on digital innovation

Word	Count	Relevance
Business	4	1
Customer of tomorrow	2	0.59
Brand	2	0.42
Product	2	0.42
Restless leadership team	1	0.21
Global messaging system integration	1	0.21
Own crm system	1	0.21
Customer experience automation	1	0.21
Rapid response	1	0.21
Streamlined product	1	0.21

This information suggests that suppliers' focus on digital innovation includes business, customer of tomorrow, brand, product, restless leadership team, global messaging system integration, own CRM system, customer experience automation, rapid response, and streamlined product. These elements are deemed relevant and significant in shaping digital innovation strategies within the airline organisation.

In Figure 5.8, the word cloud, emphasising hosting, software solutions, and systems, highlights the organisation's tech-centric core. The prominence of *Hosting* reveals a significant commitment to infrastructure, especially in *Cloud Hosting* and disaster recovery, ensuring reliable and scalable solutions. *Software solution* points to a diverse digital toolkit, from e-commerce platforms to payment solutions, catering to varied operational needs.
The question posed to the suppliers, as the results indicate in Figure 5.8, was, *"What products and services do you offer the airline that contribute to its Digital Innovation strategy?".*

Figure 5.8 Products and services suppliers offer the airline that contributes to digital innovation.

The term *systems* showcases their comprehensive offerings, such as inventory and booking systems. They notably integrate IT systems into digital platforms and focus on adaptability and customer experience. Together, these terms paint a picture of a holistic technology provider with special services for the aviation sector.

Table 5.15 categorises terms associated with services or aspects of an operation. The most emphasised term is *Access*, which underscores its primary importance in the context. Other terms like *better customer experience*, *effective price range*, and *online payment processing* indicate areas of focus, such as user satisfaction, affordability, and digital transactions—words like *passenger services system* and *support for scheduling* hint at more specialised services or functionalities.

The relevance score quantifies the importance of each term within the given context. A score of 1, as seen with *Access*, represents the highest relevance or significance.

Table 5.15 Word Count and relevance for products and services suppliers offer the airline that contributes to digital innovation.

Word	Count	Relevance
Access	2	1
Better customer experience	1	0.53
Effective price range	1	0.53
Channel distribution	1	0.42
Easier access	1	0.42
General design perspective	1	0.42
Online payment processing	1	0.42
Passenger services system	1	0.42
Support for scheduling	1	0.42

As the scores decrease, they signify comparatively less importance or emphasis within the dataset yet are meaningful. For instance, terms with a score of 0.53 are less crucial than *Access* yet more significant than terms with a score of 0.42. In essence, there is a hierarchical understanding of each term's importance.

The word cloud provided in Figure 5.9 underscores three pivotal terms: innovative, improve, and process. The organisation is hailed for its progressive strategies, especially in pioneering new solutions in the aviation sector. Its persistent drive to improve is evident in its commitment to test new systems and refine operations. The term *process* reflects a methodical approach, emphasising digitisation and cloud services.

The question posed to suppliers in Figure 5.9 was, *"Why would you suggest that the case study organisation is a digital[ly] innovative organisation?"*

Figure 5.9 Do suppliers suggest that the airline organisation is a digitally innovative organisation?

Overall, the organisation emerges as a frontrunner in the aviation industry, continually evolving to serve its stakeholders effectively.

Key terms such as *Cloud*, *Airline organisation*, *Process*, and *Service* are highlighted in Table 5.16, with those holding the highest prominence assigned a relevance score of 1. This underscores several significant points: first, the organisation's substantial emphasis on cloud technologies; second, the central role of the airline organisation in discussions or topics, underscoring its significance within the broader context; third, the critical importance of processes, which may signify a commitment to operational efficiency or systematic approaches; and lastly, the paramount importance placed on service, both in terms of quality and range, as a top priority for the organisation's objectives and strategies.

The terms, each assigned a relevance score of 0.42, offer insights into various aspects. They indicate an exploration of innovative strategies and a holistic decision-making approach involving diverse stakeholders. Emphasis on convenient and critical services underscores quality offerings, while the word, *low-cost carriers*, represents a specific business model in aviation.

Table 5.16 Word count and relevance for suppliers' opinion that the suppliers are digitally innovative organisations

Word	Count	Relevance
Cloud	2	1
Airline organisation	2	1
Process	2	1
Service	2	1
Innovative revenue stream	1	0.42
Body of stakeholders	1	0.42
Convenient service	1	0.42
Critical service	1	0.42
Front row seat	1	0.42
Low-cost carrier	1	0.42

The relevance score helps distinguish the importance of each term, providing clarity within the context described.

The question posed to suppliers in relation to Figure 5.10 was, *"Have* (sic) *your business grown over the last six years due to the airline's digital innovation expansion? Please elaborate* [*?*]*"*

The word cloud in Figure 5.10 offers a glimpse into the pivotal concerns or characteristics of a particular context or entity, with the terms *yes*, *airline*, and *new* emphasised. The repeated emphasis on *airline* highlights the central role of aviation in the context, probably underscoring the importance of airline operations, strategies, or transformations. The term *yes* could indicate a positive affirmation, agreement, consensus, or approval within the discussions. Meanwhile, the word *new* might emphasise innovation, changes, or the introduction of novel approaches within the airline sector. While terms such as *Cloud*, *Process*, and *Service* shed light on technological integration, operational efficiency, and quality of offerings, the emphasis on *yes*, *airline*, and *new* hints at an overall positive and forward-looking attitude towards advancements in the aviation industry.

Figure 5.10 Have suppliers expanded due to the airline's digital innovation expansion?

The word cloud in Figure 5.10 indicates a focus on aviation, with a positive outlook on innovation and development in airline operations and strategies.

Table 5.17 shows that the term *airline* stands out with the highest relevance score of 1 and is mentioned six times, suggesting that this topic is of utmost importance and is central to the discussions.
Following this, *growth* has a relevance score of 0.65 and appears four times, implying a notable emphasis on the expansion or positive progression within the airline sector.
Several terms like *business*, *airline organisation*, *opportunity*, *scope*, and *service* share a relevance score, denoting them of critical secondary importance. Specifically, this might highlight the role of the airline, various business strategies or offerings, and potential avenues for expansion.

The terms that received the lowest relevance scores, ranging from 0.19 to 0.22, were those that dealt with less significant issues. These included the minor negative impacts of COVID-19, the evolution of data usage, and the digitisation of new business models.
These terms introduce more specific or nuanced topics that could be under consideration. For instance, there is a reflection on the challenges presented by COVID-19, the increasing role of data in operations, and the digital transformation of business models.

Table 5.17 Word Count and relevance for suppliers' expansion due to the airline's digital innovation.

Word	Count	Relevance
Airline	6	1
Growth	4	0.65
Business	2	0.29
Case study organisation	2	0.29
Opportunity	2	0.29
Scope	2	0.29
Service	2	0.29
The negative impact of COVID-19	1	0.22
Evolution of data usage	1	0.19
New business model digitisation	1	0.19

The relevance scores assist in presenting the significance of each term hierarchically within the described context, giving viewers a quick understanding of the primary themes and secondary considerations.

The word cloud illustrated in Figure 5.11 provides insights into the complexities and challenges faced within an IT-focused industry or organisation. Three pivotal terms emerged prominently from the context: *customer*, *change*, and *people*. The term *customer* signifies the central role of client preferences, behaviours, and expectations, highlighting the necessity of understanding and anticipating the evolving desires of tomorrow's consumers.

The repeated emphasis on *change*, particularly within the landscape of digital transformation versus digital acceleration, reflects the dynamic nature of the IT and aviation sectors. This change encompasses not only technological shifts but also legislative modifications influenced by both local and international entities. The term, *people*, emphasises the human aspect, indicating challenges in hiring and retaining staff and, most critically, managing human resistance to change.

The question posed to suppliers in this context was, *"What challenges do*[*es*] *your organisation face towards implementing a digital innovation strategy?"*

Figure 5.11 Challenges suppliers face in implementing a digital innovation strategy.

It becomes evident that while technological advancements pose unique challenges, the human factor, including internal communication, user adoption, and the natural aversion to change, often emerges as a significant hurdle in effective transformation.
The word cloud illustrates a scenario whereby customer expectations, rapid technological shifts, and human dynamics create a multifaceted challenge for organisations navigating the IT landscape.

Table 5.18 indicates that the word *client* stands out as the most significant, with a relevance score of 1, appearing four times. This score emphasises the central role of clients in the discussions, suggesting the organisation's keen focus on client relations, needs, and preferences.

The terms *challenge*, *communication*, and *Industry* each have a relevance score of 0.42, indicating their noteworthiness. The word, *challenges*, might allude to the various issues the organisation faces, while *communication* emphasises the importance of effective dialogue—both internally and externally. The recurrence of the word *industry* suggests the discussions are industry-centric, aiming to understand and navigate the sector.

The other terms like *suitable human resources*, *third-party supplier*, *authoritative body*, *available resource*, *consumed energy*, and *customer of tomorrow* all have equal relevance scores of 0.21. These touch upon specific aspects, such as staffing challenges, reliance on external suppliers, adherence to authoritative mandates, resource allocation, project energy consumption and forecasting future customer needs.

Table 5.18 Word count and relevance challenges suppliers face in implementing a digital innovation strategy.

Word	Count	Relevance
Client	4	1
Challenge	2	0.42
Communication	2	0.42
Industry	2	0.42
Suitable human resource	1	0.21
3rd party supplier	1	0.21
Authoritative body	1	0.21
Available resource	1	0.21
Consumed energy	1	0.21
Customer of tomorrow	1	0.21

Overall, the relevance score offers a hierarchical understanding of the weight or importance of each term in the context being discussed, thereby giving an overarching view of primary focuses and secondary considerations.

5.3.3 LIKERT SCALE QUESTION: SUPPLIERS OF THE AIRLINE ORGANISATION

This section indicates the Likert scale analysis for suppliers of the airline organisation.

Table 5.19 highlights the detailed findings and outcomes of the questionnaire and presents descriptive statistics of the survey relating to the perceptions and practices around digital innovation, specifically in the context of the aviation industry.

The following information is a list of the detailed findings in the descriptive analysis.

High agreement with the importance of digital innovation: Many statements that revolve around the positive aspects of digital innovation or its importance in the industry tend to have a high mean (typically above 4), indicating substantial agreement.

Data security: The importance of data security was the statement with the highest agreement, with all respondents selecting "Strongly Agree" and a standard deviation of 0.

Concerns: Some concerns were raised, as evidenced by the statements with a lower mean, about resources, alignment of roadmaps, and the constraints posed by legacy systems and regulations

Integration and data quality: There was a strong consensus (mean scores above 4.5) that system integration and data quality were paramount to digital innovation. The standard deviations were low, and the responses were concentrated around the mean.

Agility: Responses indicate that organisations believe they are agile in adapting to the airline's digital strategy, and the airline is also perceived to be agile. However, the latter has more variability, as indicated by a higher standard deviation.

Resources and speed: There was ambivalence about the sufficiency of resources and the speed of partnership operations, with means around 4, suggesting that some organisations might feel they are lagging.

Value and opportunities: Partner with the airline and have a digital focus on increasing business value and opportunities. Both these statements have means above 4.7.

Market share and skill sets: Digital innovation is perceived to lead to increased market share and skills enhancement, learning, and experience. These are positive indicators of the benefits of embracing digital innovation.

Tools and culture: Most organisations have the tools and agile culture to implement and operate digital innovation initiatives, with means consistently above 4.5.

Barriers: Legacy systems, regulations, and issues like people, money, and time are perceived as barriers or challenges, as evidenced by their respective means, which are lower than other positive statements. Mainly, regulation within the aviation industry seems to elicit divided opinions, with a mean of 3.75 and a relatively high standard deviation.

Alignment and problem statements: There is a perceived misalignment between digital innovation roadmaps and priorities, with a mean of 3.92. Organisations believe they understand the airline’s needs, but the alignment might be less efficient.

Table 5.19 Suppliers' perception of digital innovation within the airline organisation

Descriptive Statistics									
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode	Std. Deviation
Mature system integration with downstream applications is key to digital innovation.	0	0	0	4	7	4.58	2.5	4	0.68
Data availability and quality form part of a digital innovation strategy.	0	0	0	1	11	4.92	2.5	5	0.29
My organisation is agile enough to adapt to the airline's digital innovation strategy.	0	0	1	2	9	4.67	2.5	5	0.65
The airline is agile to adapt to my organisation's operations and procedures.	1	0	2	3	6	4.08	2.5	5	1.24
The partnership operates at the required speed to deliver digital innovation products and services.	0	1	1	5	5	4,17	2.5	4	0.94
Sufficient resources (people and budget) are available to keep up with digital trends.	1	1	1	5	4	3.83	2.5	4	1.27
Business value increased within my organisation by partnering with the airline towards digital execution.	0	0	0	3	9	4.75	2.5	5	0.45
New business opportunities arise by having a digitally focused strategy.	0	0	0	2	10	4.83	2.5	5	0.39
Digital innovation leads towards an increase in market share.	0	0	2	1	9	4.58	2.5	5	0.79
Digital partnerships lead to increased skill sets, learning and experience.	0	0	0	4	8	4.67	2.5	5	0.49
My organisation has an agile digital framework.	0	0	1	4	7	4.5	2.5	5	0.67
My organisation has the required budget to implement digital innovation initiatives.	0	1	2	3	6	4.17	2.5	5	1.03
The skill set in my organisation is sufficient to operate in digital innovation.	0	0	0	4	8	4.67	2.5	5	0.67
My organisation has the necessary tools to implement and operate digital innovation initiatives.	0	0	1	3	8	4.58	2.5	5	0.67
Organisational culture allows for an agile digital innovation strategy.	0	0	1	2	9	4.67	2.5	5	0.65
Data security is a crucial factor we consider as an organisation.	0	0	0	0	12	5	2.5	5	0
The alignment of digital innovation roadmaps and priorities is efficient.	1	1	0	6	4	3.92	2.5	4	1.24
My organisation has a meaningful and actionable problem statement based on the airline's needs.	0	0	1	6	5	4.33	2.5	4	0.65
People, money and time are barriers to implementing digital innovation.	0	1	1	5	5	4.17	2.5	4	0.94
The existence of legacy systems adds complexity to executing digital innovation initiatives.	0	0	3	1	8	4.42	2.5	5	0.90
Regulation within the aviation industry slows down the digital innovation process.	0	1	4	4	3	3.75	2.5	3&4	0.97

While this survey demonstrates that the aviation industry acknowledges the value and importance of digital innovation, there are inherent challenges. While organisations acknowledge the potential advantages of digitisation, they are also aware of obstacles such as outdated infrastructure, regulatory hurdles, and limited resources. Overcoming these difficulties is key to developing a unified and successful digital approach within the aviation industry.

The data in Figure 5.12 reflect the respondents' views on a series of statements concerning digital innovation, specifically regarding airline operations and partnerships. In particular, the unanimous agreement on the importance of *Mature system integration with downstream applications*, *Data availability and quality*, *Business value increased by partnering with the airline*, *New business opportunities arising from a digital strategy*, *Digital partnerships increasing skill set and experience*, *The sufficiency of skill set for digital innovation*, and *Data security being a crucial factor* stands out. These areas received no disagreement, which signifies their paramount importance in the digital innovation discourse.

However, the agility of the airline and the respondents' organisation to adapt to each other's procedures and strategies indicates a slight dilution in consensus. While most respondents agreed, a small number disagreed, indicating that agility might sometimes be a challenge.
The majority of the respondents regarded resources, especially people and budget, as adequate, although a few respondents expressed reservations, which suggests the majority feel equipped for digital trends.
Statements about the complexity added by legacy systems and the regulatory environment slowing down the digital innovation process met with ambivalent reactions. Many agreed that legacy systems introduce complexity, although a few remained neutral. Conversely, regulation is the regulation of opinions; as such, a notable number of respondents remained neutral or disagreed, implying that regulation might not be a universal impediment.

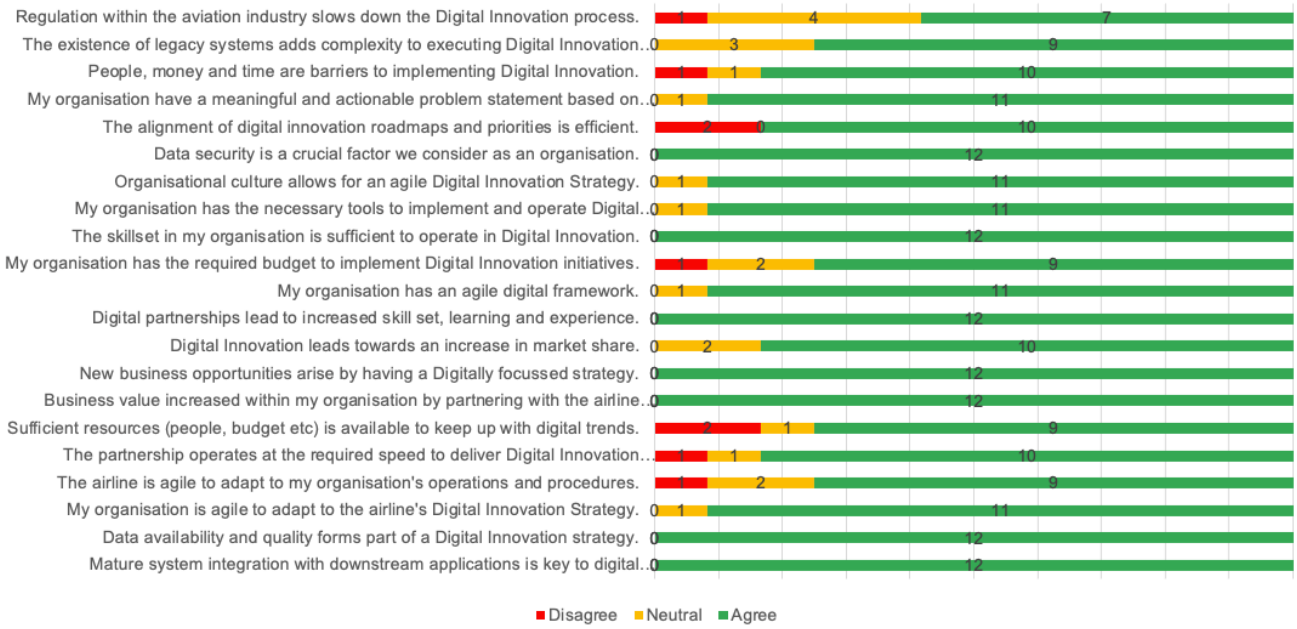


Figure 5.12 Executive summary – supplier feedback.

Lastly, views on the complexity of digital channels and the non-use of digital channels to manage travel experiences are prominent due to significant disagreement.

In summary, the data underscore the critical role of digital innovation in the airline organisation, reincorporating its importance, benefits, and the challenges it introduces. Common concerns in many areas, namely specific aspects such as agility, resource allocation, and the role of regulations, require more collaborative discussion to bridge the perceptual gaps.

5.4 WEB-BASED QUESTIONNAIRE: CUSTOMERS OF AIRLINE ORGANISATION

This section defines the three distinct categories of questions posed in the questionnaire designed for customers of the airline organisation. These categories were created to capture a well-rounded perspective on digital innovation strategies within the organisation.

The survey was sent to 6,837 airline customers who form part of the airline's opted-in marketing email base. Of the 6837 surveys distributed, 213 customers responded, a response rate of 3.1%. The selection criteria were determined by identifying customers who voluntarily subscribed to the airline organisation's marketing emails and demonstrated active engagement with email communications over the past three years. This does not constitute the entire opted-in customer base.

5.4.1 DEMOGRAPHIC QUESTIONS

In the competitive landscape of the aviation industry, particularly for low-cost carriers, understanding the nuances of customer behaviour and preferences is paramount. Knowing the age of customers is essential as it offers a glimpse into their travel needs and priorities; younger customers might be seeking affordable adventures, while older age groups might be more inclined towards convenience and accessibility.

The frequency of travel provides insights into the nature of the airline's regular clientele, helping in tailoring loyalty or frequent flyer programs. It can distinguish between habitual customers, possibly business commuters looking for cost-effective solutions, and occasional passengers travelling for leisure or personal reasons. The reason for travel delves deeper into this distinction, allowing the airline to streamline onboard services and ancillary offerings. For instance, leisure travellers appreciate bundled hotel or activity deals, while business customers might value punctuality and quick turnarounds.

Lastly, understanding the reservation booking channel offers strategic insights into customer engagement. If more customers book through mobile apps, it might indicate a trend towards digital proficiency and the need for the airline to invest more in digital platforms, thereby ensuring ease of access and convenience.

For a low-cost carrier, these demographic questions are not just metrics but rather crucial tools in shaping a resilient, adaptive, and customer-centric business model, ensuring that the airline remains both competitive and profitable.

Table 5.20 provides an overview of the different categories of customers travelling with the airline organisation.

The detailed data derived from the questionnaire completed by customers of the airline organisation deconstructs the information into insightful data. Table 5.20 illustrates the age distribution of customers, revealing that the largest demographic falls within the 46 to 60 age range, constituting nearly one-third of the total customer base. Conversely, the least represented age group is the 19–24 category. Notably, seniors aged 61 and older, along with middle-aged customers aged 36 to 45, demonstrate similar levels of representation, albeit with seniors narrowly exceeding. Young professionals aged 25–35 also comprise a substantial portion, accounting for just over 18% of the total clientele.

This diverse age distribution offers valuable insights for the airline or business. For instance, with most customers falling within the 46–60 range, tailoring services, amenities, and marketing campaigns to provide for their preferences and needs could be a strategic focus.

Table 5.20 Age of customers

Customer age group	Number within age group	Percentage
19–24	6	2.8%
25–35	39	18.3%
36–45	50	23.5%
46–60	66	30.9%
61 and older	52	24,5%
Total	213	100%

However, the significant presence of other age groups suggests that a one-size-fits-all approach might not be optimal, highlighting the importance of offering diverse and inclusive solutions to meet the varying needs of the customer base.

Table 5.21 denotes that most customers (46%) travel two to five times a year, indicating that most of the clientele are not extremely frequent flyers but rather rely on air travel multiple times.

A significant portion (25.4%) travel only once a year, suggesting a potential opportunity for airlines to offer packages or promotions to encourage them to fly more often.

Customers travelling more than once a year are a minority, but they represent a loyal and consistent user base, and special attention or loyalty programs might be beneficial for retaining and accommodating them.

Table 5.21 Frequency of travel

Frequency of travel	**Frequencies**	**Percentage**
Once a year	54	25.4%
2–5 times per year	98	46%
6–10 times per year	32	15%
11–20 times per year	20	9.4%
21–30 times per year	5	2.4%
>30 times per year	4	1.8%
Total	213	100%

Understanding these frequencies can assist the airline in developing targeted marketing campaigns, loyalty programs, and service offerings to accommodate the diverse needs of its passengers.

Table 5.22 illustrates the reasons for customers of the airline organisation travelling.

The following description explains the categories of reasons for travel:

Leisure: In the context of airline services, leisure travel entails transporting passengers who engage in air travel for personal enjoyment and leisure. The activities encompass leisure trips, tourist attractions, and family excursions, for which individuals opt for air transportation.

Leisure and business: Individuals who utilise an airline for both pleasure and business travel encompass a diverse range of customers who engage in air travel for varied reasons. This category encompasses professional obligations, such as scheduled meetings or conferences, and personal obligations, such as vacations or visiting family members. Individuals employ airlines to accommodate their varied travel requirements.

Business: Customers who use an airline for business travel typically fly to meet professional obligations, including attending meetings, conferences, or other work-related events. They depend on air travel to reach various destinations.

Table 5.22 Reason for travel

Frequency of travel	Type of travel	Percentage
Leisure	131	62%
Leisure and business	64	30%
Business	18	8%
Total	213	100%

Most customers seek leisure travel, indicating that the airline or service is favoured by those seeking relaxation or vacationing. A notable portion of customers blends business with leisure, presenting a chance to serve varied demands, possibly valuing loyalty rewards with dual benefits. Business-only clients, while fewer, have needs and, due to higher travel frequency or spending, are an essential market to serve.

Table 5.23 provides an overview of booking distribution across various channels utilised by customers to make reservations with the airline. Notably, most bookings, constituting 70% of the total, were conducted directly through the airline's website. In addition, the airline's mobile

application emerged as a popular booking platform, accounting for 13% of total bookings. Online travel agencies (OTAs) represent 8% of bookings, suggesting a significant portion of customers prefer third-party platforms for their reservations. Conversely, the airline-responsive mobile site and traditional travel agencies contributed to a smaller percentage of bookings, at 3% and 2%, respectively. Less utilised channels, such as the Discovery website, airline call centres, and ticket sales desks at the airport, each accounted for only 1–2% of total bookings. Overall, these findings underscore the dominance of online platforms, particularly the airline's website and mobile application, in facilitating bookings, while traditional booking channels play a lesser role in the overall reservation process.

Table 5.23 Booking channel used for reservations.

Booking channel	Bookings per channel	Percentage
Discovery website	5	2%
Airline call centre	2	1%
Airline mobile application	28	13%
Airline-responsive mobile site	6	3%
Airline website	149	70%
Online travel agencies	16	8%
Ticket sales desk at the airport	2	1%
Traditional travel agencies	5	2%
Total	213	100%

The airline's website and other digital platforms are the primary methods by which customers make reservations. There exists a focus on the ongoing enhancement and upkeep of these online channels to ensure efficiency in the booking process. Traditional methods, like call centres, ticket sales desks, and travel agencies, are less preferred but still crucial for a niche segment of customers.

The data suggest the need for a multi-channel strategy, ensuring all booking platforms are efficient and accommodate the varied preferences of the customer base.

5.4.2 OPEN-ENDED QUESTIONS: CUSTOMERS OF THE AIRLINE ORGANISATION

The open-ended questions were posed to customers of the airline organisation, with a specific focus on the digital innovation domain.

The rapidly evolving digital landscape has transformed various industries, including aviation. As airlines strive to enhance customer experience and differentiate themselves in a competitive marketplace, understanding their position as digital innovators becomes paramount.

The word cloud in Figure 5.13 pertains to the airline's digital innovation and prominently highlights "yes", "disruptive", "airline", and "digital". This prominence suggests that many respondents positively identify the airline as a pioneering force in digital innovation within the industry. Many view the airline as not merely adopting digital tools but actively reshaping industry norms through disruptive digital strategies.
For Figure 5.13, the question posed to customers was*, "In your own words, would you describe the case study organisation as a disruptive digital innovator?"*

Figure 5.13 Customers' views of the airline organisation as a disruptive digital innovator.

This perception underscores the airline's leadership in leveraging technology to enhance customer experience, positioning it advantageously in a competitive market. The airline's reputation as a digital trendsetter is evident, emphasising the importance of sustaining this innovative momentum.

Table 5.24 provides insights into the topics frequently discussed by the respondents, particularly highlighting conversations around the airline and its corresponding mobile

application. Such frequent mention of both the airline and its app suggests a notable emphasis on digital innovation within the organisation, affirming its commitment to adopting forward-thinking strategies. The repeated emphasis on digital innovation implies that the airline is perceived as being at the forefront of technological advancements, signalling a perception of being progressive and digitally proficient among respondents. However, it's noteworthy that alongside innovation terms, there's also a significant emphasis on "Service." This juxtaposition suggests that while technology and innovation are undoubtedly important aspects, the quality of service remains paramount for many respondents.

Table 5.24 Word count and relevance challenges: customers view the airline organisation as a disruptive digital innovator.

Word	Count	Relevance
Airline	13	1
App	6	0.48
Disruptive digital innovator	3	0.35
Innovation	4	0.33
Service	4	0.33
Yes	4	0.33
Digital innovation	3	0.3
Digital innovator	3	0.3

This dual emphasis underscores the significance of balancing technological advancements with maintaining high standards of customer service to meet the diverse needs and expectations of the respondents.

Figure 5.14 displays that when customers were questioned about the digital channels they use to manage their travel experience, several keywords emerged prominently: *website*, *app*, *airline*, and *mobile*. The dominance of *website* implies that many customers predominantly utilise the airline's official website for tasks such as booking flights, checking in, and accessing flight information.

The emphasis on *App* suggests that the airline's mobile application is an integral tool for customers, offering them essential features and conveniences like mobile boarding passes and real-time notifications. The term *airline* could indicate that customers directly reference the airline's proprietary digital channels, possibly contrasting them with third-party platforms or other airlines.

Finally, mentioning *mobile* accentuates the modern customer preference for mobile-friendly platforms. In today's digital age, customers expect airlines to provide seamless, intuitive, and readily accessible digital tools, especially ones optimised for mobile usage.

Figure 5.14 specifies the digital channels customers use to book airline tickets, and the question in this regard was, "*What digital channels do you use to manage your booking and travel experience?*"

Figure 5.14 Digital channels customers use to manage their travel experience.

This feedback should inspire the airline to invest in and refine its digital offerings further, ensuring it satisfies the evolving demands of its customer base.

Table 5.25 outlines the digital channels customers commonly utilise to manage their travel experiences, offering insights into the frequency and relevance of specific keywords mentioned by respondents. At the forefront, *Website* emerges as the most prevalent term, with a count of 60 and a relevance score of 1, suggesting a significant reliance on airline websites for travel management tasks. Following closely behind is the word *Airline*, indicating that customers often refer directly to the airline itself when managing their travel needs, possibly accessing services and information directly from the company. Additionally, *App* and *Mobile App* are frequently mentioned, underscoring the significance of dedicated airline

applications to facilitate various travel-related activities. Even though other terms, such as *Internet*, *Google*, *Cellphone*, *Email*, *Online*, and *WhatsApp*, have lower counts and relevance scores, they still contribute to the digital landscape of travel management, albeit to a lesser extent compared to airline websites and apps. The word cloud suggests that customers' perceptions of a digitally innovative organisation, especially in the airline or travel industry context, revolve around simplifying online processes, especially booking. Customers expect tools to provide more comfortable, efficient, and accessible services. x

Table 5.25 Word count and relevance challenges: Digital channels customers use to manage their travel experience.

Word	Count	Relevance
Website	60	1
Airline	38	0.66
App	37	0.65
Mobile App	14	0.34
Internet	15	0.31
Google	10	0.24
Cellphone	7	0.19
Email	7	0.19
Online	7	0.19
WhatsApp	7	0.19

For an organisation in the travel sector to be regarded as innovative, it needs to promote user-friendly online interfaces, seamless booking experiences, and comprehensive digital solutions.

The word cloud presented in Figure 5.15 appears to focus on the themes of digital convenience and customer-centric service in the context of online booking systems. Central to the cloud are the terms *easy*, *online*, and *booking*, which together suggest an emphasis on creating a streamlined, uncomplicated booking process that can be managed digitally. The prominence of *customer* and *service* underscores the importance of the user experience and the provision of support to customers using the system. Words like *digital*, *app*, and *platforms* highlight the technological infrastructure that enables this service, implying that the system is likely accessible via various digital means, including mobile applications and online platforms. The inclusion of words such as *access*, *quick*, and *ease* indicates the value of efficiency and ease of use, suggesting that the service aims to be readily accessible and simple to navigate.

Moreover, the presence of words like *technology*, *reliable*, and *available* points towards a system that prioritises availability and reliability, ensuring that users can consistently access the service and find what they need without unnecessary complications or delays.

The question posed to customers relating to Figure 5.15 was, *"What makes an airline a digital[ly] innovative organisation?"*

Figure 5.15 Customers' definition of a digital innovative organisation.

Overall, the word cloud portrays a user-friendly, technology-driven booking experience that places a high priority on customer satisfaction and ease of use.

Table 5.26 reflects customers' perspectives on what defines a digitally innovative organisation, with a focus on the online booking industry. The term *Easy* leads with the highest count and relevance, indicating that customers value simplicity above all. *Booking* and *Service* are also significant, albeit less so than ease of use, emphasising the importance of efficient reservation systems and customer support. The presence of *App*, *Customer*, and *Website* with equal counts and relevance suggests that a well-rounded digital presence, including user-friendly applications and websites, is crucial for such organisations. Less prominent but still notable are *Ability*, *Flight*, and *User*, which might reflect on the organisation's competency, aviation services, and user interface. *Customer experience* also

appears as a vital component, pointing towards the overall satisfaction derived from interacting with the organisation.

Table 5.26 Word count and relevance challenges: Customers' definition of a digital innovative organisation

Word	Count	Relevance
Easy	15	1
Booking	9	0.62
Service	9	0.62
App	8	0.55
Customer	8	0.55
Website	8	0.55
Ability	6	0.43
Flight	6	0.43
User	6	0.43
Customer experience	5	0.42

This result suggests that for customers, a digitally innovative organisation combines simplicity, efficiency, and comprehensive digital engagement to enhance the overall user experience.

The word cloud displayed in Figure 5.16 revolves around the topic of an online service, possibly a mobile application or platform for booking flights or similar services. The dominant word *yes* suggests positive feedback or affirmation, indicating overall satisfaction or agreement. Words like *easy*, *seamless*, *breeze*, *quick*, and *easier* emphasise the importance of a user-friendly and efficient experience.

Terms such as *mobile*, *online*, *app*, and *platform* point towards the digital nature of the service. *Tickets*, *boarding*, *check*, and *book* are specific to the process of managing travel arrangements. The words *coded* and *system* might refer to the technical aspects of the service, suggesting the presence of a strong technological foundation that supports user experience.

However, not all feedback seems entirely positive, as indicated by the words *laggy* and *sometimes*, which might suggest occasional technical issues or inconsistencies in the service.

The word *however* could imply the existence of some reservations or conditions to the otherwise positive sentiments expressed.

The applicable question posed to the customers was, *"Does utilising the available digital applications and features make your experience more seamless?"*

Figure 5.16 Utilising digital applications and features makes the experience more seamless.

Overall, the word cloud presents a mostly affirmative view of a digital booking service, focusing on the ease and efficiency of the process while also hinting at some occasional shortcomings in performance or reliability.

Table 5.27 reflects customer feedback on digital applications, emphasising a seamless experience. The dominant response, *Yes*, with the highest count and relevance, indicates a consensus that digital features enhance user experience. *Easy* and *Process* are acknowledged but are considered less significant. Terms like *Easy breeze*, *Peace of mind*, and *Boarding pass* highlight specific benefits of digitalisation, such as simplicity and convenience. However, *Average experience* and *Continuous advert* suggest some

drawbacks, like mediocrity in service or intrusive advertising. Overall, customers seemed to affirm the positive impact of digital features, with a few reservations.

Table 5.27 presents a nuanced view of customer sentiment regarding the digital experience. While a resounding "yes" suggests agreement with the positive impact of digital applications, some terms also point towards specific features, possible areas of improvement, or aspects of the digital experience that customers find either particularly beneficial or lacking.

Table 5.27 Word count and relevance challenges: Utilising digital applications and features makes the experience more seamless.

Word	Count	Relevance
Yes	14	1
Easy	2	0.17
Process	2	0.17
Easy breeze	1	0.12
Human contact point	1	0.12
Peace of mind	1	0.12
Average experience	1	0.11
Boarding pass	1	0.11
Busy day	1	0.11
Continuous advert	1	0.11

The organisation can leverage this feedback to understand the strengths of its digital offerings and identify areas for further enhancement.

5.4.3 LIKERT SCALE QUESTION: CUSTOMERS OF THE AIRLINE ORGANISATION

This section contains the Likert scale analysis of the airline organisation’s customers. Table 5.28 presents an overview of the comprehensive results and conclusions derived from the questionnaire.

Table 5.28 further captures customers’ perceptions of various statements related to digital channels in airlines. The data is categorised by the level of agreement with each statement, and further statistical measures (mean, median, mode, and standard deviation) provide additional insight into the central tendency and spread of the responses.

The columns "Strongly Disagree" to "Strongly Agree" show the number of respondents who selected each option for the statements.

High numbers in the "Agree" and "Strongly Agree" columns for a statement suggest that many respondents favour that statement.
Conversely, high numbers in the "Strongly Disagree" and "Disagree" columns indicate a negative perception of the respondents' statements.

Key insights from Table 5.28 include:
Ease of use: An overwhelming number of respondents (177 combined) believe that "The airlines' digital channels are easy to use."
Data security: One hundred and seventy (170) respondents feel safe using the digital channels, indicating trust in airlines' digital data protection measures.
Communication: Efficient communication throughout the journey is perceived positively by 173 respondents.
Stability: Data for the statement about airlines' digital channels' stability and consistent availability are missing.
Self-service focus: Around 161 to 169 respondents believe airlines are highly focused on providing self-service options via digital channels.
Booking experience: One hundred and seventy-four (174) respondents find the booking experience trouble-free on digital platforms.
Seamlessness: One hundred and eighty (180) respondents feel digital channels make their travel experience seamless.
Accessibility: An impressive 187 respondents find digital channels easily accessible.
Customer Loyalty: One hundred and sixty (160) respondents believe using digital channels promotes customer loyalty.
Data storage and regulation: While 145 respondents trust that their data are securely stored according to regulations, 63 respondents have neutral feelings, suggesting a lack of knowledge about this.
Payment process: One hundred and seventy-six (176) respondents feel that the payment process on digital channels is smooth, trustworthy, and safe.
Fraud & cyber security: One hundred and thirty (130) respondents are concerned about fraud and cyber threats when using digital innovation, indicating a need for airlines to bolster their security; 119 respondents believe digital channels are complex, contrasting the majority who find it easy to use. This ratio suggests that a segment of users finds digital channels challenging.

Usage: One hundred and nineteen (119) respondents do not use digital channels to manage their travel experience, suggesting a segment that prefers traditional methods or does not find digital platforms user-friendly.

The mean score in the table represents the average rating given to each statement. Scores above four (4) generally indicate a predominantly positive sentiment, while scores below three (3) suggest a negative sentiment among respondents. The median score for all statements is consistently 2.5, indicating minimal distinction between them. This uniformity might suggest a potential inconsistency or misinterpretation within the data presented. A mode of five (5) for most statements indicates that "Strongly Agree" is the most chosen response among participants. Furthermore, the standard deviation values offer insight into the spread of responses; higher values suggest a wider range of opinions among respondents, whereas lower values indicate greater consensus or agreement.

Table 5.28 Customers' perceptions of digital innovation within the airline organisation

Descriptive Statistics									
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode	Std. Deviation
The airlines' digital channels are easy to use.	4	1	31	77	100	4.26	2.5	5	0.86
I feel safe using the digital channels—my information is protected.	4	4	35	78	92	4.17	2.5	5	0.90
Efficient communication is available throughout the journey.	2	9	29	73	100	4.22	2.5	5	0.90
The airlines' digital channels are stable and consistently available. The airline has a sharp focus on self-service via digital channels.	3	9	40	69	92	4.12	2.5	5	0.95
The airline has a sharp focus on self-service via digital channels.	3	5	36	72	97	4.20	2.5	5	0.90
The booking experience is trouble-free via the digital channels.	3	9	27	72	102	4.23	2.5	5	0.92
The digital channels make the travel experience seamless.	5	4	24	81	99	4.24	2.5	5	0.90
The digital channels are easily accessible.	3	6	17	83	104	4.31	2.5	5	0.85
The use of digital channels leads to customer loyalty.	5	10	38	66	94	4.10	2.5	5	1.01
My data are secure and stored according to regulations.	5	9	54	66	79	3.96	2.5	5	1
The payment process is smooth, trustworthy and safe.	2	9	26	77	99	4.23	2.5	5	0.89
Fraud and cyber security are threats to using digital innovation.	13	12	58	59	71	3.77	2.5	5	1.15
Using the digital channels is complex.	49	70	42	24	28	2.59	2.5	2	1.31
Do not make use of digital channels to manage my travel experience.	49	70	42	24	28	1.96	2.5	2	1.36

Most participants favoured airlines' digital platforms, particularly regarding intuitiveness, accessibility, and communication effectiveness. Nevertheless, there are apprehensions about potential cybersecurity risks, and some users perceive these digital platforms as intricate or do not use them. Airlines should enhance their cybersecurity protocols and strive to make their digital services more intuitive for all users.

Figure 5.17 displays the results emanating from the questionnaires and reveals a meaningful perspective on the use of digital channels in the travel experience. While only a minority of respondents actively refrain from using digital channels to manage their travel, indicating limited reluctance, the majority hold a favourable view of the digital services provided. The

complexity of these digital channels is not seen as a significant barrier, with many disagreeing that the channels are complex, suggesting a user-friendly interface. However, there is a noticeable concern about fraud and cybersecurity, with a considerable number acknowledging it as a potential threat to digital innovation, although this concern does not translate into a majority viewpoint.

The respondents expressed strong confidence in the security and smooth operation of the payment process, and had widespread consensus that personal data was handled securely and in compliance with regulations. This trust extends to the overall perception that digital channels foster customer loyalty and are highly accessible, enhancing the overall travel experience by providing seamless services and a trouble-free booking experience.

Self-service options, a particular focus of the airline, are also well-received, which aligns with the high stability and consistent availability of the airline's digital channels. The communication throughout the journey is deemed efficient by many, underscoring the effectiveness of ongoing interaction between the airline and its passengers.

Safety is a paramount concern, and the data reflect a strong sense of security among the users, who feel that their information is well protected. Lastly, many respondents affirmed the ease of use of the airlines' digital channels, which is crucial in fostering a positive user experience. In summary, the data portray a digital interface that is embraced by travellers for its convenience, reliability, and contribution to a secure and enjoyable journey.

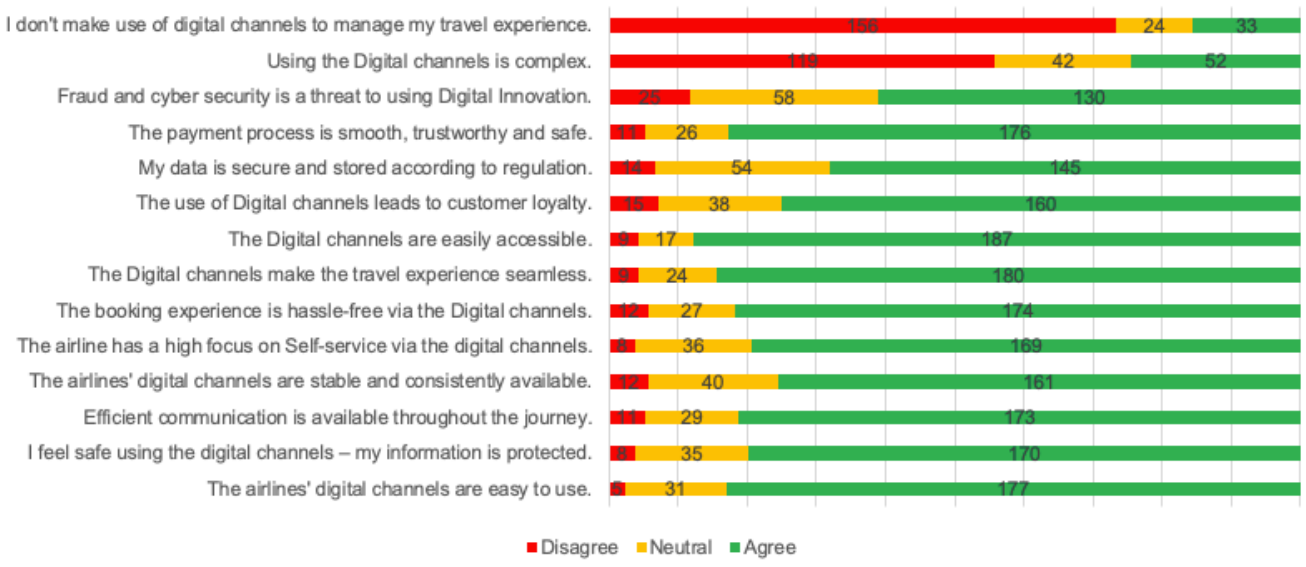


Figure 5.17 Executive summary: customer feedback.

Figure 5.17 indicates a generally positive response to the digital channels, with most statements receiving a majority of "agree" responses, showing that users find the digital channels easy to use, secure, and enhance their travel experience. Statements related to security and fraud have a higher number of neutral responses, indicating some uncertainty or variability in perceptions of risk.

5.5 CONSOLIDATION OF RESULTS

The data utilised in this research were procured through the distribution of questionnaires to three distinct groups associated with the airline organisation: employees, suppliers, and customers. Each group interacts uniquely with the airline organisation as part of its internal operations, suppliers contribute to the external logistics and support, and customers are the recipients of the organisation's services.

This study aimed to obtain diverse perspectives from these groups, with a particular emphasis on digital innovation. The study intended to comprehend how these three groups perceive and interact with digital innovation in their respective engagement with the airline organisation.

The digital landscape continually evolves, driving organisations to explore and adopt new strategies to remain relevant and competitive. A critical aspect of this exploration is understanding the perceptions and challenges related to digital innovation across different stakeholders.

Table 5.29 provides an insightful comparison of how employees, suppliers, and customers perceive and understand digital innovation within the context of an airline organisation.

Table 5.29 comprises four columns. The first column defines the topic areas under consideration. Column two presents feedback from employees regarding their understanding of digital innovation. Column three captures feedback from suppliers on the same topic, and column four captures customers' feedback regarding their comprehension of digital innovation.

The data derived from the employees, suppliers, and customers regarding their understanding of digital innovation was consolidated within *Excel* using a systematic

approach. First, the results from separate online questionnaires tailored for each stakeholder group were imported into *Excel*. These responses were then organised into structured formats, with each row representing an individual respondent and each column corresponding to specific questions or themes related to digital innovation.

Next, relevant themes and concepts were identified within the responses. These themes could include descriptions of digital innovation, understanding and perceptions, challenges faced, and the strategies employed. By utilising *Excel*'s functionalities, such as conditional formatting, responses were compared across the columns to identify similarities and patterns. Similar themes across different stakeholder groups were grouped, and responses were colour-coded based on their relevance and frequency of occurrence.

For instance, if employees, suppliers, and customers all mentioned "customer experience" as a vital aspect of digital innovation, responses related to this theme would be grouped and highlighted with the same colour across the respective columns for each stakeholder group. This method allowed for a systematic comparison of responses across different stakeholder groups, enabling the identification of common trends, discrepancies, and insights regarding their understanding of digital innovation. The data gathered in this manner provided insights into the perceptions, challenges, and strategies associated with digital innovation from the perspectives of the organisation's employees, suppliers, and customers.

Digital innovation is perceived differently depending on the perspective: internal (employees), external (suppliers) or customer-centric (customers). Employees view digital innovation as combining technological advancements, process improvements, and business transformation. This perception encompasses adopting new tools and methods that enhance efficiency and improve the customer experience. However, they also recognise challenges such as training requirements, time constraints, budget limitations, and associated risks. They see digital innovation as adding business value from a strategic standpoint but are aware of potential disagreements related to cost agility, strategic partnerships, system integration, data availability, and overall business value.

Suppliers perceive digital innovation to improve processes, gain a competitive edge, and make data-driven decisions while keeping a customer-centric approach. Suppliers also face challenges such as adapting to change, dealing with legacy systems, navigating regulations,

and managing resource constraints. Customers describe digital innovation in terms of its disruptive nature, focusing on functional aspects and service quality.

Table 5.29 Respondents' understanding of digital innovation.

Topic areas	Employees	Suppliers	Customers
Description of digital innovation	Technology, process, business transformation.	Business, customer experience, brand, product, automation	Disruptive, airline, digital, service quality.
Understanding and perceptions of digital innovation	New tools, methods, efficiency, and customer experience.	Process improvement, competitive advantage, data-driven decision-making, customer-centric.	Forward-thinking, digitally proficient, user-centric, seamless booking.
Challenges in digital innovation	Resources, training, time, budget, risk.	Resistance to change, legacy systems, regulations, resource constraints	No feedback
Digital innovation strategy	Business value, costs, strategy.	Agility, strategic partnerships, system integration, data availability, business value.	Innovative app, customer-centric, digital services, competitive advantage

They perceive that digital innovation reflects a forward-thinking, digitally proficient approach that prioritises user-centricity and provides seamless booking experiences. Customers particularly appreciate the innovative applications, customer-centric approaches, digital services, and the competitive edge these innovations offer. Unlike employees and suppliers, customers did not provide explicit feedback on the challenges associated with digital innovation.

5.5.1 COMBINED ELEMENTS ACROSS DATA COLLECTION RESPONDENTS

Upon analysis of the diverse datasets, five elements were prominently underscored in the collective perspective on digital innovation across the three research groups.

The recurring themes of *Business Value*, *Customer Experience*, *Efficiency*, and *Process Improvement and Transformation* accentuate the multifaceted impact of digital innovation. The emphasis on *Business Value* suggests that digital innovation is pivotal to strengthening an organisation's profitability and competitive edge. Concurrently, the focus on *Customer*

Experience highlights the role of digital innovation in refining customer interactions through streamlined bookings, personalised services, and efficient support. The theme of *Efficiency* points towards the potential of digital innovation to optimise operations, leading to cost savings and heightened productivity. Lastly, the emphasis on *Process Improvement and Transformation* indicates that digital innovation is perceived as a catalyst for modernising traditional business practices by incorporating new technologies and methodologies. Collectively, these themes portray digital innovation as a comprehensive strategy aimed at delivering tangible business value, enhancing customer experiences, and fostering operational agility.

Figure 5.18 was generated through a process involving the collection and analysis of data from the online questionnaires distributed to employees, suppliers, and customers of the airline organisation. The data collected from respondents was imported into *Excel* for further processing, whereby frequency occurrence analysis was conducted to identify how often each term appeared within the dataset. The terms were then evaluated for their relevance to the core concept of adding business value, and a colour-coding scheme was applied to differentiate the most significant terms visually. The five terms most frequently mentioned and considered highly relevant were marked with a distinct colour.

Figure 5.18 was created to illustrate the relationships and overlaps between the identified key areas. The central theme, *Adding Business Value*, was surrounded by the four most pertinent components determined by the data analysis: Customer Experience, Efficiency, Process Improvement, and Transformation. Each of these components represents a strategic area where the frequency and relevance of terms indicate a significant impact on business value.

Figure 5.18 presents a conceptual framework for adding business value through digital innovation in an airline organisation, where the interplay between different elements leads to transformation and improved business outcomes. Further, Figure 5.18 exhibits a strategic approach that synergises various components to enhance business value within an airline organisation through digital innovation. This strategy focuses on four core elements: Customer Experience, Efficiency, Process Improvement, and Transformation, each interconnected through a series of interdependent activities intended to enhance business operations.

The recurring focus on *Business Value* underscores the pivotal role of digital innovation in generating and augmenting organisational worth. This role encompasses outcomes such as heightened profitability, competitive advantage, and other tangible benefits that positively influence the financial performance of the entity.

Regarding *Customer Experience*, digital innovation initiatives frequently target enhancements in customer interactions and satisfaction levels. Irrespective of whether this pursuit happens through the facilitation of seamless booking procedures, the provision of personalised services, or efficient customer support mechanisms, elevating the overall customer experience remains a paramount objective in digital innovation endeavours.

The concept of *Efficiency*, particularly relating to timesaving measures, highlights the role of digital innovation in optimising operations and streamlining processes. Such enhancements not only lead to cost reductions but also foster heightened productivity, thereby further reinforcing the overall business value proposition.

Furthermore, the focus on *Process Improvement* signifies the function of digital innovation as a catalyst for the evolution and refinement of traditional business methodologies. This process involves the adoption of new technologies, the optimisation of workflows, and the implementation of novel methodologies to enhance operational effectiveness and efficiency.

Lastly, the notion of *Transformation* encapsulates broader shifts within the organisation, encompassing cultural change and the adoption of innovative practices. Such changes might entail the integration of new technologies, restructuring workflows or implementing agile methodologies to foster greater organisational responsiveness and adaptability to evolving market dynamics.

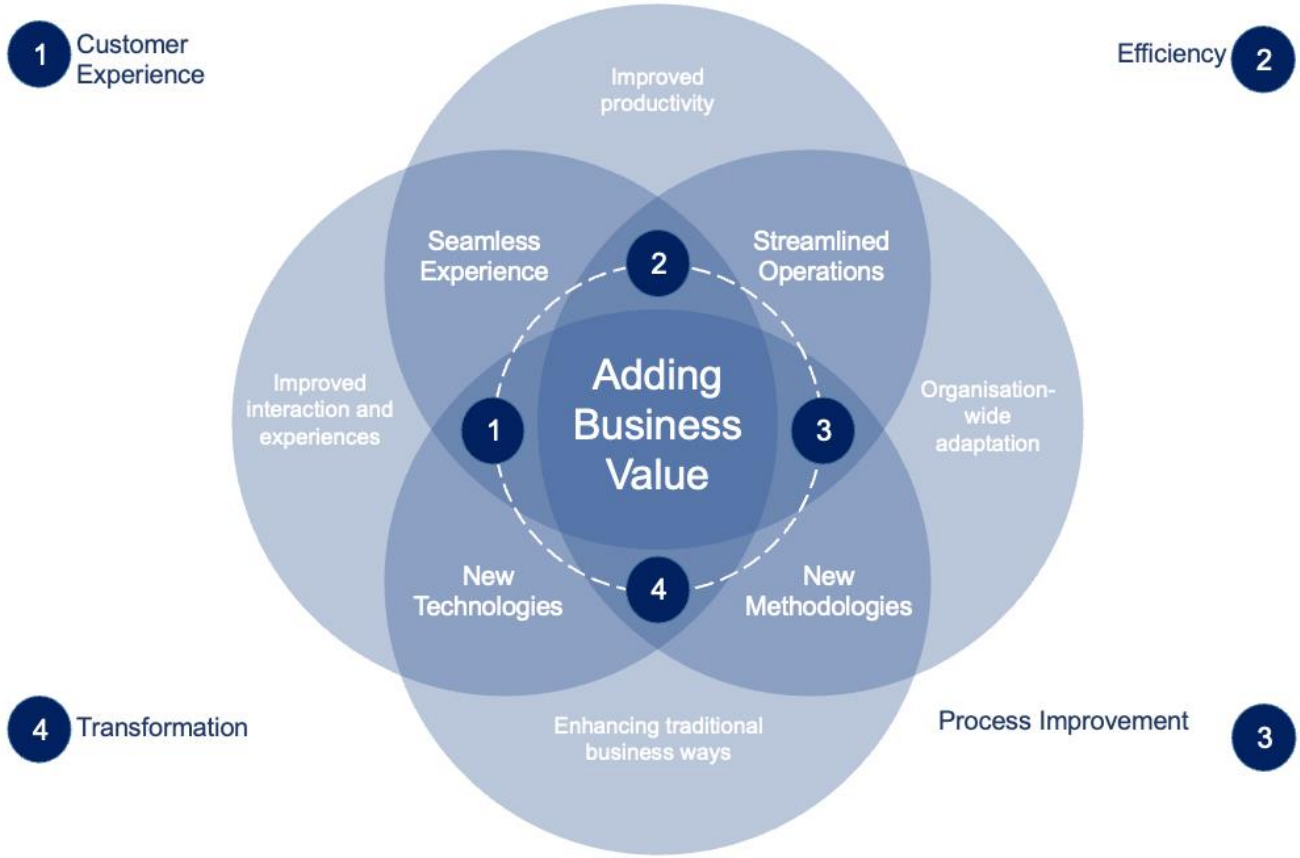


Figure 5.18 Combined value from digital innovation

Each element is an outcome integral to the overarching goal of adding business value. The framework illustrates that these elements are mutually reinforcing, with each dyad of activities contributing to another. The framework posits that an airline must advance customer experience, amplify efficiency, enact continuous process improvements, and pursue a transformative agenda by adopting new technologies and methodologies to add substantive business value.

5.5.2 DATA INTEGRATION: RESPONDENTS' FEEDBACK ON RESEARCH QUESTIONS

Table 5.30 collates viewpoints from three groups of respondents, concentrating on the principal research inquiries pertinent to this study. It is essential to recognise that synthesising insights from customers, employees, and suppliers is imperative for addressing the research questions with due efficacy.

Customer feedback serves as a metric for the efficacy of digital initiatives, while the workforce contributes knowledge regarding internal operational successes, and supply chain partners offer assessments of the enterprise's external engagements. The synthesis of these perspectives enables the formulation of a comprehensive digital innovation strategy, thereby facilitating the airline's expansion and maintaining its competitive edge in the marketplace.

The main research questions of the study, as described in Section 1.5, are:
Primary Research Question: What are the elements of a digital innovation strategy framework for an airline organisation towards creating business value?
Secondary Research Question 1: What are the critical digital innovation strategy opportunities?
Secondary Research Question 2: How to achieve business value by implementing digital innovation?
Secondary Research Question 3: What challenges impact digital innovation in an airline organisation?

Table 5.30 features five columns serving distinct purposes. The initial column defines the type of research question being conducted. The second column outlines the specific research questions investigated in the study. Columns three, four, and five, respectively, display feedback from employees, suppliers, and customers regarding these research questions.
The study gathered data on digital innovation strategy from employees, suppliers, and customers analytically using *Excel*. Separate online questionnaires for each stakeholder group were imported and organised into rows for respondents and columns for digital innovation questions. Next, relevant themes and concepts were identified within the responses. In this instance, the themes were intended to link the data from the online questionnaires and compare that to the relevance of the research questions for this study.

The analysis of responses underwent stages of familiarisation with the data, theme review and definition, and reporting. This approach ensured the feedback was accurately interpreted

and aligned with the research questions. The researcher organised the resultant findings into a comprehensive table that correlated stakeholder feedback with both primary and secondary research questions, thereby offering a multifaceted view of digital innovation strategies.

In constructing a digital innovation strategy framework for an airline organisation, data were systematically gathered through structured questionnaires tailored to distinct stakeholder groups: employees, suppliers, and customers. The employees provided insights into the impact of digital innovation on their workflow, efficiency, and customer service; the suppliers discussed the enhancement of supply chain processes and customer satisfaction through digital tools; and the customers offered perspectives on how digital innovation shapes their service quality and user experience.

The employees emphasised the benefits of digital innovation in improving efficiency and process optimisation; the suppliers identified the value added using digital tools in process enhancement and informed decision-making; and the customers highlighted the transformative effect of digital innovation on service quality and experience. Secondary questions further delineated the opportunities, value realisation, and challenges of digital innovation, with each group contributing unique insights into the overarching strategy framework. The synthesised table stands as an analytical tool, offering a cross-sectional view of feedback from all involved parties. This feedback forms the foundation of a digital innovation strategy framework designed to generate business value, ensuring a pragmatic approach capable of navigating the complexities of digital transformation within the airline industry.

Table 5.30 Respondents' understanding of research questions.

Research question type	Research question	Employees	Suppliers	Customers
Primary	What are the elements of a digital innovation strategy framework for an airline organisation towards creating business value?	Focuses on efficiency, process optimisation, customer experience, and data-driven decision-making to create business value.	Utilisation of digital tools, emphasising process improvement and data-driven decisions to improve customer experience and create business value.	Digital innovation is seen as disruptive, improving the airline industry's service quality and customer experience.
Secondary 1	What are the critical digital innovation strategy opportunities?	Adopting it involved tools, enhancing customer engagement, and optimising processes through technology.	Opportunities in digital innovation are seen as enhancing customer experience and competitive edge through data-driven strategies.	Opportunities to create customer-centric booking experiences and embrace forward-thinking, digitally proficient strategies.
Secondary 2	How to achieve business value by implementing digital innovation?	Achieves business value through streamlined operations, error reduction, differentiation, and improved customer loyalty.	Digital strategies enhance efficiency and customer experience; strategic partnerships and system integration are value drivers.	Business value from innovative apps, digital services focusing on customer-centric solutions, and competitive advantage.
Secondary 3	What challenges impact digital innovation in an airline organisation?	Includes challenges such as high-costs, regulatory adaptation, and employee disagreements regarding implementation.	Challenges to digital innovation include resistance, outdated systems, regulatory hurdles, and limited resources.	No specific customer feedback

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of feedback from all involved parties. This feedback forms the foundation of a digital innovation strategy framework designed to generate business value, ensuring a pragmatic approach capable of navigating the complexities of digital transformation within the airline industry.

Table 5.30indicates the various perceptions of employees, suppliers and customers about the research questions as part of the data obtained from the questionnaires.

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The analysis of responses underwent stages of familiarisation with the data, theme review and definition, and reporting. This approach ensured the feedback was accurately interpreted and aligned with the research questions. The researcher organised the resultant findings into a comprehensive table that correlated stakeholder feedback with both primary and secondary research questions, thereby offering a multifaceted view of digital innovation strategies.

In constructing a digital innovation strategy framework for an airline organisation, data were systematically gathered through structured questionnaires tailored to distinct stakeholder groups: employees, suppliers, and customers. The employees provided insights into the impact of digital innovation on their workflow, efficiency, and customer service; the suppliers discussed the enhancement of supply chain processes and customer satisfaction through digital tools; and the customers offered perspectives on how digital innovation shapes their service quality and user experience.

The employees emphasised the benefits of digital innovation in improving efficiency and process optimisation; the suppliers identified the value added using digital tools in process

enhancement and informed decision-making; and the customers highlighted the transformative effect of digital innovation on service quality and experience. Secondary questions further delineated the opportunities, value realisation, and challenges of digital innovation, with each group contributing unique insights into the overarching strategy framework. The synthesised table stands as an analytical tool, offering a cross-sectional view of feedback from all involved parties. This feedback forms the foundation of a digital innovation strategy framework designed to generate business value, ensuring a pragmatic approach capable of navigating the complexities of digital transformation within the airline industry.

Table 5.30 represents a cross-sectional analysis of feedback from employees, suppliers, and customers, providing a foundation for a digital innovation strategy framework that aims to create business value for an airline organisation. This stakeholder-centric approach ensures that the framework is grounded in practical insights and can address the real-world complexities of digital transformation in the airline industry.

Primary Research Question: All three groups—employees, suppliers, and customers—agreed that efficiency, customer experience, and data-driven decision-making were key to creating business value through digital innovation. Employees and suppliers emphasised the importance of process optimisation and digital tools, while customers focused on the disruptive nature of digital innovation and its role in improving service quality.

Secondary Research Question 1: The employees regarded adopting web-based tools and technology for better customer engagement as necessary for opportunities in digital innovation strategy. Suppliers and customers both highlighted the importance of customer experience, with suppliers focusing on competitive advantages gained through data-driven strategies and customers valuing seamless, user-centric booking systems and forward-thinking approaches.

Secondary Research Question 2: Regarding value, the employees addressed the importance of streamlined operations and loyalty-building initiatives, while suppliers pointed out the efficiency gains and customer experience improvements that can be leveraged through strategic partnerships and system integration. The customers noted the value in innovative apps and services that prioritised their needs and helped the airline stand out in a competitive market.

Secondary Research Question 3: The employees and suppliers noted the challenges associated with digital innovation as high-costs, the need for regulatory agility, resistance to

change, legacy system issues, and resource limitations. The customers did not provide specific feedback on challenges, which suggested that their focus was more on the outcomes of digital innovation rather than the obstacles to implementing it.

In summary, the table reflects a consensus from all stakeholders that digital innovation is central to creating business value, with a particular focus on enhancing customer experience. However, the approach to achieving this and the perceived challenges differed among employees, suppliers, and customers, indicating the need for a multifaceted strategy that addressed internal operations, market competitiveness, and customer needs.

5.6 DATA INTEGRATION: RESPONDENTS' FEEDBACK IN THE CONTEXT OF DYNAMIC CAPABILITIES

The model of dynamic capabilities by Teece et al. (1997) refers to an organisation's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. The theory proposed by Teece (2017) suggests that organisations need specific capabilities to create and sustain a competitive advantage in a constantly evolving business landscape. Chapter 3 provides a detailed evaluation of Teece (2017) (Teece, 2017).

In this segment, feedback from the employees, suppliers, and customers was integrated into the dynamic capabilities model by Teece et al. (1997), particularly emphasising sensing, seizing, and transforming. The data gathered from online questionnaires were organised and categorised in *Excel* to underscore the significance of feedback related to the sensing, seizing, and transforming processes. The study aimed to use the data from the questionnaires to determine how employees', suppliers' and customers' feedback could be applied practically within Teece et al. (1997).

As mentioned in Chapter 3, the model is constructed around three primary dynamic capabilities:

Sense: This involves the capability to identify and make sense of changes in the external environment, including changes in technology, customer needs, and market dynamics.

Seize: Once opportunities are sensed, organisations must have the capability to seize them effectively. This action involves mobilising resources, investing, and altering the business model to capitalise on the identified opportunities.

Transform: The final capability involves reconfiguring asset structures and capabilities in response to changing demands and technologies.

These capabilities (sense, seize, and transform) are intended to ensure that the organisation is agile, adaptive, and able to maintain a competitive advantage in the face of change and uncertainty. Firms can navigate and thrive in dynamic markets by effectively sensing opportunities and threats, seizing them, and continuously transforming themselves.

In the current research, a structured approach was anchored on the dynamic capabilities model, as referenced in Chapter 3 of this study. This model was central to interpreting data gathered from respondents, including employees, suppliers, and customers. A significant aspect of this process was the employment of research questionnaires and open-ended questions, which were instrumental in collecting comprehensive insights. The responses obtained are summarised in Table 5.29 offering a clear and organised view for further analysis. The analysis involved delving into employee, supplier, and customer data, which ensured that the data were systematically collected, summarised, and interpreted effectively within the framework of the dynamic capabilities model, thus meeting the study's objectives.

5.6.1 EMPLOYEES' FEEDBACK IN THE CONTEXT OF DYNAMIC CAPABILITIES

This segment of Chapter 5 examines the combination of employees' viewpoints within Teece's dynamic capabilities theory framework. This analysis intended to interpret the theoretical foundations that facilitated comprehension of the strategic effectiveness inherent in a digital innovation-centric strategy within the broader context of dynamic capabilities theory.

To integrate the dynamic capability framework by Teece et al. (1997), particularly focusing on sensing, seizing, and transforming, data concerning a digital innovation strategy were collected from employees via online questionnaires. Next, the data were organised into subsets in *Excel*, and key themes related to sensing, seizing, and transforming were analysed by consolidating common elements from the dataset. Relevant data points, as identified relative to the Teece et al. (1997) model, were highlighted with colours to signify the most frequent themes. The data from *Excel* were then integrated into Teece's model to showcase practical insights into employee perspectives on sensing, seizing, and transforming within the airline organisation.

The employee feedback provided was contextualised within the framework of dynamic capabilities theory, emphasising the crucial role of organisational sensing, seizing, and transforming in fostering digital innovation. As vital participants in the innovation process, employees contribute valuable insights during each phase. In the sensing phase, employees identify the need for technological upgrades, process improvements, and business transformation, laying the foundation for innovation. Through their actions in the seizing phase, employees actively leverage new technologies to enhance processes and capitalise on opportunities, thereby driving organisational growth.

Employees also play a pivotal role in the transforming phase, during which they adapt to structural realignments and contribute to the sustained integration of innovation into operational frameworks. Their feedback underscores the challenges and opportunities inherent in digital innovation, informing strategic decision-making and guiding resource allocation. Ultimately, by incorporating employee perspectives within the context of dynamic capabilities theory, organisations can cultivate a culture of innovation that empowers employees to drive meaningful change and achieve strategic objectives.

Within digital innovation, organisations embark on a journey defined by sensing, seizing, and transforming. This framework guides them in recognising opportunities, leveraging new tools and methods, and integrating innovations into their operations. Amid challenges like resource constraints and budget limitations, organisations strive to maximise business value and strategic alignment.
This exploration examines the dynamics of digital innovation through the lens of these principles, offering insights into its multifaceted dimensions and implications for success, as indicated in Figure 5.19.

Description of digital innovation: Technology, process, business transformation.
Sensing: Identifying the need for technology upgrades, process improvements, and business transformation aligns with the sensing phase, where organisations detect opportunities for innovation.
Seizing: Leveraging new technologies to enhance processes can be seen as the seizing step whereby an organisation capitalises on the sensed opportunities.

Transforming: Implementing business transformation indicates the transforming phase, in which an organisation realigns and reconfigures its operational model to sustain innovation.

Understanding and Perception digital innovation: New tools, methods, efficiency, customer experience.

Sensing: Recognising the importance of new tools and methods and the need for efficiency.

Seizing: Employing new tools and methods to enhance customer experience.

Transforming: Ensuring continued efficiency and a positive customer experience.

Challenges in digital innovation: Resources, training, time, budget, risk.

Sensing: Identifying challenges such as resource constraints and risks.

Seizing: Allocating budget, time, and training to overcome challenges.

Transforming: Managing risks and ensuring the effective use of resources during transformation.

Digital innovation strategy: Business value, costs, strategy.

Sensing: Understanding the potential business value and costs associated with digital innovation.

Seizing: Developing and implementing a strategy to capitalise on the sensed business value.

Transforming: Adjusting the strategy to ensure sustained business value and manage costs.

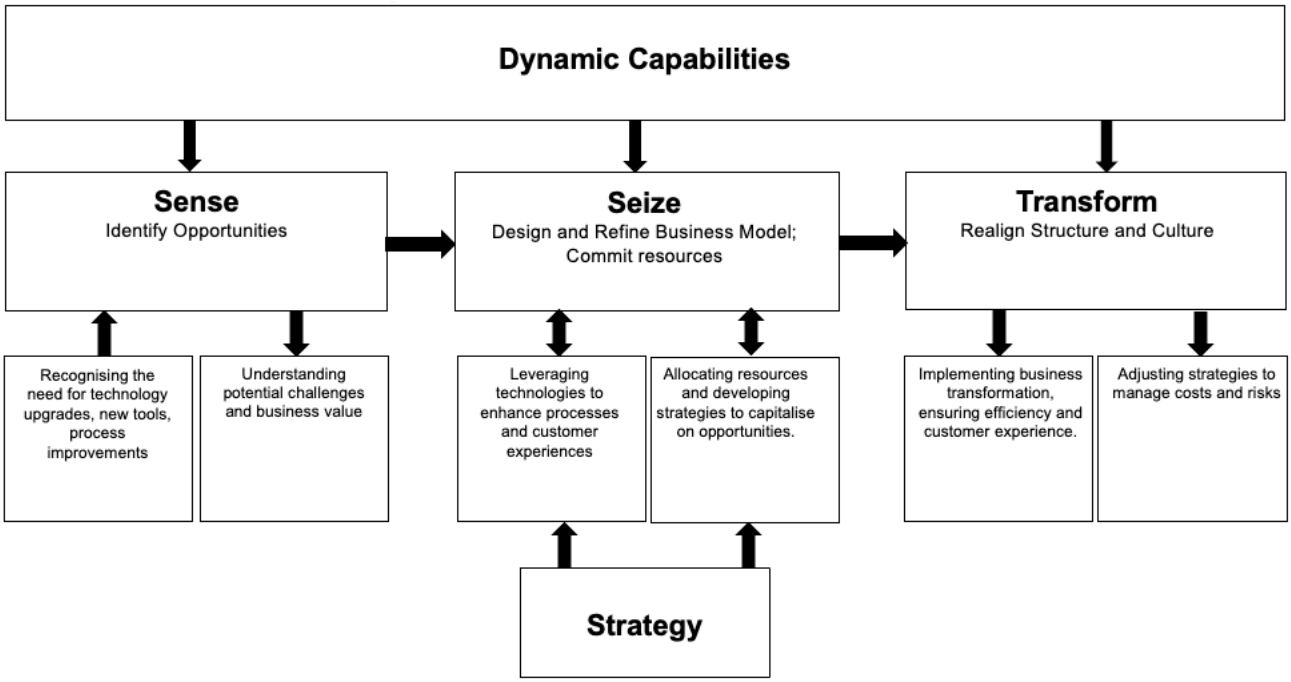

Figure 5.19 Employee's feedback contextualised in dynamic capabilities theory (adopted from (Teece et al., 1997).

In an airline organisation, digital innovation progresses through Teece's model, guided by employee feedback. Initially, employees' insights drive the sensing phase, identifying key areas for technical and process upgrades. In the seizing phase, the organisation adopts new technologies to enhance customer service and efficiency. Finally, the transforming phase involves refining the business model to sustain innovation, informed by employee feedback. This cyclical process of sensing, seizing, and transforming, with continuous employee input, is vital for the airline to maintain its competitive stance in digital innovation.

5.6.2 SUPPLIER'S FEEDBACK ON DYNAMIC CAPABILITIES

Figure 5.20 focuses on the suppliers' feedback via the questionnaires, as discussed previously. This analysis examined how suppliers' viewpoints align with Teece's dynamic capabilities theory framework, intending to understand the theoretical foundation for comprehending the strategic effectiveness of a digital innovation-focused strategy within the broader context of dynamic capabilities theory.x

The study collected data concerning a digital innovation strategy from suppliers through online questionnaires to integrate the Teece et al. (1997) dynamic capability framework, specifically focusing on sensing, seizing, and transforming. Subsequently, the data were structured into subsets in *Excel*, and the main themes pertaining to sensing, seizing, and transforming were examined by consolidating common elements from the dataset. The relevant data points identified relative to the Teece et al. (1997) model were highlighted with colours to denote the most frequent themes. The *Excel* data were then incorporated into Teece's model to present practical insights into the suppliers' perspectives on sensing, seizing, and transforming within the airline organisation.

Incorporating the suppliers' feedback into the dynamic capabilities framework enhanced the strategic model by providing external insights into the three core processes: sense, seize, and transform. Suppliers, as a crucial part of the business ecosystem, can offer valuable information that aids in identifying opportunities, particularly in recognising emerging trends and technologies that could impact business practices and customer experiences.x

The suppliers' input in the seizing process is equally important as they can suggest practical ways to refine the business model and might help in understanding the resource commitments needed for automation and process improvements. Lastly, in the transformation stage, suppliers can provide perspectives on structural and cultural shifts necessary to integrate new technologies, as well as feedback on how evolving brand and product offerings may affect supply chain dynamics. Engaging suppliers in the strategic conversation ensures a more collaborative approach to maintaining a competitive advantage in dynamic markets.

The suppliers' feedback is instrumental to this framework, by providing essential insights into the practical application of technology in the supply chain. Their input refines the sensing phase, which emphasises the integration of technology with business strategy and the focus on customer engagement. In the seizing phase, feedback from suppliers informs the embrace of automation to optimise business processes. For the transforming phase, suppliers contribute to the continuous adaptation of new technologies, helping to shape the evolution of products and services.

Description of digital innovation: Technology, business, customer experience, brand, product, automation.
Sensing: Acknowledging the importance of integrating technology into business strategies, improving customer engagement, and concentrating on targeted product development for strategic adaptation.
Seizing: Embracing automation to improve business processes and customer interactions represents the seizing phase.
Transforming: Continuously adapting and integrating new technologies to evolve the brand and product offerings relates to the transforming phase.

Understanding and Perceptions of digital innovation: Process improvement, competitive advantage, data-driven decision-making, customer-centric.
Sensing: Identifying opportunities for process improvement and understanding the significance of a customer-centric approach and data-driven decision-making.
Seizing: Implementing process improvements and leveraging data to gain competitive advantage.
Transforming: Continuously refining processes and maintaining a customer-centric approach to sustain competitive advantage.

Challenges in digital innovation: Resistance to change, legacy systems, regulations, resource constraints.

Sensing: Detecting challenges such as resistance to change, outdated legacy systems, stringent regulations, and resource constraints.

Seizing: Developing strategies to overcome resistance and update legacy systems.

Transforming: Continually adapting to regulations and efficiently managing resources.

Digital Innovation Strategy: Agility, strategic partnerships, system integration, data availability, business value.

Sensing: Recognising the importance of agility, strategic partnerships, and data availability for creating business value.

Seizing: Forming strategic partnerships, ensuring system integration, and leveraging data for agility.

Transforming: Continuously refining strategies to ensure sustained agility, effective partnerships, and consistent business value.

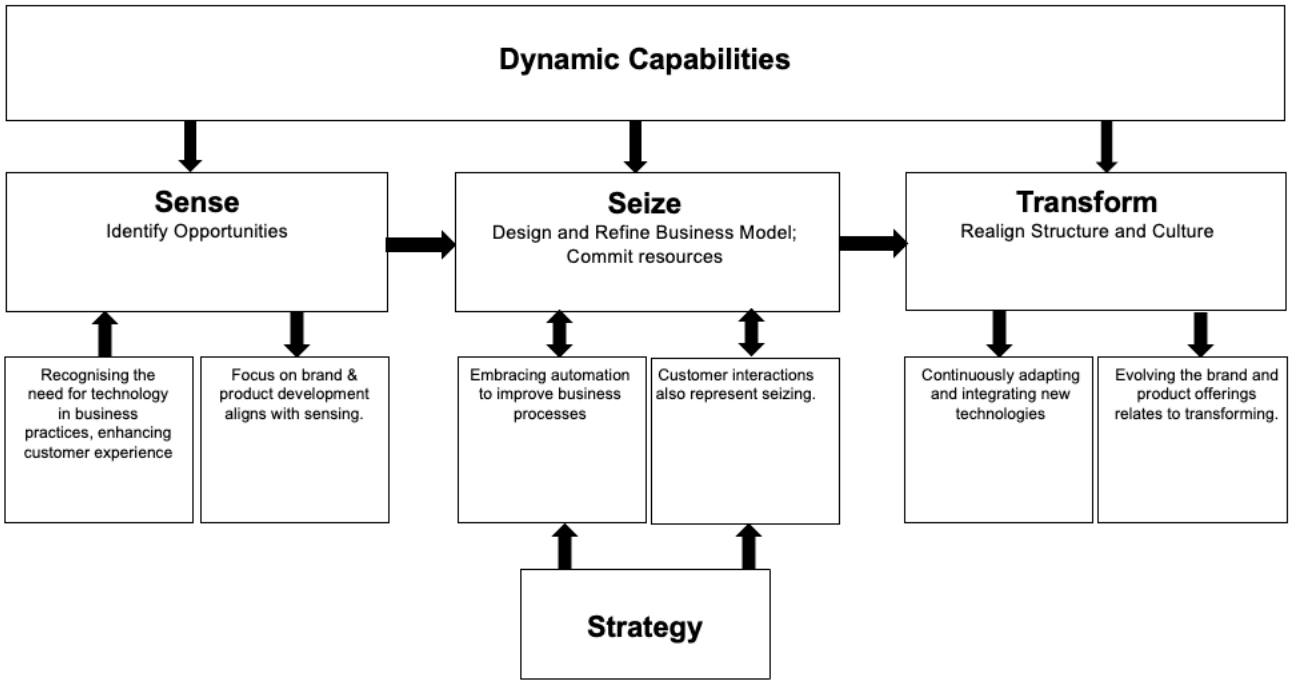

Figure 5.20 Suppliers' feedback incorporated in Teece (adopted from (Teece et al., 1997).

The supplier accounts stress the crucial role of technology in streamlining business processes and deepening customer interactions, with automation as an essential factor in operational

efficiency. Their perspectives support a digital innovation approach that drives process improvements and maintains a competitive edge through intelligent, data-driven decisions and a commitment to customer satisfaction. These contributors recognise the challenges of digital transformation, such as resistance to change and the constraints of outdated systems. Advocating for flexibility, strategic partnerships, and integrated data use, suppliers suggest that a successful digital innovation strategy should be capable of ongoing adaptation to sustain and enhance business value in a constantly changing market environment.

5.6.3 CUSTOMERS' FEEDBACK ON DYNAMIC CAPABILITIES

Figure 5.21 centres on the customer feedback obtained through questionnaires, as outlined earlier. This analysis investigates the alignment of customers' perspectives with Teece's dynamic capabilities theory framework, aiming to grasp the theoretical underpinning for assessing the strategic efficacy of a digital innovation-centric strategy within the broader scope of dynamic capabilities theory.

Data regarding a digital innovation strategy were collected from customers through online questionnaires to integrate the Teece et al. (1997) dynamic capability framework, particularly focusing on sensing, seizing, and transforming. Then, the data was organised into subsets in *Excel*, and key themes related to sensing, seizing, and transforming were analysed by consolidating common elements from the dataset. Applicable data points identified in relation to the Teece et al. (1997) model were highlighted with colours to signify the most recurrent themes. Thereafter the *Excel* data were incorporated into Teece's model to provide practical insights into customer perspectives on sensing, seizing, and transforming within the airline organisation.

Figure 5.21 provides a visual representation of a strategic framework that incorporates dynamic capabilities from the perspective of customer feedback within an organisation. This framework is structured into three stages: sense, seize, and transform, which are critical for businesses aiming to remain competitive and customer-centric.

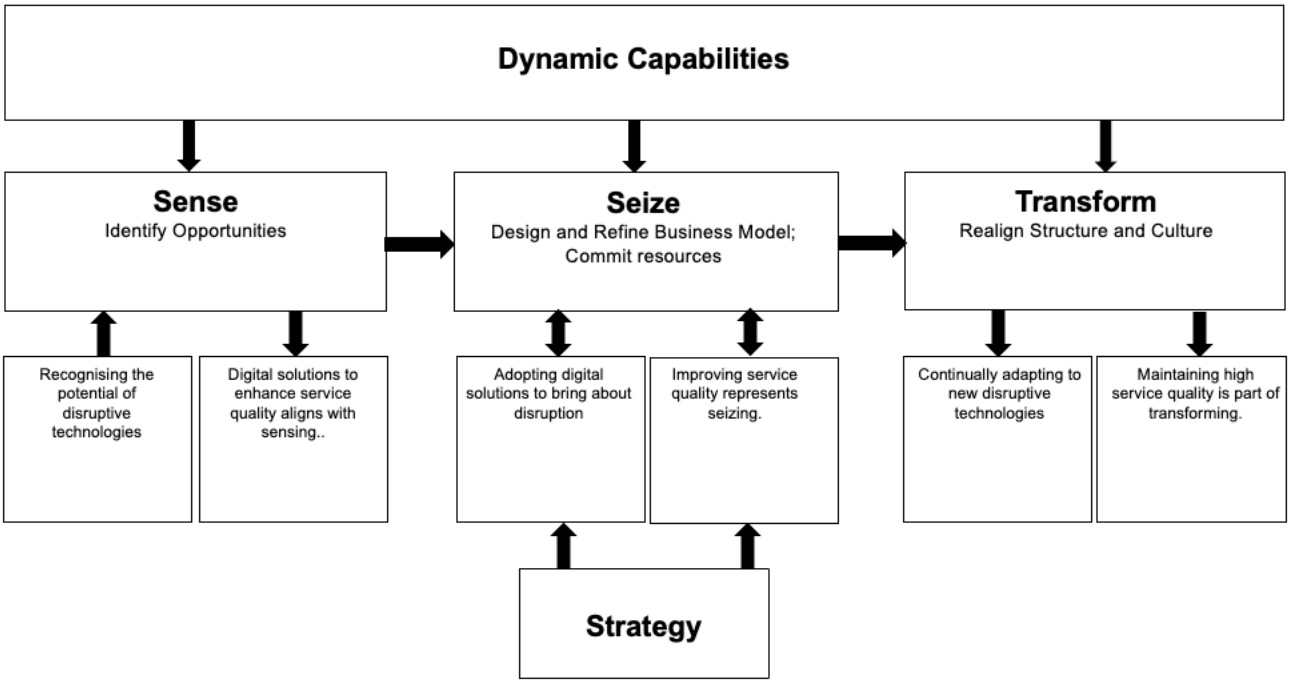

Figure 5.21 Customers' feedback incorporated in Teece (adopted from (Teece et al., 1997).

In the sensing stage, the focus is on identifying opportunities that resonate with customers. This approach involves recognising the potential of disruptive technologies and leveraging digital solutions to enhance service quality while ensuring it aligns with customer sensing—essentially, understanding and anticipating customer needs and preferences.

In moving to the seizing stage, the emphasis shifts to designing and refining the business model based on customer insights, committing resources to initiatives that customers find valuable. This strategy includes adopting digital solutions that lead to disruption in the marketplace; however, from a customer viewpoint, it's about improving service quality, which represents seizing the opportunities that customers care about.

Finally, the transformation stage is about realigning the organisation's structure and culture to ensure they remain congruent with customer expectations. This transformation is not a one-time event but rather a continuous process of adapting to new disruptive technologies and maintaining a high level of service quality, as perceived and demanded by customers.

The entire process is underpinned by a customer-informed strategy, which recognises that sensing, seizing, and transforming are ongoing and interconnected strategic activities. These are crucial for building and sustaining a competitive advantage through a customer-focused approach. The framework's cyclical nature suggests that customer feedback from the Transform stage can revert to new sensing opportunities, thereby creating a dynamic, iterative process that continually evolves based on customer input and market changes.

The introduction of customer feedback into the Teece et al. (1997) dynamic capabilities framework provides a structured approach to evaluating the airline industry's adoption of digital innovation. It underscores the significance of leveraging disruptive technology to enhance service quality. By interpreting customer insights and addressing potential challenges, the airline industry formulates strategies to develop innovative applications and digital services. These strategies are designed not merely to satisfy but indeed to surpass customer expectations, thereby establishing a competitive edge. The evolution of such strategies through the sensing, seizing, and transforming phases is essential for effectively embracing and exploiting digital progress.

Description of digital innovation: Disruptive, airline, digital, service quality.
Sensing: Recognising the potential of disruptive technologies and digital solutions in enhancing the service quality of the airline industry.
Seizing: Adopting digital solutions to bring about disruption and improve service quality.
Transforming: Continually adapting to new disruptive technologies to maintain high service quality.
Understanding and perceptions of digital innovation: Forward-thinking, digitally proficient, user-centric, seamless booking.
Sensing: Identifying the need for a forward-thinking, digitally proficient approach and a user-centric design with seamless booking features.
Seizing: Implementing strategies and technologies that align with a forward-thinking and user-centric approach.
Transforming: Ensuring that the implemented solutions continue to be forward-thinking and user-centric.

Challenges in digital innovation: No feedback

In this case, the study received no feedback regarding challenges in digital innovation, so it is impossible to interpret this in the context of Teece's model.

Digital innovation strategy: Innovative app, customer-centric, digital services, competitive advantage.

Sensing: Recognising the importance of innovative apps, customer-centric approaches, digital services, and competitive advantage.

Seizing: Developing and implementing innovative applications and customer-centric digital services to gain a competitive advantage.

Transforming: Continuously updating and improving the app and digital services to maintain a competitive advantage.

The customer responses elucidate the pivotal role of disruptive technologies in augmenting service quality within the airline sector. Such feedback highlights the necessity for incorporating advanced, user-oriented digital solutions for enhancing booking systems to improve the travel experience significantly.

Although customers did not define explicit challenges, they underscored the importance of persistent innovation in applications and services to sustain competitive superiority. This perspective is consistent with the principles of the Teece et al. (1997) dynamic capabilities framework, which suggests airlines should be adept at identifying opportunities, capitalising on them through customer-centric innovations, and continually transforming their business practices to ensure the continuance of service excellence.

5.7 CONCLUSION

This chapter offered an in-depth evaluation of the online questionnaires used in the present academic research, which probed the digital innovation strategies of an airline organisation. The research encompassed three types of questionnaires: demographic, open-ended, and Likert scale. Demographic questions aimed to acquire the participants' profiles by capturing their professional backgrounds. Open-ended questions allowed the participants to express their views and insights on digital innovation strategies freely. In contrast, the Likert-scale questions measured the perceptions and attitudes of the respondents towards digital innovation.

The analysis of the responses revealed that organisational members generally perceived digital innovation as a fusion of new technology, process improvement, and overall business

transformation. The stance towards digital innovation was predominantly positive within the airline industry, albeit with some resistance and uncertainty. The findings highlight the importance of strategic business alignment, active customer engagement, and continuous technological progression as integral to digital innovation.

In addition, this chapter delved into the strategic implications of data analytics and machine learning tools, which are instrumental in interpreting complex data sets and enhancing decision-making processes. It also explores the suppliers' challenges in adopting and integrating digital innovation strategies, such as overcoming organisational resistance, updating legacy systems, and ensuring a seamless transition to more digitally centric operations. The discussion extends to the potential of such strategies to revolutionise customer service, operational efficiency, and the creation of new business models within the dynamic aviation sector.

6 DATA ANALYSIS: SEMI-STRUCTURED INTERVIEWS

6.1 INTRODUCTION

In the rapidly evolving landscape of the airline industry, digital innovation emerges as a pivotal factor in creating and sustaining business value. In this study, a critical component of this exploration involved conducting semi-structured interviews with the executive team of the airline organisation, offering invaluable insights into the practical aspects of implementing digital innovation strategies. The researcher conducted interviews with twelve members of the executive team (Exco), aiming to obtain first-hand perspectives from those at the helm of decision-making within the airline. All twelve members of the Exco team participated in and responded to the semi-structured interviews. Their views provide a unique lens through which the theoretical frameworks discussed in earlier chapters can be examined and applied in a real-world context. The choice of a semi-structured interview format was deliberate, allowing for flexibility in discussion while ensuring a thorough exploration of vital thematic areas pertinent to digital innovation. The interviews were conducted and recorded via Microsoft *Teams*.

The interviewees comprised senior management team members, each with a crucial role in the airline's strategic planning and execution. Their collective experience and expertise in navigating the airline through digital transformation initiatives make their contributions to this study particularly significant.

These interviews provide operational perspectives and enrich the academic dialogue on digital innovation strategies. They offer a bridge between theory and practice, highlighting real-world applications and the implications of strategic digital initiatives in the airline sector.

Integrating data from questionnaires administered to employees, suppliers, and customers with the insights obtained from semi-structured interviews with the executive committee (Exco) team of an airline significantly enhanced the richness and depth of the research study, assisting in creating a framework towards a digital innovation strategy.

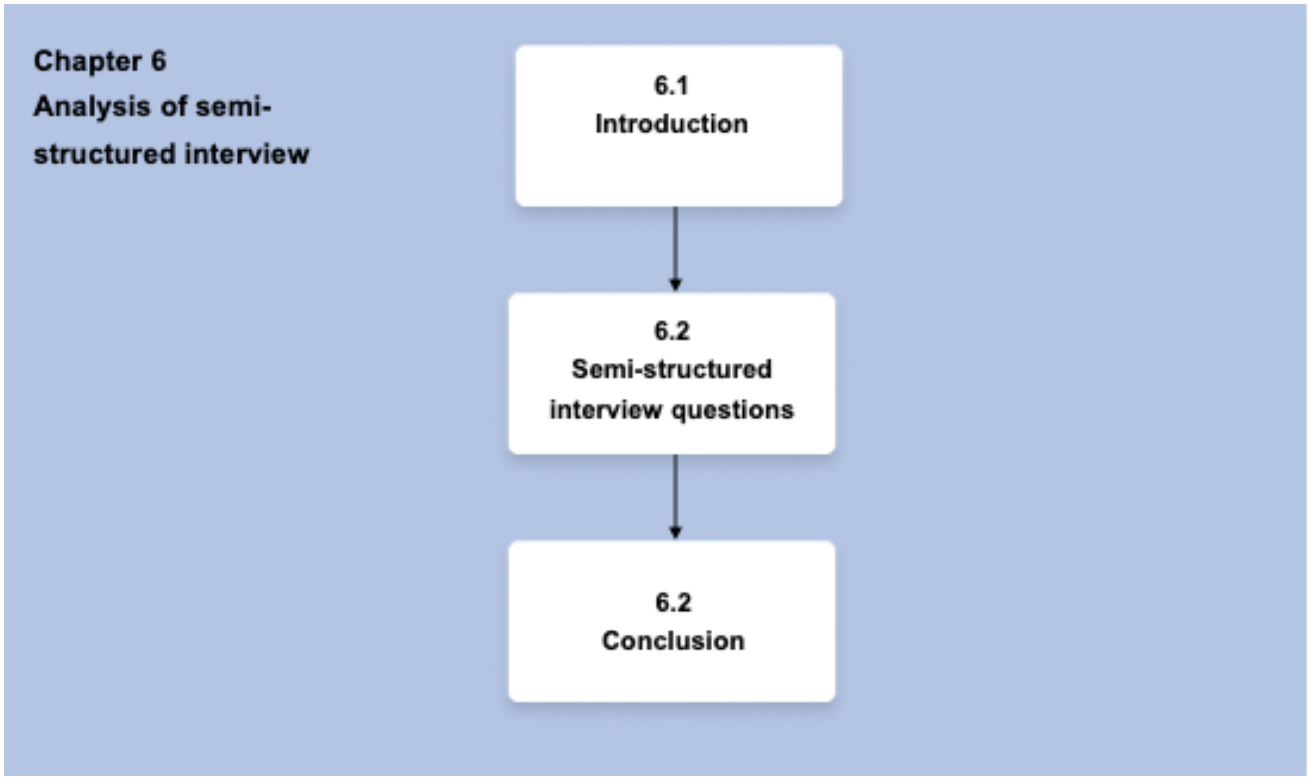

Figure 6.1 Overview of Chapter 6

6.2 SEMI-STRUCTURED INTERVIEW QUESTIONS

The following list of questions was discussed with the senior management team as part of the semi-structured interviews. The questions were intended to gather comprehensive insights that would directly lead to creating a digital innovation framework.

Understanding the job titles and managerial levels of the Exco members revealed the organisational structure and distribution of decision-making power, which was critical for tailoring a digital innovation strategy aligned with the hierarchy and governance of the airline. The Exco members' years of experience provided a temporal perspective, which helped to understand the evolution and depth of digital maturity within the organisation.

Questions about personal experience and knowledge about technology and innovation inform the current capabilities and preparedness of the leadership to drive digital change. The definitions of digital innovation from these leaders provided a collective view of the concept, which was essential for ensuring a shared understanding and vision within the framework.

Exploring who was deemed responsible for digital innovation strategy helped identify the perceived ownership and accountability structures. This information is crucial for the framework's effectiveness, as it guides the positioning of strategies for successful execution. Assessing the presence and purpose of a digital innovation strategy, along with the necessity for digital transformation, reflected the existing state of the organisation and underscored the immediacy of the need for change.

Questions regarding the difficulties and impediments to digital innovation and the criteria for evaluating the effectiveness of digital transformation initiatives underscored the practical hurdles and benchmarks for success that the framework needed to incorporate. Identifying the digital technologies to invest in and the critical component of digital innovation suggested strategic focus areas for the framework. Budgetary considerations for digital innovation and experimentation provided insight into resource allocation and investment priorities, influencing the practical aspects of the framework. Digital adoption queries aimed to understand how new technologies were integrated and utilised within the organisation.

Finally, seeking opinions on the benefits of focusing on digital innovation practices and the overall impact of a digital innovation strategy offered qualitative insights into the potential value creation and areas for strategic emphasis. These responses helped ensure that the developed framework was not only theoretically sound but also grounded in the realities and nuances of the airline industry, thereby enhancing its applicability and potential for creating real business value.

- What is your job title?
- What managerial level best describes your position?
- How many years of experience do you have working within your organisation?
- What is your experience and knowledge about technology and innovation within the organisation?
- Could you please define your understanding of digital innovation?
- Who, in your mind, is responsible for the digital innovation strategy in the organisation?
- Do you think the company has implemented a digital innovation strategy?
- Why does the organisation need to transform and innovate digitally?
- What, in your opinion, are [the] challenges or barriers to digital innovation?

- How do you know whether the digital transformation is working at your organisation?
- Which digital technologies/solutions should you invest in?
- What, in your mind, are four key components that form part of digital innovation?
- Do you believe digital innovation and experimentation have a sufficient budget?
- What is digital adoption?
- Do you believe your organisation would benefit from an increased focus on digital innovation practices? How so?
- Do you have any further comments or opinions on the impact of a digital innovation strategy for the organisation?

The Exco team's responses provided a comprehensive perspective on the current state and future potential of digital innovation in the airline. It highlighted the importance of a supportive culture, strategic investments, and a clear vision for leveraging technology to drive business value and transformation.

6.2.1 DEMOGRAPHIC ANALYSIS FROM SEMI-STRUCTURED INTERVIEWS

Upon analysing the first three questions of the semi-structured interviews with the 12 members of the Exco team, a diverse range of managerial levels and years of experience within the organisation is observed. A significant portion of the respondents are part of the executive management team, while a few hold an executive director position. This diversity in management levels is crucial as it provides varied perspectives on the organisation's approach to digital innovation strategy.

Table 6.1 indicates a wide range of executive tenure within the organisation, spanning from one to forty years. This diverse tenure distribution offers a multifaceted view of the airline's digital strategy evolution. Specifically, four executives had a short tenure of one to five years, providing new ideas and fresh perspectives. A larger group of five executives were in the intermediate range of six to 15 years, offering a balanced viewpoint with insights into more recent strategic shifts. Lastly, three executives with an extensive tenure of 16 to 40 years contributed deep historical context and a long-term view on the development of digital strategies within the organisation.

Table 6.1 Respondents' understanding of research questions.

Tenure with airline organisation	Years of experience within the the airline organisation	Number of Executives
Short	1–5 years	4
Intermediate	6–15 years	5
Extensive	16–40 years	3

This demographic mix, encompassing different levels of management and a wide range of experience within the airline, provided a rich and comprehensive set of viewpoints. Such a varied group was likely to offer many insights into how digital innovation strategies have been conceived, implemented, and evolved, thereby enriching the research's overall understanding and findings.

The information in Table 6.1 was gathered from the semi-structured interviews and is displayed under Section 6.2.3.

6.2.2 CONSOLIDATED FEEDBACK FROM INTERVIEWEES

The study employed data mining techniques to transcribe and interpret the feedback received from the Executive Committee (Exco) members following their participation in semi-structured interviews. These Exco members were thoroughly briefed on the interview process, ensuring they understood the relevance of their contributions to the overarching research goals. Their insights and data from online questionnaires provided a qualitative dataset. This dataset was coded and analysed to determine patterns, themes, and divergences in perspectives on digital innovation. The synthesis of this rich qualitative data was instrumental in shaping the named framework, ensuring it captured real-world executive insights and provided a grounded blueprint for digital innovation strategies within the airline industry. This methodical approach enhanced the validity of the research findings and ensured the resulting framework reflected the collective wisdom and individual nuances of the organisation's leadership.

In analysing the responses from the Exco team of the airline organisation, both agreements and disagreements among the interviewees on several key topics were evident. The information consolidated the feedback from the interviewees and indicated various opinions and understandings of the questions posed in the semi-structured interviews.

6.2.3 ANALYSIS OF QUESTIONS FROM SEMI-STRUCTURED INTERVIEWS

The information below provides the Exco team's summarised answers to each question in the semi-structured interviews.

What is your job title?

- Chief of Fleet
- Chief of Operations
- Chief Executive Officer
- Executive Manager of Flight Operations
- Chief Marketing Officer
- Executive Manager for HR and Corporate Services
- Executive Manager, Legal, and Company Secretary
- Executive Manager of Standards and Compliance
- Executive Finance Manager
- Executive Manager for Technical
- Chief Financial Officer
- Executive Manager of IT Innovation.

What managerial level best describes your position?

- Executive Management
- Executive Management
- Executive Management
- Executive Management
- Executive Management
- Executive Management
- Executive Management
- Executive Management
- Executive Management

- Executive Management
- Executive Management
- Executive Director
- Executive Director

How many years of experience do you have working within your organisation?

- 40 years
- Four years
- 18 years
- 13 years
- Nine years
- 33 years
- 15 years
- Five years
- Seven years
- One year
- 15 years
- Five years
- **What is your experience and knowledge about technology and innovation within the organisation?**
- Experience is primarily with systems already in place within the organisation, with limited technology knowledge.
- Has a background in engineering and emphasises the integral role of technology in operations and maintenance, focusing on streamlining processes and improving efficiencies.
- Have been very involved in technology and innovation, even serving as the CIO for about three years during the company's early stages.

- Has experience with electronic flight bags like iPads, which are used for downloading applications and integrating them into the crew's document system.
- Has an intimate knowledge of the technology used in the organisation, especially in areas relevant to their work, and a general understanding of other areas like engineering and technical spaces.
- Is aware of the benefits of technology and innovation, especially in the human resources field and facility maintenance.
- Has limited experience with technology and innovation, mainly through reviewing agreements and practical aspects relevant to their department.
- Has observed the critical importance of technology and innovation in the airline industry, emphasising its role in improving the passenger experience.
- Experience is mainly in finance, focusing on process flow and the use of technology for interacting with passengers and for internal processes.
- Acknowledges limited digital technology in the organisation, with recent initiatives like iPads being a significant step. Innovation is often driven by necessity rather than strategic improvement.
- Has some knowledge of hardware and technology innovations since the start of the company, including website development.
- Emphasises continuous improvement in digital innovation, especially in low-cost airlines, and the necessity to innovate efficiently and differently.

[Could you] Please define your understanding of digital innovation[?]

- Digital innovation is unlocking efficiencies, knowledge, and information using information technology and the digital revolution.
- Digital innovation is the seamless integration of data and systems to provide useful information for management decisions and simplifying work life, emphasising proper design and execution.
- Digital innovation is taking existing processes and making them digital and then further improving those digital processes.
- Digital innovation is the digital transformation and digitalisation of information, moving from paper forms to electronic formats and incorporating elements like artificial intelligence.

- Digital innovation is creating or iterating something new with a digital element, focusing on automation and technology. It's not just about trendy apps but also about making business and processes easier.
- Digital innovation is the process of going paperless and making processes electronic and seamless.
- Digital innovation is a reorganisation away from paper-based information storage, retrieval, and distribution.
- Digital innovation is moving away from manual interventions to using digital means to speed up work and make repetitive tasks easier.
- Digital innovation is finding new or digital ways to improve processes, making them faster, more scalable, and reducing the need for human interaction.
- Digital innovation is moving the company to the next level of competitiveness, similar to the early adoption of cell phones.
- Digital innovation is converting manual processes to digital forms rather than creating something entirely new, like a social media platform.
- Digital innovation is the integration of technology and process improvements to enhance operations, focusing on innovating correctly with the latest technologies for better customer experience.

Who, in your mind, is responsible for the digital innovation strategy in the organisation?

- The interviewee believes subject matter experts know what is needed in their areas but require guidance and consultation from the IT and technology team.
- While IT may lead in structuring the organisation's architecture, every division needs to understand how to use technology to improve their operations. Business units should own the outcomes they seek, with IT enabling these environments.
- The responsibility lies with the top management but should be driven by the CIO.
- The responsibility for digital innovation strategy is seen as a collective effort involving everyone in the organisation, from cleaners to crew members, as part of an ingrained culture.

- Digital innovation is the responsibility of everyone in the organisation. While there is a structured team to assist in delivering strategies, every individual should seek opportunities for digital improvement.
- The responsibility for the digital innovation strategy should be centralised, driven by an innovation department with the CIO and their delegates providing direction.
- The strategy should be a company-wide initiative driven by the Chief Information Officer (CIO).
- The responsibility is seen as a collective effort, with every employee contributing to identifying areas for digital improvement. The Innovation Department plays a key role in assisting with these improvements.
- The interviewee believes that department heads are primarily responsible for digital innovation, with support from the innovation or digital team.
- The responsibility is shared between IT engineering and the technical division, each with a partial view of the overall picture.
- The CEO and senior team are seen as the drivers of digital innovation, with the Chief Information Officer (CIO) accountable for implementation.
- The Chief Information Officer (CIO), or sometimes a Chief Digital Officer (CDO), is responsible for driving the digital innovation strategy and ownership in the organisation.

Do you think the company has implemented a digital innovation strategy?

- The organisation is thought to have a strategy in place, but its effectiveness is uncertain.
- The interviewee believes the company has implemented a digital innovation strategy.
- The company emphasises and focuses on digital innovation but lacks a formal strategy.
- The company has implemented a digital innovation strategy, with each department contributing and emphasising the importance of a digital culture.
- The interviewee believes the company has implemented a digital innovation strategy and is ahead of many others in this regard.
- The company has implemented a digital innovation strategy, which is seen as a competitive advantage.

- The interviewee believes a digital innovation strategy has been implemented but is not yet fully realised.
- The interviewee believes the company has implemented a digital innovation strategy, particularly compared to other airlines.
- The company has implemented a digital innovation strategy to some extent but there is always room for improvement.
- There seems to be resistance to a comprehensive digital innovation strategy, though some areas, like mobile apps and websites, are progressing well.
- The interviewee believes the company has implemented a digital innovation strategy that is continuously evolving.
- Although not formally documented, the innovation team drives the digital innovation strategy through frameworks, guidelines, product development, and thought processes.

Why does the organisation need to transform and innovate digitally?

- The need for digital innovation is driven by the company's incredible growth, which can only be managed effectively using technology.
- Emphasises the potential for digital improvements in operations and technical areas to simplify the business.
- The main driver is to achieve efficiencies through digital transformation.
- Digital transformation is necessary for efficiency, productivity, and to keep up with the pace of change in the industry.
- Digital innovation is fundamental to their business model, especially as a low-cost airline. It helps in reducing costs, gaining a competitive advantage, and improving cohesion and decision-making through data.
- The organisation needs to innovate digitally to work faster and smarter and to utilise data for improvement and analysis.
- Digital transformation is necessary for staying competitive within the industry.
- There is a necessity for digital transformation to remain competitive and avoid falling behind in an increasingly digital industry.

- Digital transformation is essential to keeping up with the external digital environment and for internal efficiency and accuracy.
- Digital transformation is crucial to staying competitive and not being outpaced by potential new, digitally adept competitors.
- Digital innovation is necessary for scalability and growth, especially as the company expands.
- Highlights the changing customer demands and technology advancements, emphasising the need for self-service and AI integration to stay ahead and delight customers.

What, in your opinion, are challenges or barriers to digital innovation?

- Challenges include a lack of experience and industry knowledge among the staff selecting digital solutions and a general willingness to change but without full buy-in.
- Identifies cost and user adoption as major challenges, stressing the importance of proper project management and change management to realise benefits and efficiencies.
- Challenges include resistance to change, difficulty in choosing the right products, and convincing people to use the new digital solutions.
- Dependence on connectivity is a major challenge, as the business could be significantly impacted if internet access is lost.
- The main barriers are time, resources, and sometimes, cost. Recognising the need for innovation within the business is also a challenge.
- Time and resource constraints are seen as major barriers, with a tendency to revert to old methods because of these constraints.
- Challenges include staff reluctance to adopt new technology, which might resolve as older staff retire and younger, more digitally proficient employees enter the workforce.
- Challenges include a paradigm shift from manual to digital work, employee discomfort with technology potentially taking over jobs, and the need for an initial substantial financial investment.
- Resistance to change is seen as the primary barrier to digital innovation.

- Major challenges include cost, resistance to change, and a perception that traditional methods are adequate.
- Challenges include a skills shortage in specialised fields, high salaries for skilled personnel, and the global competition for talent.
- Internal adoption, keeping pace with rapid technology changes, budget constraints, and the need for alignment in business and technological thought processes are significant challenges.

How do you know whether the digital transformation is working at your organisation?

- Success is indicated by adding capabilities without increasing staff and overall improved ease of operations.
- Success measurement involves setting and achieving business goals, such as financial, time, or resource savings. Regular benchmarking and evaluation of project outcomes against these benchmarks are crucial.
- Success is measured by the adoption of new digital processes and their efficiency, particularly in terms of time-saving
- Success is measured by comparing current operations with older, less efficient methods, like the difference between operations in 1980 and the present day.
- Success is measured by the efficiencies achieved, user adaptation, and the impact of the implementation on business operations.
- Success is measured by comparing the company's application of principles with other companies in the industry, focusing on service delivery and growth.
- Success is measured by time savings and reduced manual work.
- Success can be measured through internal questionnaires and feedback from users and customers, including specific innovation-related questions in customer questionnaires.
- Success is measured by activity, output, efficiencies, and cost savings.
- Success can be gauged through improvements in employee morale and key performance indicators like on-time performance and net promoter score.
- Success is measured through metrics like time saved and customer experience improvements.

- Success is measured through customer feedback (NPS), reduced system issues, and effective data strategy and innovation.

Which digital technologies/solutions should you invest in?

- The interviewee emphasises the need for heavy investment in training and awareness for all staff to ensure they can effectively use the digital solutions provided.
- Recommends investing in technology that simplifies integration between systems, focusing on operational systems, technical spaces, and management data.
- Investment should focus on technologies that help with workflow, policies, procedures, and checklists and can integrate and connect to other systems.
- Investment should be made in future technologies like AI and communication systems between flight decks and operation centres.
- The focus should be on both experimental technologies like artificial intelligence for data analysis and on basic process flow improvements.
- The focus should be on process improvements, dashboards, and integration between systems and platforms, with some caution about AI and chatbots.
- Investment should focus on technology and processes, such as implementing large systems like AIMS and MRO, along with the finance systems, while also considering process and people components.
- Investment should focus on digital innovations that improve day-to-day work, including AI and other critical digital tools.
- The interviewee suggests investing in technologies that automate processes, like using bots for repetitive tasks and improving process flows.
- Investments should focus on AI, MRO systems, and data mining to significantly enhance operations.
- Investment in emerging technologies like AI and machine learning, considering the potential to fall behind if not adopted.
- Investment focusing on mobility, data integration, AI, and providing mobile tools and technologies for staff.

What, in your mind, are the four key components that form part of digital innovation?

- Key components are hardware, software, project cost, company culture, and processes.
- Key components include simplicity of technology for easy adoption, cost-effectiveness, user requirement understanding, and the integration of systems.
- Key components include time savings, efficiency, cost-saving, accuracy, scalability, and ease of use compared to manual processes.
- Key components include organisational efficiency, customer engagement through apps, and using data for various purposes, including analysing competition and customer needs.
- Key components include a culture that values digital innovation, efficiency, data and reporting for intelligent decision-making and effective execution.
- Key components include process improvement, data management, and integration.
- Key components include technology, processes, business reorganisation, and guidelines.
- Key components include organisational culture and readiness for innovation, buy-in from all levels, financial resource allocation, and prioritisation of digital projects.
- Key components include time-saving, efficiency, accuracy, and scalability.
- Key components include time-saving measures, effective communication strategies, and integrated software systems.
- Key components include time, effort, experience, and scalability.
- Key components are people, processes, technology, and culture, with culture playing a vital role in fostering a mindset targeted towards digital strategy and transformation.x

Do you believe digital innovation and experimentation have a sufficient budget?

- The budget for digital innovation and experimentation is insufficient.
- The current budget for digital innovation and R&D is insufficient, advocating for more investment in innovative ideas and exploration.
- There is no specific budget for experimentation, but it has not stopped the company from innovating. Costs are evaluated and approved as needed.

- The interviewee is unsure about the budget for digital innovation and experimentation, noting that there are many projects the company wants to undertake.
- The budget is not formalised, but there is senior-level belief and passion for digital innovation, allowing for justification of expenditures as needed.
- The budget is not sufficient, but the organisation has achieved significant progress with the available funds.
- The budget is sufficient but needs careful planning and prioritisation.
- The budget might not be sufficient, but the organisation is fortunate to have a CEO who supports digital initiatives.
- There should be a specific budget for digital innovation and experimentation, which is often overlooked due to tight budgets.
- The budget for digital innovation and experimentation appears to be lacking.
- The budget is a balance between cost and risk and is not necessarily sufficient for all desired projects.
- The airline has a sufficient budget, especially for experimentation in AI, though external consultancy might be necessary.

Do you believe your organisation would benefit from an increased focus on digital innovation practices? How so?

- The organisation would benefit from increased digital innovation, particularly in saving work hours and facilitating scalability.
- The integration of systems to streamline processes is a key benefit of increased focus on digital innovation.
- Probable benefits from an increased focus on digital innovation, citing reasons like time and cost savings and ease of use.
- An increased focus on digital innovation is critical to the business, preventing strain and ensuring competitiveness.
- An increased focus on digital innovation is essential for gaining a competitive edge in a highly commoditised industry and for operating efficiently in a high-volume, low-margin business.

- Increasing focus on digital innovation is beneficial across all departments, including support and operational departments.
- Strongly believes in the benefits of increased focus on digital innovation for remaining competitive and embracing new technologies within the aviation industry and commerce.
- The organisation would benefit from increased digital innovation to stay ahead of competitors, enhance passenger experiences, and maintain or increase market share.
- The organisation would benefit from an increased focus on digital innovation, mainly through improved efficiency, accuracy, and less dependence on people.
- The organisation already benefits from a focus on digital innovation, particularly in AI and robotics.
- Increased focus on digital innovation is seen as beneficial for cost-effectively handling growth and outdated processes.
- Increased focus on digital innovation is essential for scalability and long-term benefits, emphasising the need for solutions that offer economies of scale.

Do you have any further comments or opinions on the impact of a digital innovation strategy for the organisation?

- Internal marketing is critical for the successful uptake of any programs, projects, software or solutions being implemented.
- Suggests starting with designing a sound architecture for data and system usage, moving away from quick fixes towards more structured, long-term solutions.
- It was easier to experiment and innovate when the company was smaller, but it has become more challenging as the organisation has grown.
- Emphasises the importance of digital innovation and the need to retain personnel integral to building the business and adapting to digital changes.
- Emphasises the need for digital innovation to be a part of the entire organisation's culture, ensuring that everyone is aware of and believes in the solutions, leading to better utilisation and effectiveness.
- Is generally happy with the current strategy but emphasises the importance of not ignoring support departments in digital innovation efforts.

- Does not provide additional comments on this topic.
- There is a need for broader organisational awareness of digital innovation efforts. This could be achieved through internal communication initiatives like roadshows or informational videos.
- Emphasises the importance of digital innovation and its necessity in all areas of the organisation.
- Concerns about catching up with technology compared to industry leaders and questioning where these leaders are heading next.
- No further comments were provided.
- The strategy should be well-documented and communicated to enhance understanding of the work being done and the rationale behind it.

This section focuses on essential elements from the semi-structured interviews with participants' quotes highlighted.

Regarding their understanding of digital innovation, most interviewees agreed it involved integrating digital technology into existing processes to enhance efficiency, decision-making, and user experience. However, they diverged in their views on the extent of this integration. Some saw it as simply digitising and improving current processes, while others viewed it as a radical reorganisation away from paper-based systems, emphasising automation and advanced technology.

“Digital innovation is about transforming existing processes into digital ones and enhancing already digital processes to improve them.”
“It is about improving processes with technology for better outcomes.”
“Digital innovation... something that is automated or processed or based around some kind of technology.”
“It is perceived as automating manual processes and making things digital rather than inventing something entirely new.”
“It is about creating an environment where data and systems are seamlessly combined to provide information for effective use and decision-making.”

In terms of implementing a digital innovation strategy, many respondents agreed that the airline has adopted such a strategy to some degree. However, they disagreed on its effectiveness and breadth. Some viewed it as a significant competitive advantage, while others saw considerable room for improvement or a lack of a formalised strategy.

“There is not a formal strategy, but an emphasis on making things digital, driven by top management and the CIO.”
“While not formalised on paper, innovation is driven by the team's culture and leadership.”
"The actual strategy and the discipline... it is very much the responsibility of every individual in their area."
“The CEO and his senior people are responsible for driving the digital innovation strategy, with the CIO being accountable for its implementation.”
“The strategy should be a collective responsibility, with IT leading the architecture and each division understanding its application.”

Challenges or barriers to digital innovation also surfaced as a common theme. The interviewees agreed on issues like resistance to change and budget constraints. However, the degree to which these challenges impact the organisation varies. Some highlighted skills shortages and the need for better alignment between business and technological strategies, while others emphasised employee reluctance to adopt new technologies.

“Resistance to change and choosing the right digital products are significant barriers.”
“Adoption internally and technology advancing faster than the organisation can keep up are major challenges.”
"The biggest kind of barrier… is just time and resources."
“A major barrier is the shortage of skills and the high-cost of hiring specialised personnel.”
“The main challenges are cost and ensuring user adoption to build a strong business case for future development.”

On the metrics for the success of digital transformation, there was agreement on using efficiencies, user adaptation, and business impact as crucial measures. However, respondents were divided on how success was quantified; some preferred comparing current operations with past methods, and others relied on customer feedback or internal questionnaires.

“Success is measured by adopting digital processes and saving time, which implies improved efficiency.”
“Feedback from customers and fewer system issues indicate successful digital transformation.”
“Are you putting something in play that makes a difference and are you seeing users adapt to it?”
“Success is measured by improved efficiency, such as reducing tasks from hours to minutes.”
“Success is indicated by achieving the benchmarks set at the start of a project, such as resource savings.”

Investment priorities in digital technologies also showed divergence. While there was a shared understanding of the need to invest in system-integrating and workflow-improving technologies, opinions varied on the focus areas. Some advocated focusing on emerging technologies like AI, whereas others suggested adhering to more fundamental process improvements.

“Investments are focused on technologies that can formalise workflows, work instructions, and improve structure and integration.”
“Mobility, data integration, and AI are key investment areas for the airline industry.”
"There is much value that we can derive from what comes out of the artificial intelligence space."
“Focus is on emerging technologies like AI, which can lead to significant advancements and prevent the company from falling behind.”
“Priorities should include technologies that simplify system integration and provide management data.”

The budget for digital innovation is another area of contention. Several interviewees felt the current budget was insufficient, yet some believed significant progress had been made within the existing financial constraints. Others argued for a more formalised budget approach or believed the current budget was adequate.

“There is no specific budget for experimentation in digital innovation, but it has not stopped investment in promising areas.”

“There is some budget for experimentation, especially in AI, though external consultants may be needed.”
"It is not that we say we are going to spend X amount of turnover on digital innovation for improvement, but I think inevitably we do."
“While there is not a 'sufficient' budget for digital innovation, resource availability and cost are limiting factors.”
“The current budget for R&D and innovation does not seem sufficient for exploring new ideas.”

Lastly, regarding digital adoption, while most agreed it required the entire organisation's buy-in, they differed on what constituted effective adoption. Some focus landed on user adoption of new tools, while others emphasised recognising opportunities for improvement.

“It involves seeking and using new digital innovation s within the organisation.”
“Involves both internal and external stakeholders using the solutions effectively.”
"Digital adoption works on two levels… the user adoption so you make a new tool and are people using it and using it appropriately.”
“Defined as the willingness of people to transition from traditional methods to new digital solutions.”
“It requires organisation-wide understanding and buy-in, with each individual playing a role in defining the scope and using the systems effectively.”

The semi-structured interviews revealed the Exco members’ insights, highlighting the critical role of digital innovation in the airline sector. The interview transcriptions present an amalgamation of these discussions, emphasising the strategic importance of integrating technological advancements to enhance operational efficiency and customer experience within the industry.

"Taking existing processes and making them digital… then taking some of the processes that are already digital and making them even better."
"There is definitely an individual thing within the organisation where people understand what digital innovation is, value it, and look for the power that it can bring to change the way that they work."
"I mean, I think the one thing that is often not truly spoken about enough is how it needs to live throughout the organisation and how it needs to be educated throughout the organisation

so that everybody within a structure is seeing opportunities, is realising what the solutions might be, is ensuring that they believe in the solutions and that their teams believe in the solutions and utilise them."
"Yes, it will benefit. As I mentioned, we are a growing organisation with many old archaic processes, and now, it is a stress test to them to the maximum. And the only way we can solve that is either through digital."
"Scale defines when you need to be digitally innovative."

The quotes emphasise the transformational role of digital innovation in refining business processes, highlighting its necessity for modernising outdated systems and improving efficiency. The interviewees stressed that a comprehensive understanding and adoption of digital innovation across an organisation were crucial for leveraging its full potential, particularly in scaling operations and remaining competitive.

6.2.4 EMERGING THEMES AND CONCEPTS

The study employed a thorough content analysis method to grasp the evolving ideas and themes derived from the semi-structured interviews. Initially, every interview was transcribed accurately to ensure that all pertinent details were captured accurately. The prominent themes emerging from the interview content were identified and concisely outlined.

Table 6.2 features three columns serving distinct purposes. The first column ranks the most common themes identified in the analysed data, using a scale of one (high) to five (low). The second column outlines the emerging themes obtained from the semi-structured interviews. The third column explains these themes in detail, providing further insights in relation to the themes mentioned in Column Two.

The data on digital innovation strategy gathered through semi-structured interviews from the Exco team were imported into *Excel* and organised into rows. Next, relevant themes and concepts were identified within the responses. These themes were highlighted with various colours in *Excel* to group the data in a structured way, aiming to correlate the findings from the semi-structured interviews with the relevance of emerging themes that form part of the airline organisation’s digital innovation strategy. The resulting insights were then organised into a table, linking the Exco feedback with the highlighted emerging themes observed during the interview process.

The themes presented in Table 6.2 emerged from the semi-structured interviews focused on the study topic, "Digital Innovation Strategy: A Framework for Creating Business Value for an Airline Organisation". The study identified these themes based on their recurrence and relevance to the study.

Unlocking efficiencies and information: This theme suggests that digital innovation is a vehicle for unlocking efficiencies within the company and providing access to knowledge and information. IT and the broader digital revolution are crucial here, enabling the organisation to streamline operations and make better-informed decisions.

Integration of data and systems: Digital innovation is characterised by the seamless integration of data and systems essential for providing valuable information for management and simplifying the complexity of work life. This integration is fundamental to breaking down silos within an organisation and ensuring that different systems communicate with each other effectively.

Digitisation of processes: This theme captures the transition of processes from manual to digital, with an ongoing emphasis on improving these processes post-digitisation. It underscores the continuous journey of digital innovation, not just the initial implementation.

Digital transformation and digitalisation: This points to a broader, more transformative change whereby traditional paper-based operations are converted to electronic formats. This theme often includes using advanced technologies such as artificial intelligence (AI) to enhance and revolutionise existing business practices.

Creating or iterating with a digital element: This theme emphasises creativity in digital innovation, focusing on the development or iteration of new products, services, or processes that incorporate digital elements. It moves beyond adopting trendy apps to include automation and foundational technological changes.

These themes collectively provided valuable insights into the key considerations and strategies for developing a digital innovation framework tailored to the unique challenges and opportunities airline organisations face in today's digital landscape. Furthermore, a ranking system was applied to each theme, determined by its significance within the research context. This ranking was derived from a consideration of both the inherent importance of the theme and the frequency with which related terms and sentences were present in the transcribed interviews. Through this systematic analytical process, most feedback was refined, unveiling

valuable insights into the research subject. This methodical approach aided in recognising meaningful patterns and trends inherent in the data, contributing to a comprehensive understanding of the research topic.

In an evolving digital era, adopting emerging themes and concepts in digital innovation is vital for organisations seeking a competitive edge. This importance stems from the need to navigate an ever-changing technological landscape, where remaining ahead requires not only adopting new technologies but also reimagining business processes and models. Emerging themes in digital innovation encapsulate the latest trends, consumer behaviours, and technological advancements, enabling organisations to anticipate and respond to shifts in the market proactively. They act as a compass, guiding strategic planning and investment decisions to align with future growth opportunities.

Simultaneously, concepts in digital innovation provide a framework for implementing these themes into tangible strategies and actions. They offer a blueprint for transforming insights into operational realities, ensuring organisations conceptualise and execute change effectively.

Combined, these themes and concepts catalyse a culture of innovation that permeates every level of an organisation, fostering an environment that encourages experimentation, embraces risk-taking, and prioritises agility. By leveraging these emerging themes and concepts, organisations can unlock new efficiencies, create unparalleled customer experiences, and drive sustainable growth in an increasingly digital world.

Table 6.2 Emerging themes and concepts.

Rank	Emerging Themes	Description
1	Unlocking Efficiencies and Information	A means to unlock efficiencies, knowledge, and information using technology and the digital revolution.
2	Integration of Data and Systems	Regarded as the seamless integration of data and systems to provide functional management information and simplify work life.
3	Digitisation of Processes	Involves making existing processes digital and then further improving those digital processes.
4	Digital Transformation and Digitalisation	The transformation from paper forms to electronic formats, incorporating elements like AI.
5	Creating or Iterating with a Digital Element	Focuses on creating something new with a digital element, emphasising automation and technology beyond trendy apps.

Figure 6.2 visualises the layers of digital transformation within an organisation. Their recurrence and relevance to the study as data were analysed and gathered from the online questionnaires and semi-structured interviews, as shown in Table 6.2. These layers are presented as a set of concentric circles, whereby each outer circle encompasses the inner ones, suggesting a building block or scaffolding effect in which the innermost concepts are fundamental, and each subsequent layer builds upon the previous.

Below is an overview from the innermost circle to the outermost:

Unlocking efficiencies and information: At the core of digital transformation, this likely refers to the immediate gains from using digital technologies. This transformation includes streamlining processes, improving access to information, and making better-informed decisions.

Integration of data and systems: As efficiencies are gained, the next step is often integrating data and systems. This process can mean ensuring different software and databases communicate effectively or the seamless flow of information across the organisation.

Digitisation of processes: Advancing towards integration involves transforming conventional, manual operations into digital formats, which can enhance speed and precision and typically result in improved customer experiences.

Digital transformation and digitalisation: This broader layer refers to an organisation's overall shift from traditional to digital forms of operation. It constitutes more than technology; it includes cultural changes, rethinking business operations, and transforming business models.

Creating or iterating with a digital element: The outermost layer indicates an ongoing innovation and development process with digital technology at its core. It emphasises that digital transformation is not a one-time project but rather a continuous process of improvement and adaptation.

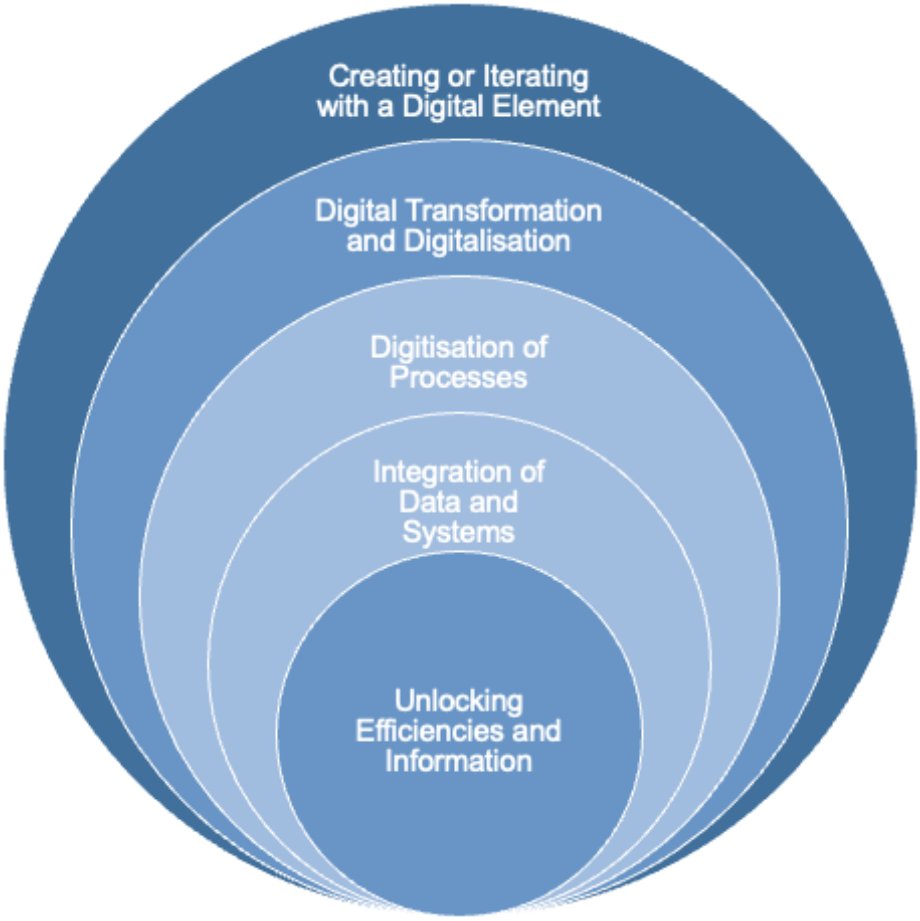

Figure 6.2 Emerging themes and concepts.

Each layer is necessary for the one above it, suggesting that for a business to innovate with digital elements (the outermost layer), it must have a solid foundation in the more fundamental aspects of digital transformation.

In summary, Figure 6.2 articulates a view of digital innovation as a series of technological advancements and a strategic and cultural shift within the organisation that can significantly improve efficiency, decision-making, and overall competitive positioning.

6.2.5 THE FOUR COMPONENTS OF A DIGITAL INNOVATION STRATEGY

A systematic content analysis methodology identified the critical components extracted from the semi-structured interviews. The interviews were transcribed to ensure the comprehensive capture of all crucial elements. Next, the interview transcriptions were revealed and used to encapsulate the key components.

The components were structured to enable a logical depiction of the data. This prioritisation was informed by the inherent significance of a component as well as the occurrence frequency of associated terms and phrases within the transcriptions.

Table 6.3 contains three distinct columns, each serving a specific function. The first column ranks the most crucial key components, extracted from analysed data, on a scale ranging from one (high) to four (low) importance. The second column lists key components derived from the semi-structured interviews. The third column explains the significance of the ranked themes.

The study collected data pertaining to digital innovation strategy from the Exco team and managed the data utilising *Excel*. Semi-structured interviews were also conducted with the Exco team members. Data from these interviews were imported into *Excel* and structured into rows corresponding to the respondents. Subsequently, pertinent themes and concepts were discerned from the responses. These components were visually differentiated in *Excel* using various colours to facilitate structured data grouping for correlating the semi-structured interview findings with the significance of emerging themes integral to the airline organisation's digital innovation strategy. The resultant insights were then organised into a table, aligning the Exco feedback with highlighted emerging themes observed during the interview process, all predicated on a key question posed during the semi-structured interviews: "What, in your opinion, constitute[s] the four key components integral to digital innovation?"

In digital innovation, certain elements are essential to ensure an organisation can adopt new technologies and thrive through transformation. These components include *Company Culture and Organisational Readiness*, which is the foundation of digital innovation, providing the mindset and the preparedness necessary for change; *Efficiency and Time Savings*, which streamlines processes and generates cost benefits, contributing to competitive advantage; *Integration of Systems and Technology*, which ensures that various digital solutions work in cohesion, thereby enhancing user experience and operational effectiveness; and *Scalability*, which allows digital solutions to evolve in line with business growth, ensuring long-term sustainability. Together, these elements form a comprehensive framework that supports a strategic approach towards embedding digital innovation within the organisation.x

One specific question was used to determine the critical components of digital innovation:

What, in your mind, are four key components that form part of digital innovation?

Using the question "What are four key components of digital innovation?" offers diverse expert insights, customisation to specific contexts, deep thinking, qualitative data, and a holistic view, thereby enhancing our understanding of the topic.

This question can also be referenced to the information in the literature review under Section 2.3.1 The Elements Of Digital Innovation. The four components of digital innovation, as analysed in the semi-structured interview combined with this scientific literature review, create a digital innovation strategy framework.

From Table 6.3, the following information adds more detail to the critical components of digital innovation.

Company culture and organisational readiness for innovation: This is a critical component. A culture that values digital innovation and an organisation ready for change is essential for fostering a mindset that embraces digital strategy and transformation.
Efficiency and time savings: Efficiency in operations and the ability to save time are repeatedly emphasised. This includes improving accuracy and speed, leading to cost savings and better performance than manual processes.
Integration of systems and technology: Seamlessly integrating technology and systems within an organisation is another critical component. This ensures that digital initiatives are coherent, systems are user-friendly, and the technology is simple enough for all users to adopt quickly.
Scalability: The capacity for digital innovations to scale is crucial for long-term growth. This includes expanding and adapting digital processes to accommodate growing or changing business needs.

Table 6.3 Four components of digital innovation strategy

Rank	Key Component	Importance
1	Company Culture and Organisational Readiness	Vital for fostering a mindset that embraces digital strategy and transformation.
2	Efficiency and Time Savings	Critical for improving operations, leading to cost savings and better performance than manual processes.
3	Integration of Systems and Technology	Essential for ensuring coherence in digital initiatives and ease of adoption for users.
4	Scalability	Digital innovations must expand and adapt to the organisation's growth and changes.

Figure 6.3 displays the hierarchy of digital innovation components in an organisation. The foundation, *Company Culture and Organisational Readiness*, is crucial as it signifies the necessity of a mindset geared towards embracing digital changes. *Efficiency and Time Savings* follows, indicating that streamlining processes is the next step after establishing a supportive culture; *Integration of Systems and Technology* is the third level, emphasising the need for a unified digital infrastructure to support innovation; and *Scalability* reflects the goal of efficiently expanding digital capabilities, contingent upon successfully implementing the underlying levels. A company must cultivate a digitally ready culture to enable efficient, integrated, and scalable digital innovation.

Figure 6.3 Four components of digital innovation.

These four components form the foundation of digital innovation, highlighting the importance of a supportive culture, the pursuit of efficiency, the strategic integration of technology, and the scalability of digital solutions, as seen in Figure 6.3.

6.3 CONCLUSION

In the airline industry, cultivating a culture of digital innovation is essential. Such a culture fosters creativity and innovation, enabling employees to propose new ideas and experiment with emerging technologies. This environment supports the organisation's growth.

A culture embracing digital innovation is vital in a changing landscape. It allows the organisation to adapt swiftly to market shifts, technological advancements, and regulatory changes, ensuring resilience and competitiveness.

In an environment that prioritises digital innovation, collaboration thrives, breaking down departmental barriers and fostering cohesive teamwork to address intricate challenges effectively. The attraction and retention of top-tier talent are significantly bolstered within a framework that champions digital innovation, as skilled professionals actively seek opportunities to engage with state-of-the-art technologies.

A competitive edge can be attained swiftly through the rapid adoption and integration of emerging digital technologies, rendering the organisation agile and adept at responding to dynamic market demands. The augmentation of the customer experience attests to the benefits of digital innovation, ranging from personalised travel options to streamlined check-in processes, thereby cultivating enduring customer loyalty. Furthermore, operational efficiency experiences a notable enhancement by utilising digital technologies, yielding cost reductions and elevating service quality standards.

A culture steeped in digital innovation facilitates data-driven decision-making, empowering leaders to make strategic choices that propel growth and foster organisational resilience. In the airline industry, nurturing such a culture is paramount, serving as a catalyst for technological advancement and operational excellence amid the ever-evolving aviation landscape.

PART 4

7 THE AIRLINE DIGITAL INNOVATION FRAMEWORK

7.1 INTRODUCTION

This research study has the primary objective of establishing a comprehensive framework to generate business value within the context of an airline organisation.
This objective is realised through aligning the organisation's digital strategy to significantly enhance the knowledge artefact.

The study obtained data for this study from diverse sources, including individuals who interacted with the airline organisation. Tailored questionnaires focusing on digital innovation were circulated among three different groups: the employees, customers, and suppliers linked to the airline organisation to gain an in-depth understanding.

The feedback acquired from the respondents was subjected to a detailed analysis, resulting in the identification of core thematic areas relevant to the development of a digital innovation strategy. In addition to survey-based data collection, the researcher conducted semi-structured interviews with members of the Exco within the airline organisation. These interviews were thoughtfully designed to extract a broad spectrum of perspectives and insights from the Exco team, thereby interpreting the significance of a digital innovation strategy within the context of the airline organisation.

The combination of findings from the online questionnaires and the insights collected from the semi-structured interviews were paramount in formulating the comprehensive framework for developing and implementing a digital innovation strategy.

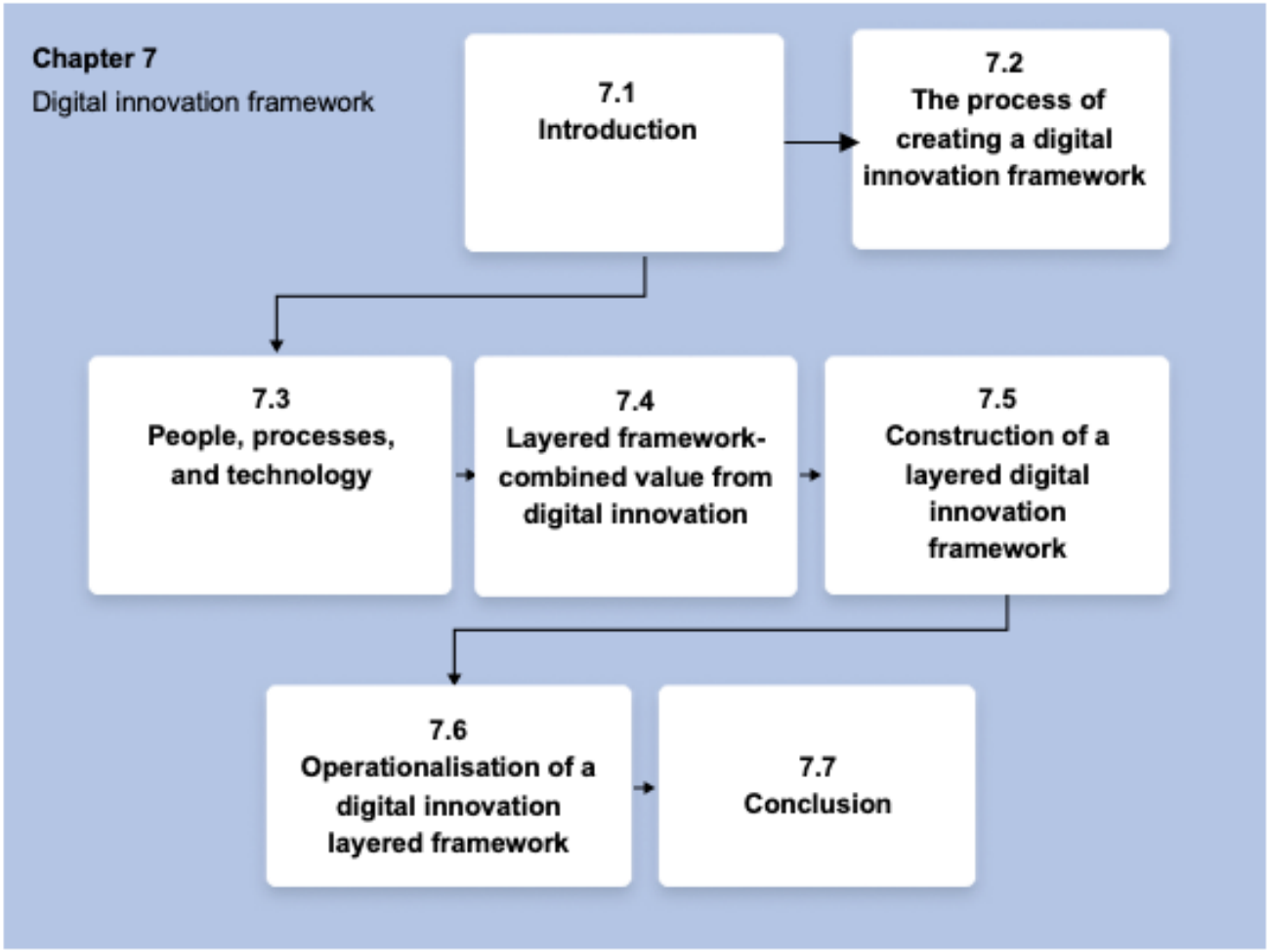

Figure 7.1 Overview of Chapter 7

7.2 THE PROCESS OF CREATING A DIGITAL INNOVATION FRAMEWORK

Figure 7.2 provides an overview of the methodology employed to develop the final digital innovation framework. By utilising data gathered earlier in the research, this figure explains the emerging themes and concepts related to digital innovation and the critical elements that constitute its core. These components contribute collectively to the aggregate value derived from implementing a digital innovation strategy. Recognising the essential roles of people, processes, and technology is central to formulating such a strategy.

Developing a layered digital framework consolidated the data analysis explained in Chapters 5 and 6. This consolidation incorporated the critical components of digital innovation, emerging themes and concepts determined from the research data to be constructed around the core elements of people, processes, and technology. This layered approach then

consisted of an outer layer in which the named concepts would determine the value of digital innovation. The consolidation of this method created a layered digital innovation framework.

The process of developing a layered digital innovation framework can be explained as follows: **Central principle: people, process, and technology:** At the heart of the strategy lies the foundational elements—people, process, and technology—the core from which the strategy radiates. People represent the human capital: the stakeholders, customers, and employees. Process denotes the procedures and workflows that enhance or re-engineer, and technology encompasses the tools and platforms that enable digital transformation. This principle forms the core of the layered digital innovation framework.

Integration of key components: The second layer focuses on integrating the essential components for creating a layered digital innovation framework. These components include unlocking efficiencies and information, developing company culture and organisational readiness, scalability of processes and systems, and efficiency and time savings through digital means. This layer bridges the core and practical themes that drive the innovation forward.

Synthesis of emerging themes and concepts: The emerging themes and concepts from the research data are analysed into actionable insights in the outermost layer. This process involves creating or iterating with a digital element, digitalising processes, and integrating data and systems into a cohesive digital ecosystem. It captures the broader vision and direction of the digital innovation strategy informed by the core components and supported by the foundational core.

This layered approach highlights the key benefits of implementing a digital innovation strategy and is utilised for the outer layer of the layered digital innovation framework.

In essence, the layered framework focuses on the core elements of any organisation, i.e., its people, processes, and technologies. The framework then expands to incorporate critical components identified as necessary for digital innovation. Lastly, it integrates with the incorporation of emerging themes and concepts from the field of digital innovation to establish a comprehensive strategy for transformation and digitalisation. The upcoming sections summarise and confirm the data grounding of the research steps.

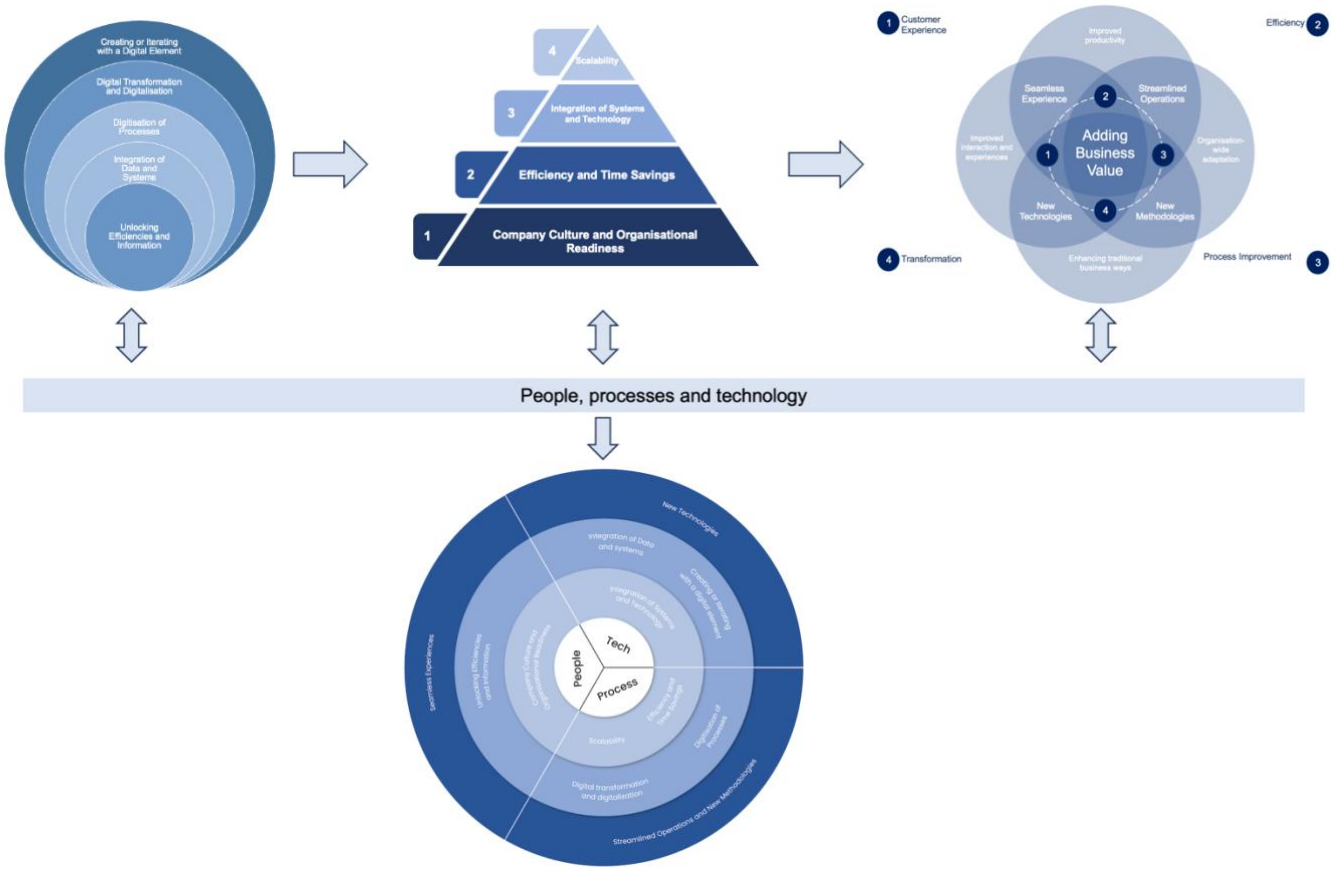

Figure 7.2 Overall layered framework process definition.

These foundational elements are instrumental in driving the strategy forward and establishing a comprehensive digital innovation framework, as presented in Figure 7.6.

The subsequent sections of this chapter feature the procedure used to formulate the digital innovation framework depicted in Figure 7.2.

7.3 PEOPLE, PROCESSES, AND TECHNOLOGY

As part of the analysis of the semi-structured interviews, understanding the interplay between people, processes, and technology is imperative. These three elements form the cornerstone of any successful digital transformation initiative.

People are central in this equation. Every person's part in embracing and driving digital change is paramount, from leadership to the frontline staff. It is about having a skilled IT team and cultivating a culture in which digital innovation is valued and encouraged. This involves managing change effectively and ensuring all employees are committed to and capable of

adapting to new technologies. Regular training and upskilling become indispensable in this context, ensuring the workforce is competent and comfortable with technological advancements.

Processes should meticulously align with the digital strategy. This alignment ensures that every operational aspect of the airline supports and enhances the overarching business objectives. Digital innovation often necessitates rethinking and streamlining existing processes to improve efficiency, agility, and customer responsiveness. Moreover, a continuous improvement mindset is crucial, allowing processes to evolve in response to new technological opportunities and market dynamics. Implementing metrics and key performance indicators to assess the effectiveness of these processes is also vital for measuring their impact on business value and customer satisfaction.

Technology, as the enabler of innovation, is the third critical component. It goes beyond simply adopting the latest hardware and software; instead, it involves integrating these technologies into the airline's existing systems seamlessly and strategically coherent. This includes harnessing data effectively for insightful decision-making and ensuring the security and reliability of these technological systems, which is particularly crucial in the highly regulated aviation sector.

The true essence of a successful digital innovation strategy constitutes the synergy of these three elements. The capabilities and mindsets of people must align with user-friendly and strategically integrated technology, while processes should be designed to maximise the potential of technological capabilities. This holistic approach is vital to implementing digital innovation initiatives and ensuring they are sustainable, scalable, and aligned with the airline's business objectives. Integrating people, processes, and technology drives business value creation in the airline industry through digital innovation.

Therefore, based on the data collected, people, operational procedures, and technological infrastructure constitute the fundamental pillars of a digital innovation strategy. These components are naturally interconnected, converging to produce business value derived from implementing a digital innovation strategy collectively.

7.3.1 THE CORE OF THE LAYERED FRAMEWORK

Figure 7.3 portrays a circle divided into three segments labelled *People*, *Technology*, and *Process*, presenting a holistic view of the crucial components of a digital innovation strategy. The *People* segment underscores the role of human talent in driving innovation—IT professionals, end-users, and stakeholders—who must be adept at embracing new technologies and adapting to change. *Technology* highlights the essential technological tools and solutions like AI, big data, and IoT that underpin digital transformation, requiring careful selection and integration to align with business objectives. Lastly, *Process* represents an organisation's systematic approaches, such as agile and DevOps, to implement and sustain digital innovation.

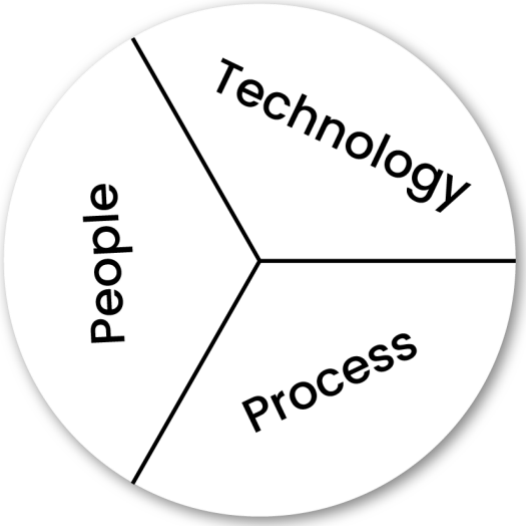

Figure 7.3 People, Process and Technology

A balanced strategy must complement these elements, ensuring technology is leveraged effectively by skilled people and within processes to achieve successful digital transformation. Further, a balanced digital innovation strategy should integrate technology with the human aspect and the processes that enable its implementation. Overemphasising one aspect over the others could lead to challenges, such as adopting new technologies without the necessary workforce skills or innovating without processes that ensure sustainable and scalable results.

7.3.2 LAYERED FRAMEWORK: INCORPORATING KEY DIGITAL INNOVATION COMPONENTS

The next step in creating the framework in this study was incorporating the four critical components of digital innovation, as discussed in Table 6.3, based on the consolidated feedback from the semi-structured interviews.

Figure 7.4 builds on the three-segment model of *People*, *Technology*, and *Process* by adding a second layer that outlines the core components of each segment crucial for digital innovation. The *People* segment expands to emphasise *Company Culture* and *Organisational Readiness*, highlighting the need for a culture that fosters innovation and an organisation prepared to support and adapt to technological changes. For the *Technology* segment, the *Integration of Systems and Technologies* is essential, thus indicating the importance of blending new and existing technologies for seamless operation and maximising resources. Lastly, the *Process* segment includes *Efficiency and Time Savings* and *Scalability*, underscoring that processes should not only be efficient but also capable of scaling to accommodate growth and change.

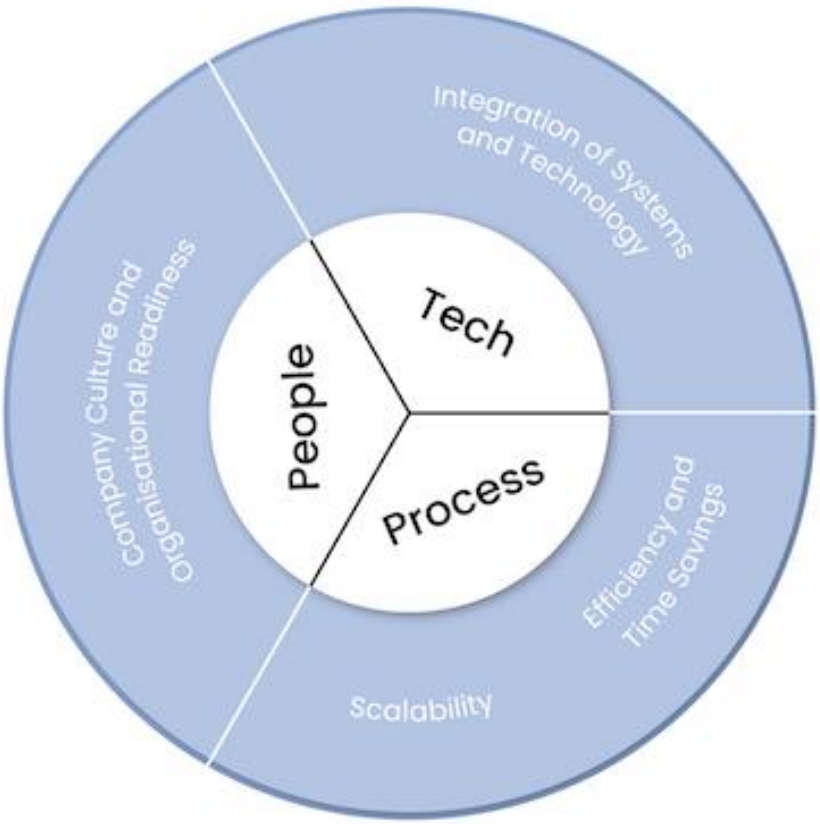

Figure 7.4 Four components of digital innovation.

This layered model suggests that for a digital innovation strategy to be successful, it must have a solid foundation in a supportive culture, integrated technology, and scalable processes, all of which are fundamental to driving digital transformation.

7.3.3 LAYERED FRAMEWORK: INCORPORATING EMERGING THEMES AND CONCEPTS

The comprehensive analysis of the evolving ideas and principles presented in Figure 6.2 established the foundation for subsequent phases that contributed to developing a layered framework. This integrated layer accentuates the interdependent relationship between the different components explored and examined in this research study as a component of analysing data.
Integrating systems and technology in the second layer is the basis for integrating data and systems in the third.

Figure 7.5 suggests that an organisation can create a unified infrastructure by effectively combining various technological systems and platforms, enabling seamless data flow and analysis. This integrated technological framework is crucial for the creation of iterating with a digital element, which refers to the ongoing process of improvement and innovation with technology at its core. It allows rapid testing, learning, and evolving digital solutions informed by real-time data insights.

Scalability, efficiency, and timesaving in the second layer are closely linked to digital transformation and digitisation in the third layer. Scalability ensures that digital solutions can grow and adapt to increasing demands without compromising performance, while efficiency and time-saving initiatives streamline operations, reducing waste and speeding up processes. These aspects are vital for an organisation's digital transformation and digitisation, as they enable it to transform existing processes into more agile, cost-effective, and customer-centric digital operations. This transformation often involves digitising processes, converting manual processes into digital ones, and further enhancing efficiency and scalability.

Company culture and organisational readiness in the second layer are essential for unlocking efficiencies and harnessing information in the third layer. A company culture that embraces innovation, continuous learning, and adaptability is crucial for realising the benefits of digital

technologies. Organisational readiness ensures that the structure, talent, and mindset are in place to support digital initiatives.

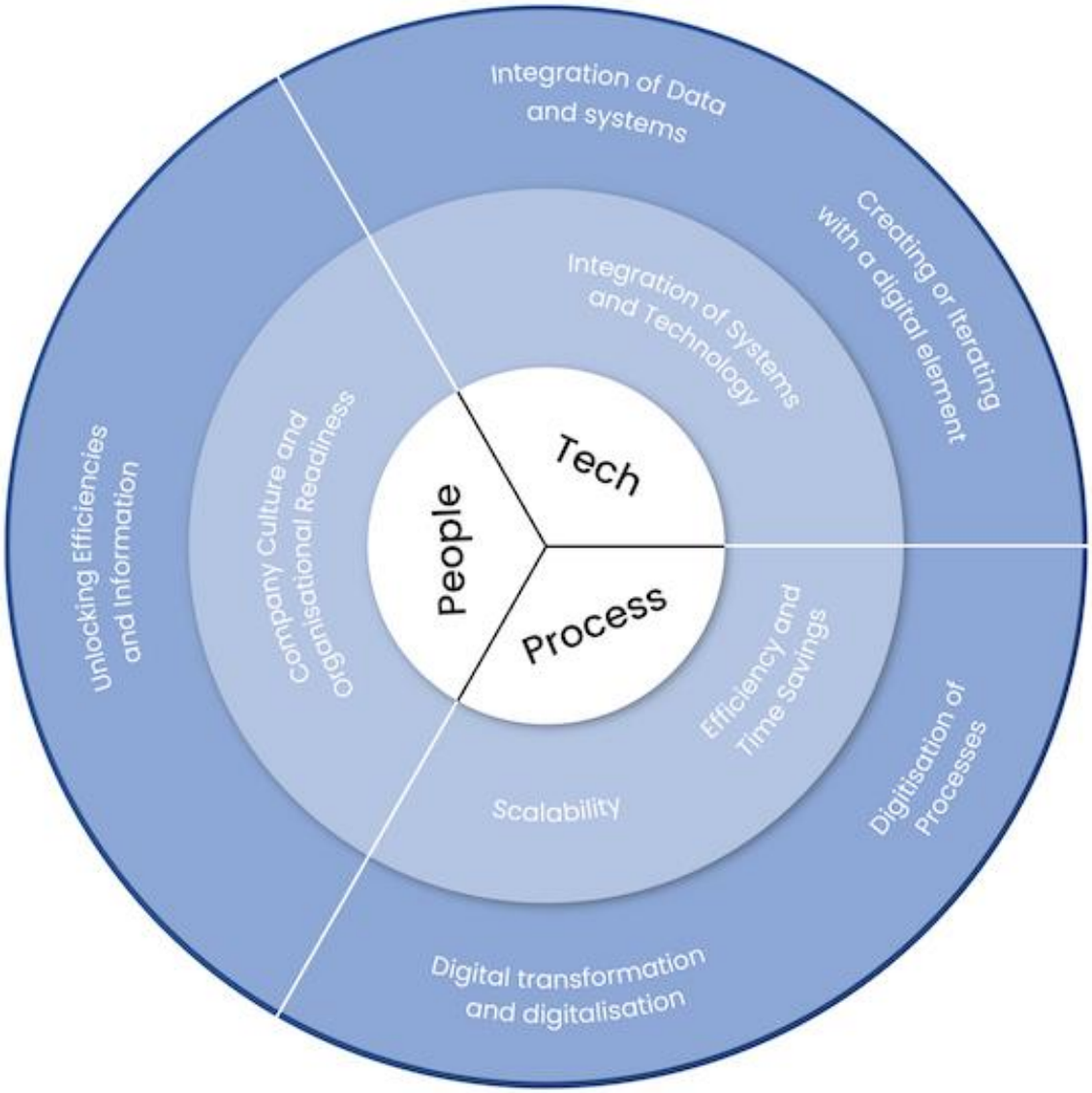

Figure 7.5 Emerging themes and concepts.

Together, these elements foster an environment where efficiencies can be identified and leveraged, and information is valued as a critical strategic asset, driving better decision-making and performance across the organisation.

7.4 LAYERED FRAMEWORK: COMBINED VALUE FROM DIGITAL INNOVATION

The fourth layer of the layered framework focuses on the business value an airline organisation can obtain from implementing a digital innovation strategy. As displayed in Figure 5.18, three elements ultimately form part of the value gained from implementing a

digital innovation strategy: a seamless experience, streamlined operational efficiencies and the exploration of new technologies.

Figure 7.6 outlines an advanced layered framework that depicts the progression from core principles to broader goals in a digital innovation strategy.

Unlocking efficiencies and information concerns optimising operations and making informed decisions using the data available within an organisation. When these efficiencies are realised and information utilised effectively, it naturally leads to a seamless experience for employees and customers. This effectiveness could manifest as smoother workflows, reduced bottlenecks, and a more intuitive interaction with digital platforms, all contributing to a frictionless user experience and enhancing satisfaction.

Integrating data and systems is fundamental to providing a solid base for developing new technologies. Organisations can innovate more efficiently by ensuring systems work harmoniously, data are consolidated, and new products or services are created. Additionally, iterating with a digital element means continuously improving and updating digital offerings. This cycle of integration and iteration becomes the breeding ground for developing new technologies, as it allows for rapid prototyping, testing, and refinement based on solid data insights and technology infrastructure.

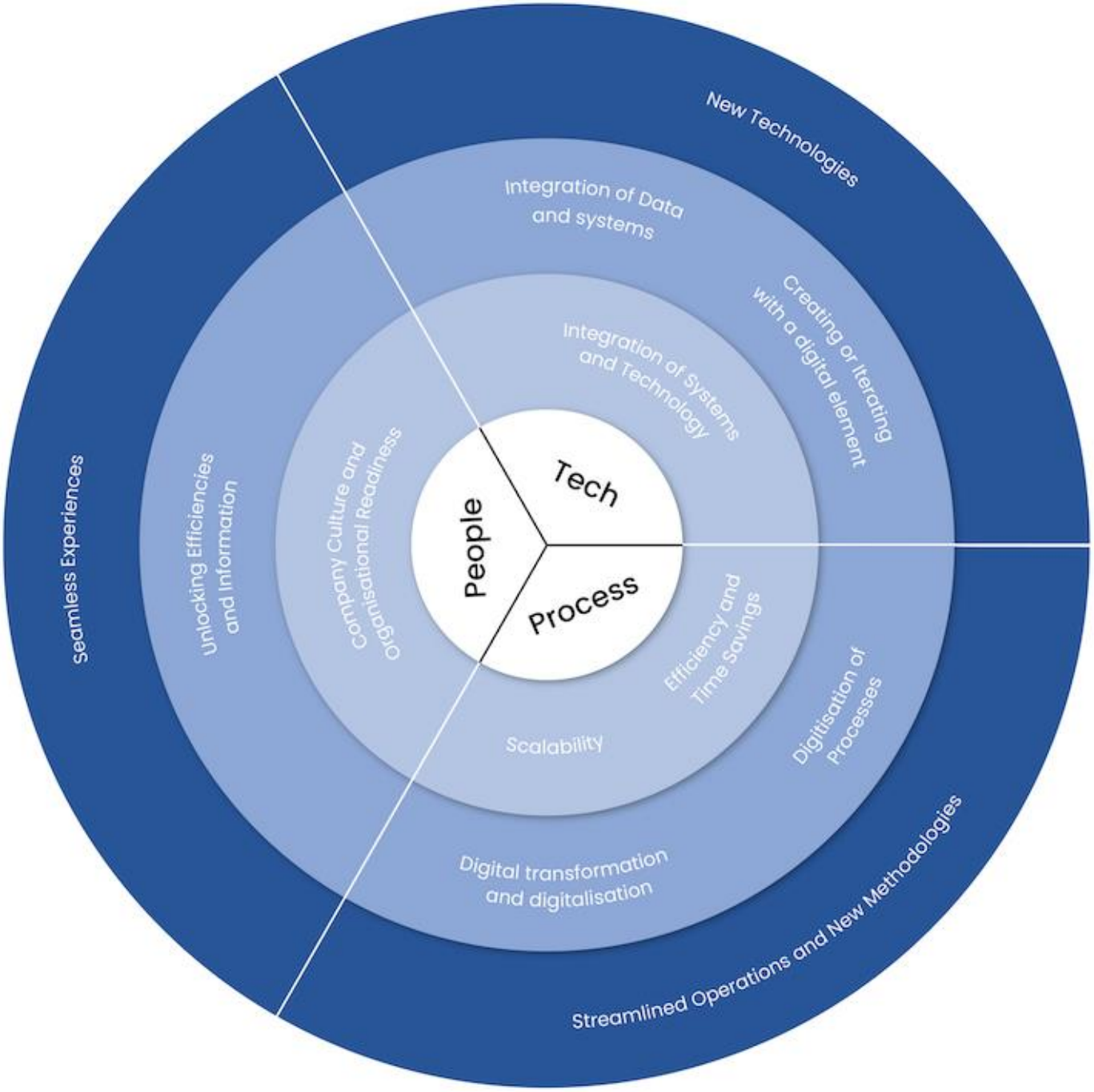

Figure 7.6 Layered digital innovation framework.

Digital transformation and digitisation, along with the digitisation of processes, relate to converting traditional operations into digital formats and embracing digital technology to transform all business areas. This shift leads to more efficient and effective operations and paves the way for new methodologies. Streamlined operations reduce waste, save time, and increase productivity, allowing for exploring new ways of working, such as using data analytics for strategic decisions or adopting agile methods for project management. The digitisation of processes improves current operations and provides a platform for innovation and adopting new, more effective methodologies.

7.5 CONSTRUCTION OF A LAYERED DIGITAL INNOVATION FRAMEWORK

Combining the feedback from the aforementioned steps, Figure 7.6 presents a comprehensive model for digital innovation strategy and indicates a strategic, structured approach to achieving digital innovation within an organisation, highlighting the interplay between and progression from foundational elements to outcomes.

At its centre, the core components of *People*, *Technology*, and *Process* are the essential building blocks of any digital innovation strategy. *People* emphasises the need for an organisation's workforce to be sufficiently prepared to drive and support change; *Technology* represents the technological infrastructure and tools required for digital actions; and *Process* pertains to the methodologies and practices that enable the effective implementation and management of digital initiatives.

The first layer surrounds the core, which provides detail on the immediate factors critical to the core components' effectiveness: *Company Culture and Organisational Readiness*, which addresses the human aspect of digital transformation, highlighting the need for a culture that embraces change and innovation, and a readiness at an organisational level to support such a shift. *Integration of Systems and Technologies* speaks to the technological aspect, stressing the importance of seamless integration of various systems and platforms to enable smooth operation and data flow. *Efficiency and Time Savings* and *Scalability* relate to process improvements essential for handling increased demand and maintaining performance as the organisation grows.

The second layer contains the practical outcomes of the first layer's focus areas: *Unlocking Efficiencies and Information* involves leveraging optimised processes and the strategic use of data to improve decision-making and operational efficiency. *Integration of Data and Systems* is the outcome of a technological strategy that focuses on breaking down silos to allow for a unified view of the organisation's data, enabling better analytics and insights. *Creation of Iterating with a Digital Element* indicates a continuous improvement and innovation culture, where digital solutions are regularly updated and refined in response to feedback and changing needs.

The third layer outlines the broader objectives resulting from the second layer's achievements: *Seamless Experiences* are created when customers and employees interact with the organisation's digital interfaces without friction, a key differentiator in today's market. *New Technologies* emerge from an environment that fosters innovation and leverages integrated systems and data, allowing the organisation to remain at the forefront of technological advancements. *Digital Transformation and Digitalisation* refers to the overarching goal of fully integrating digital technology into all aspects of the business to improve performance and competitiveness.

Finally, the outermost layer encapsulates the strategic end goals: *Streamlined Operations and New Methodologies*. This results from the entire model working in harmony, leading to operations optimised for efficiency and effectiveness and adopting new methodologies enabled by digital technologies. These include agile project management, data-driven strategy formulation, and customer-centric product development.

In essence, the model suggests that an organisation must carefully orchestrate its approach to digital innovation , ensuring that each layer supports and enhances the next, ultimately leading to a transformed business that is agile, efficient, and ready for the future.

7.6 OPERATIONALISATION OF A DIGITAL INNOVATION LAYERED FRAMEWORK

The layered digital innovation framework describes a comprehensive approach for operationalising a digital innovation strategy within an organisation and indicates how an organisation can implement this framework from the core to the outermost layer.

7.6.1 CORE LAYER: PEOPLE, PROCESS, AND TECHNOLOGY

People: Begin by fostering a culture of valuing innovation and readiness for change among the workforce. This involves training, development, and possibly recruiting new talent adept in digital capabilities.

Process: Identify digital enhancement or transformation opportunities to evaluate and map existing processes. Process reengineering might be necessary to ensure optimised workflows for digital integration.

Technology: Assess the current technology stack and infrastructure to determine if they support digital transformation goals. Implement necessary technology solutions to serve as the backbone of the digital innovation strategy.

7.6.2 INTEGRATION AND SCALABILITY.

Integration of Data and Systems: It is essential to merge various data sources and systems to enable a smooth exchange of information throughout the organisation, thereby enhancing decision-making processes and operational efficiency.

Scalability: Design the digital innovation initiatives to be scalable from the start. This means they should be able to grow and adapt to increased demand or changes in the business environment without significant rework.

7.6.3 DIGITAL TRANSFORMATION AND DIGITISATION.

Digital Transformation: Implement transformation initiatives by digitising paper-based processes, automating repetitive tasks, and employing digital tools to enhance decision-making and operations.

Digitisation of Processes: Convert manual processes to digital formats, relevant technology systems, tools, and other digital workflow management systems.

7.6.4 EMERGING THEMES AND NEW METHODOLOGIES.

Streamlined Operations and New Methodologies: Adopt lean methodologies, continuous improvement processes, and agile frameworks to streamline operations. This assists in continually refining the digital innovation strategy and its execution.

New Technologies: Stay abreast of and incorporate new technologies that can offer competitive advantages, such as AI, the IoT, or blockchain, appropriate for the organisation’s context and strategy.

7.6.5 CREATING A DIGITAL ECOSYSTEM.

Creating or Iterating with a Digital Element: Encourage a culture of innovation that integrates digital thinking into all aspects of the business, from customer interactions to internal processes.

Integration of Systems and Technology: Use the insights gained from earlier layers to integrate systems and technology further, ensuring a digital ecosystem responsive to the organisation's needs.

7.6.6 IMPLEMENTATION AND CONTINUOUS IMPROVEMENT.

Implement the strategy into practice with a phased rollout, starting with pilot projects in areas most likely to benefit from digital innovation.

Monitor and measure the impact of digital initiatives against set KPIs to ensure they deliver value.

Promote a culture of continuous improvement, using feedback loops to refine and enhance the digital strategy over time.

Organisations prioritise initiatives based on impact, cost, and strategic fit to implement a digital innovation framework effectively, balancing rapid gains with longer-term projects. Technology needs must be identified to support such initiatives, including potential investments in new digital platforms and advanced technologies like AI. Stakeholder engagement plans could facilitate regular communication and feedback throughout the implementation process.

By following these steps, an organisation can operationalise its digital innovation framework, ensuring it is implemented and positioned for ongoing evolution and success in a digital landscape.

7.7 CONCLUSION

Integrating stakeholder feedback into an airline organisation’s strategic operations under digital innovation authority necessitates a systematic approach that aligns with digital innovation theories.

Analysing the amassed data is the next crucial step, in which patterns and opportunities for enhancement are identified within the core domains of *People*, *Technology*, and *Process*. This analysis is instrumental in informing strategic decisions, ensuring they are based on

concrete evidence rather than assumptions. The feedback obtained, especially in the *People* domain, often necessitates a cultural shift towards customer-centricity and innovation, leading to significant changes in training, change management, and HR policies. Such cultural integration ensures the airline's ethos and operations are attuned to stakeholders' needs and expectations.

In the *Technology* domain, insights gained from stakeholders should directly influence the adoption of new technologies and the upgrading of existing systems, focusing on boosting customer experiences and operational efficiency. Likewise, the *Process* improvements should address the inefficiencies identified by stakeholders, possibly including the digitisation of customer service operations or the optimisation of supply chain management. These process enhancements are integral to the digital innovation strategy, highlighting the importance of efficient, streamlined operations aligning with digital transformation goals.

Strategic initiatives derived from executive insights should be systematically planned and implemented in stages. This phased approach allows for real-time monitoring and iterative improvements, ensuring the strategy remains flexible and responsive to stakeholder feedback. Ensuring organisation-wide integration of these changes is essential and requires clear communication across all departments and the establishment of dedicated teams to oversee the seamless adoption of new technologies and processes.

Lastly, the framework for digital innovation must embrace a culture of continuous improvement, which involves a regular reassessment of strategies to ensure they remain synchronised with the dynamic aviation industry and evolving customer needs. This continuous feedback loop enables the airline to remain agile and proactive in its digital innovation efforts, ensuring that stakeholder insights translate into tangible improvements and transformative outcomes. An airline can effectively drive digital innovation and transformation through this systematic and responsive approach.

PART 5

8 CONTRIBUTION AND CONCLUSION

8.1 INTRODUCTION

Chapter 8 outlines the research contributions, starting with an introduction and detailing the findings for each research question. The chapter then defines the study's theoretical and practical contributions, offers reflective commentary, discusses limitations, and proposes avenues for future research, thus providing a complete overview of the study's impact and potential for further investigation.

This study investigates whether digital innovation addresses customer-facing outcomes and business-facing benefits within airline organisations' digitalisation initiatives (Smit et al., 2018). The research also sheds light on the internal business areas, systems, and processes necessary to develop a digital innovation strategy. Moreover, the study highlights that new digital technologies often evolve from integrating existing technologies, forming the foundation for future innovations (Snow et al., 2017).

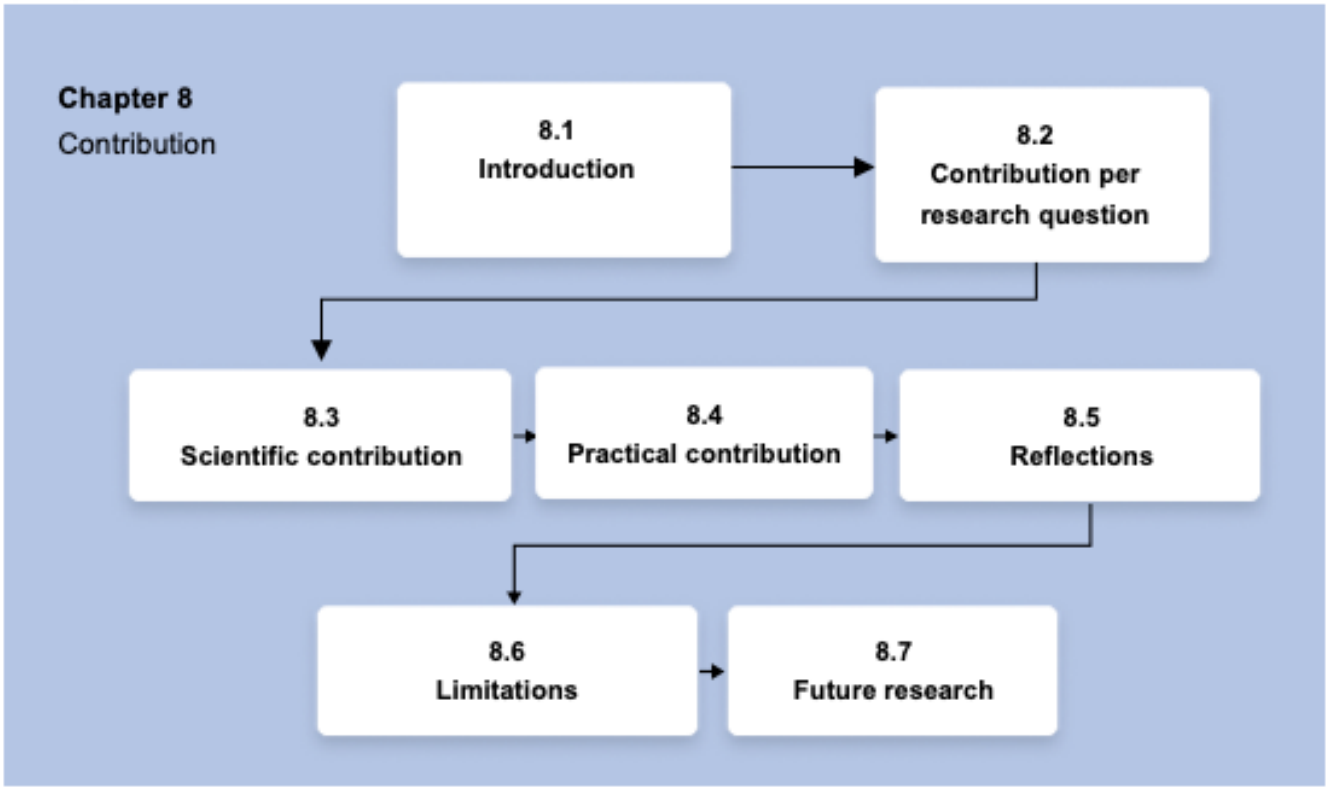

Figure 8.1 Overview of Chapter 8

The study also highlights the importance of an adaptive, company-wide culture to embrace digital innovation as a core component of creating a digital innovation framework.
Understanding and mapping dynamic capabilities such as sensing, seizing, and transforming is essential in evaluating the organisation's level of agility.

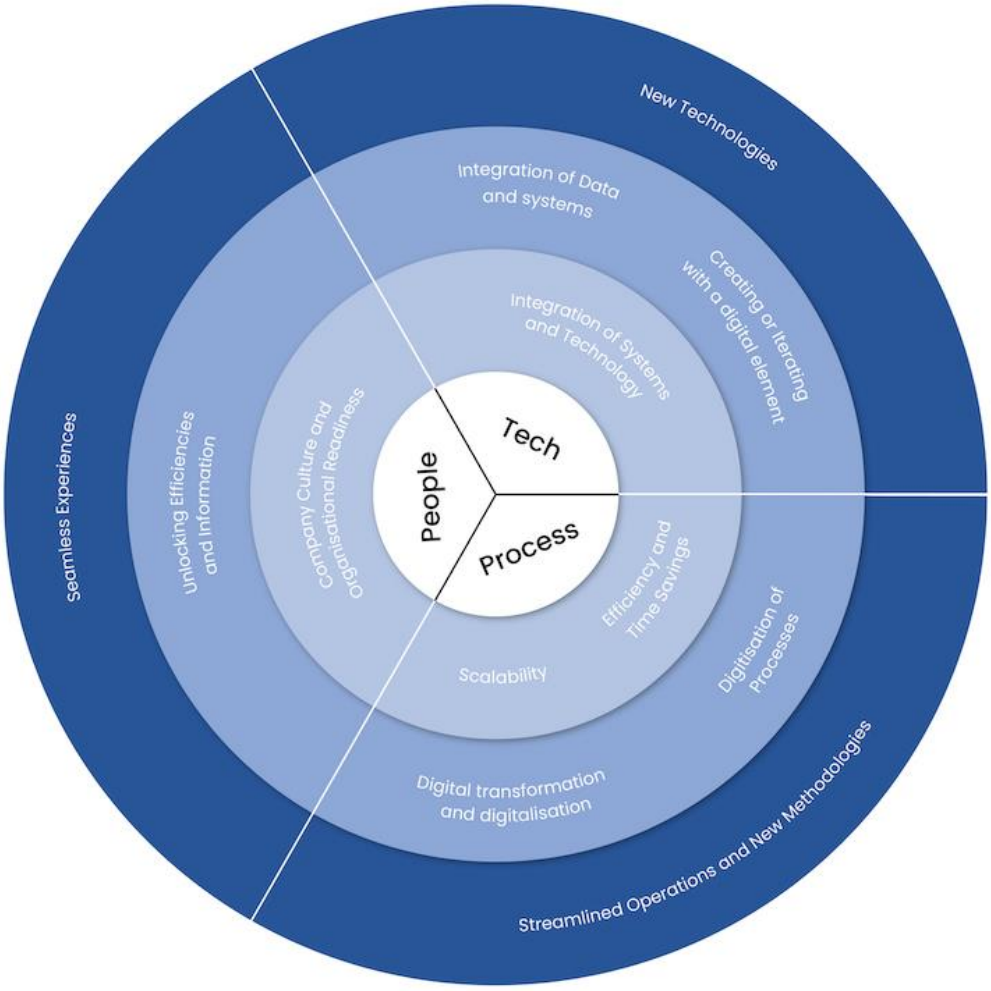

Figure 8.2 Layered digital innovation framework.

The study collected data from various respondents interacting and engaging with the airline organisation. Web-based questionnaires were distributed to customers, suppliers, and employees of the airline organisation. The collected data were analysed and summarised into combined elements aiding the ultimate creation of the artefact. The researcher conducted semi-structured interviews with the Exco team of the airline organisation to gather information relating to digital information on a more strategic level.
Both the information obtained from the online questionnaires and the semi-structured interviews were deconstructed and analysed to ultimately contribute to the framework needed to implement a digital innovation strategy for the airline organisation (see Figure 8.2).

8.2 CONTRIBUTION PER RESEARCH QUESTION

Considering the presented problem statement, it is imperative to gain insight into the strategic realignment and comprehensive adjustments an organisation must undertake to succeed in digital innovation and transformation. The scope of digital initiatives encompasses a technological paradigm shift that exerts influence across multiple facets within the broader aviation industry (Zaharia & Pietreanu, 2018).

The research questions provide a holistic understanding of how airline organisations can strategically leverage digital innovation. They address the identification of opportunities, the realisation of business value, the management of challenges, and the establishment of a framework, all of which are essential for thriving in the digital era.

The following questions have been incorporated within the context of this research study, and the responses were shaped by the research and analysis performed to address each research question separately and in accordance with the feedback received.

Secondary Research Question 1: What are the critical digital innovation strategy opportunities?
Secondary Research Question 2: How to achieve business value by implementing digital innovation?
Secondary Research Question 3: What challenges impact digital innovation in an airline organisation?

Primary Research Question: What are the elements of a digital innovation strategy framework for an airline organisation to create business value?

8.2.1 CRITICAL DIGITAL INNOVATION STRATEGY OPPORTUNITIES

The research question, "What are the critical digital innovation strategy opportunities?" is a fundamental inquiry within the study, aiming to unearth and examine the strategic opportunities within digital innovation. Its primary purpose is to identify specific areas, initiatives or approaches where organisations can apply technology and innovation strategically to their advantage in the digital age.

The increasing digitisation of work and personal spaces is introducing a new era of innovation, specifically in digital domains, transforming how individuals, organisations, and the broader

society operate and interact. Over the past ten years, various digital technologies have emerged and grown, including cloud computing, mobile technology, the Internet of Things (IoT), and digital control systems (Nambisan et al., 2017).

By addressing this question, the research aims to shed light on potential sources of competitive advantage, enable well-informed decision-making, enhance organisational adaptability to changing market dynamics, and ultimately facilitate value creation for the organisation and its stakeholders. This question, therefore, plays an essential role in guiding organisations towards identifying and exploiting the most promising pathways for digital innovation, ultimately contributing to their competitiveness and success in the contemporary digital landscape.

The critical digital innovation strategy opportunities identified in this research study can be summarised as enhancing efficiencies, data integration, digitalisation of processes, investment in emerging technologies, cultural transformation, customer-centric approach, and scalability.

The advancement of digital innovation strategies encompasses several pivotal areas. Efficiency is enhanced through the deployment of digital tools, notably automation and digital workflows, which significantly reduce costs and time.

Consolidating different data sources through data integration intensifies the capacity for informed decision-making and augments customer engagement, enabling customised services. The digitisation of traditional processes reinforces efficiency and accuracy, streamlining access to information. Investment in emerging technologies like AI, IoT, and blockchain yields competitive advantages, enabling the development of innovative services and business models.

Cultural transformation within organisations is crucial to this evolution, emphasising the adoption of digital innovation through training, change management, and fostering a culture of continuous improvement. Customer-centric approaches, leveraging digital platforms, are instrumental in enhancing customer engagement and satisfaction.

Lastly, the scalability of digital strategies ensures their long-term applicability and adaptability to evolving technological landscapes.

8.2.2 VALUE FROM DIGITAL INNOVATION STRATEGY IMPLEMENTATION

The question "How can business value be achieved through the implementation of digital innovation?" explores methodologies and strategies organisations can employ to leverage digital technology to enhance their business outcomes. This process involves identifying the critical digital initiatives that align with business goals, optimising processes, improving customer experiences, and fostering a culture that embraces change to drive growth, competitive advantage, and profitability.

Based on the data collected and analysed, core elements, Customer Experience, Efficiency, Process Improvement, and Transformation collectively enhance business value. For Customer Experience, leveraging new technologies refines customer interactions, leading to enriched experiences. Efficiency combines this with streamlined operations rooted in improved productivity and broad operational optimisation. Process Improvement arises from new methodologies, improving operations through continuous innovation. Transformation integrates new technologies with these methodologies, requiring organisational adaptation. Interconnected elements underpin an airline's journey to add significant business value through technological and methodological advancements.

Figure 5.18 provided a detailed description of the elements contributing to the value of digital innovation, and the relevant question was answered in detail.

Business value from digital innovation is realised by a systematic enhancement of operational processes and customer relations. Digitally optimised operations promote significant cost efficiencies and productivity gains, while integrated data analytics enable more informed decision-making, directly impacting strategic business outcomes. Further, digital innovation drives customer engagement by offering personalised experiences through advanced technological platforms. The organisational cultural shift towards digital readiness is pivotal for sustaining innovation.

The increasing significance of digital technology in achieving business objectives has led to a profound transformation of entire industries. As a result, managers are keenly interested in managing digital innovation. Recent research highlights the vast potential for product and service innovation stemming from digital technologies, which are challenging to control and predict. Consequently, organisations require agile tools to navigate these emerging digital innovation processes effectively. These processes compel companies to reassess their

assumptions about product portfolios, digital landscapes, and innovation strategies (Nylén & Holmström, 2015).

The digitalisation of businesses across various industries, driven by technologies like IoT, big data analytics, artificial intelligence, and cloud computing, is an emerging phenomenon. Firms must embrace this transformation successfully through digital technology to achieve substantial improvements in areas such as customer experience, operational efficiency, and the creation of new business models. Failure to do so might leave them vulnerable to competition (Fitzgerald et al., 2014).

Lastly, business value is quantified by metrics that reflect the impact of digital initiatives on the business's bottom line and market position.

Digital innovation enhances business value by refining customer experience and streamlining operations for greater efficiency. New technologies and methods revitalise interactions and optimise processes, promoting cost savings and strategic insights. This continuous innovation necessitates a cultural shift toward digital adaptability, with success measured by the tangible impact on profitability and market presence.

8.2.3 CHALLENGES TO AIRLINE DIGITAL INNOVATION

The research question "What challenges impact digital innovation in an airline organisation?" aims to identify and understand the barriers and difficulties an airline faces when integrating new digital technologies and processes.

This question intended to uncover factors that might hinder the successful implementation and adoption of digital initiatives, including organisational, technological, financial or cultural challenges. Understanding these challenges is crucial for developing effective strategies to overcome them and facilitate successful digital transformation within the airline industry.

Digital technology has the potential to bring about radical change and challenge existing markets (Henderson, 2006). However, it requires a deep understanding of the specific characteristics of digital technology. Many previous studies have failed to fully explore the intricacies of technology (Orlikowski, 2000). Organisations need managers who are well-versed in the unique nature of digital technology to manage digital innovation effectively.

As identified by the study, challenges to digital innovation in airline organisations are multifaceted. They include resistance to change, budget constraints, and difficulty choosing the right digital products. Moreover, keeping pace with rapidly advancing technology and ensuring that adoption happens internally is challenging.

Time and resources present significant barriers, a shortage of specialised skills and the high-costs of hiring qualified personnel. In addition, there are challenges in ensuring user adoption and alignment between business strategy and technology. These issues must be navigated carefully to ensure the successful digital transformation of an airline organisation.

Lastly, this research question explores the obstacles airline organisations encounter by integrating new digital technologies and processes. It delves into organisational, technological, financial, and cultural impediments to digital innovation. Identifying these barriers is vital to formulating strategies for successful digital transformation. Various challenges include resistance to change, budgetary limits, suitable digital solutions, the pace of technological advancement, resource constraints, skill shortages, and the costs of skilled staff. The research question further stresses the importance of internal adoption and aligning business strategies with technology to achieve digital transition.

8.2.4 ELEMENTS OF A DIGITAL INNOVATION STRATEGY FRAMEWORK

The main research question, "What are the elements of a digital innovation strategy framework for an airline organisation towards creating business value?" examines and attempts to understand the components that constitute an effective digital innovation strategy for an airline organisation. The goal is to determine how these components can be coordinated to enhance operational efficiency, customer satisfaction, and competitive edge, ultimately creating increased business value.

The analysis of the data mining from various sources underlines an evaluation of data across *People*, *Technology*, and *Process*, using stakeholder insights to drive a cultural shift towards customer-centricity and innovative practices. Technology adoption is tailored to enhance customer experience and operational efficiency, while process improvement is directed at rectifying the inefficiencies highlighted by stakeholders. The strategy unfolds in phases, with constant reassessment to maintain agility and responsiveness to the ever-changing aviation

industry and consumer demands. This iterative approach ensured the airline's digital innovation strategy was transformative and aligned with creating business value.

The elements below were vital in answering the primary research question, as discussed in Section 6.2.5. Further to the method explained above, the following were highlighted and analysed.

Company culture and organisational readiness for innovation: The organisational ethos significantly influences the adaptability and success of digital initiatives. A culture steeped in digital innovation values will likely embrace new strategies and transformations. This element is the foundation for cultivating an environment where innovation can flourish, ensuring the workforce is primed to support and drive digital changes.

Efficiency and time savings: Operational efficiency is paramount in the airline industry, where time savings directly correlate to cost reductions and service improvements. Digital innovation strategies prioritising efficiency can revamp operational processes, reducing redundancies and enhancing the speed of service delivery. These strategies can lead to refining existing protocols and adopting new technologies that automate and optimise various airline operations.

Integration of systems and technology: Harmonising new technologies with existing systems is critical for a seamless transition and user adoption. This element ensures that digital tools are not isolated but are part of an integrated ecosystem that enhances the user experience for both customers and employees. It involves carefully selecting and implementing technologies that complement and enhance the existing infrastructure, facilitating efficient operations and decision-making.

Scalability: In the rapidly evolving aviation landscape, the ability to scale digital innovations ensures that an airline can adapt to market changes and evolving business needs. Scalability allows for the expansion of digital processes, enabling airlines to grow without being hampered by their technological infrastructure. This includes developing effective digital solutions in the current state, but they can also evolve with the airline, accommodating increased passenger numbers, new routes, and additional services.

Each of these elements is interdependent, with the success of one often influencing the effectiveness of the others.

The digital innovation strategy framework for an airline involves cultivating a culture ready for change, emphasising operational efficiency for time and cost savings, integrating user-friendly systems and technology, and ensuring the scalability of digital processes for long-term growth. These elements are fundamental in driving business value within the airline industry.

The secondary questions informed the primary research by identifying key aspects of a digital innovation strategy in the airline industry. The first explored opportunities for innovation, crucial for the framework's strategic objectives. The second assessed how these innovations translate into business value, a core aim of the framework. The third identified potential challenges, providing insights into obstacles the framework had to address. Together, they offered a comprehensive understanding necessary to develop an actionable framework for digital innovation that aims to create business value.

8.3 SCIENTIFIC CONTRIBUTION

This research study contributes scientifically by offering an interpretive case study that addresses a deficiency in the current literature on digital innovation strategy implementation in airline organisations to derive business value. By utilising web-based questionnaires and semi-structured interviews for data gathering and evaluation, the study provides a layered framework for understanding dynamic capabilities and organisational agility in the context of digital innovation.

The study outlines strategic opportunities for digital innovation, defining technological and strategic application areas to enhance competitive advantage and adaptability in the airline industry. It comprehensively examines the interplay between digital technology and business outcomes, including customer experience, efficiency, and process improvement.

The study makes several significant theoretical contributions. Firstly, it deepens the understanding of digital innovation strategies in the airline industry, providing insights into how these strategies can be effectively developed and implemented. Secondly, it expands the knowledge of organisational agility and strategic alignment in the context of digital transformation, highlighting the critical factors that contribute to successful digital innovation. Lastly, the study provides a detailed theoretical framework that can be applied to similar

industries facing rapid technological changes, offering a valuable reference for further research and practical application.

The study offers actionable insights for airline executives on implementing and scaling digital innovations. It emphasises the importance of integrating new technologies with existing systems to ensure seamless operations and avoid operational silos. Additionally, the study identifies critical challenges and opportunities in digital transformation, providing practitioners with valuable information to develop effective strategies. This practical guidance can help airline organisations navigate the complexities of digital innovation and achieve their strategic objectives.

Ultimately, the study enriches academic discourse by systematically exploring the strategic influence of digital innovation for business value creation in the aviation industry, thus adding valuable insights to the existing body of knowledge.

8.4 PRACTICAL CONTRIBUTION

The practical contribution of this research manifests in operationalising a digital innovation framework within the airline organisation. This operationalisation process is a critical bridge, translating the research insights into actionable improvements in airline operations and customer engagement.

Section 7.5, Operationalising a layered digital innovation framework, provided a detailed description of how the layered digital innovation framework can be operationalised.
The integration of these insights is strategic and multifaceted. For *People*, it involves shaping company culture to prioritise customer-centricity and innovation, potentially through the development of training programs. In the realm of *Technology*, assessing technological needs and deficits leads to investment in new systems or upgrading existing platforms to boost customer experience and operational efficiency. *Process* focuses on revising or creating new processes to eliminate inefficiencies, possibly by digitising customer service processes or streamlining the supply chain.

Strategic initiatives guide the implementation phase. These initiatives must be in harmony with the overarching goals of digital transformation, suggesting new business strategies or digital transformation initiatives. The implementation of the layered digital innovation

framework is executed in stages, monitored and evaluated for impact, allowing for iterative improvements based on performance metrics and ongoing feedback.

Organisation-wide integration is critical for layered digital innovation framework implementation, necessitating clear communication throughout the organisation to ensure each department understands the changes and how they contribute to the digital innovation strategy. A dedicated team or team should oversee this integration, ensuring seamless adoption of new technologies, processes, and cultural shifts.

The layered digital innovation framework highlights the importance of continuous improvement and regular revisitation of strategies to ensure they remain relevant and effective in the ever-changing aviation industry. This approach is central to maintaining an agile and responsive organisation in evolving technological and market landscapes.

Furthermore, creating a roadmap is crucial in applying this framework, enabling the strategic prioritisation of projects and technology investments. This phase involves creating insights and strategic initiatives from the data analysis into a logical plan with clear milestones and timelines. Projects should be assessed for potential impact and feasibility, and a technology focus must be established to support these initiatives. Detailed project planning includes defining scopes, budgets, and resources, with a keen eye on risk assessment and mitigation strategies.

Stakeholder engagement must be merged throughout the implementation of the layered digital innovation framework, with regular updates and feedback mechanisms in place. The layered digital innovation framework should be reviewed and updated periodically, reflecting changes in the operational environment, technological advancements, and evolving customer needs.

In conclusion, implementing the layered digital innovation framework offers a comprehensive blueprint for an airline organisation to navigate the complexities of digital transformation, ensuring sustained competitive advantage and responsiveness to market and technological changes.

8.5 COMPARISON TO OTHER AIRLINES

The digital innovation strategies in the airline industry have evolved significantly, driven by the need to enhance customer service, operational efficiency, and overall competitiveness. This section compares the digital innovation strategy framework developed in this study with those implemented by other airlines, using recent seminal work on similar topics to highlight fundamental differences and similarities.

8.5.1 KEY COMPARISONS

- Digital Marketing Strategies

Current Study: This study introduces a multi-layered digital innovation strategy focusing on dynamic capabilities such as sensing, seizing opportunities, and transforming operations to foster agility and resilience. It emphasises integrating new technologies with existing systems, aligning with business strategies, and creating a customer-centric approach.

Other Studies: Basal and Suzen (2023) highlight the importance of digital marketing in strategic management within aviation, demonstrating a significant relationship between digital marketing methods and strategic management. Similarly, Karaağaoğlu and Çiçek (2019) analyse digital marketing strategies of national and international airlines, emphasising the effective use of digital tools to enhance customer loyalty and competitive advantage (Basal & Suzen, 2023; Karaağaoğlu & Çiçek, 2019).

- Digital Transformation and Distribution Channels

Current Study: The study presents a framework that integrates digital technologies to streamline operations, promote agile project management, and enhance customer-centric product development. This approach aims to align digital transformation with overall business objectives.

Other Studies: Poulaki and Katsoni (2020) discuss the evolution of airline distribution channels through digital transformation, highlighting the benefits of digitalisation in revenue maximization, cost reduction, and customer loyalty. This aligns with the current study's emphasis on operational efficiency and customer experience (Poulaki & Katsoni, 2020).

- Innovative Technologies and Customer Experience

Current Study: The multi-layered strategy model in this study focuses on enhancing customer experiences through the seamless integration of digital technologies, ensuring interoperability, and maintaining a customer-centric approach.

Other Studies: Ahmad et al. (2021) explore the potential role of blockchain technology in the aviation industry, highlighting its benefits in terms of trusted traceability, transparency, and security for data and transactions. This study's focus on innovative technologies and their application in aviation aligns with the current study's approach to integrating advanced technologies to enhance customer experiences and operational efficiency (Ahmad et al., 2021).

- Strategic Planning and Innovation Management

Current Study: The study provides strategic planning frameworks that guide adopting disruptive digital innovations, aligning them with business objectives and market demands to achieve sustained competitive advantage.

Other Studies: Chepkemboi and Paul (2019) examine the impact of disruptive innovations on the performance of selected airlines in Kenya, highlighting the need for strategic adoption of digital platforms, mobile technology, and blockchain to sustain performance. This comparison underscores the importance of strategic planning in managing digital transformation transformation (Chepkemboi & Paul, 2019).

8.5.2 OVERVIEW OF COMPARIONS

The comparison reveals that while the digital innovation framework developed in this study shares common goals with other airlines' strategies, such as enhancing customer experience and operational efficiency, it uniquely emphasises a multi-layered approach integrating dynamic capabilities and strategic planning frameworks. This comprehensive approach ensures alignment with business objectives, fostering agility and resilience in a rapidly evolving digital landscape.

Specifically, the framework's emphasis on dynamic capabilities allows airlines to respond swiftly to market changes and technological advancements, maintaining a competitive edge. By incorporating strategic planning frameworks, the study provides a structured pathway for integrating digital innovations into the broader business strategy, ensuring that technological advancements are adopted and effectively leveraged to achieve long-term goals.

Furthermore, this study's framework prioritises cross-functional collaboration and continuous improvement. The framework supports sustainable growth and adaptation by promoting an organisational culture that values innovation and flexibility. This is particularly crucial in the airline industry, where external factors such as regulatory changes, economic fluctuations, and customer preferences can rapidly shift.

In addition, the framework includes mechanisms for measuring and evaluating the impact of digital initiatives, ensuring that airlines can track their progress and make data-driven decisions. This focus on metrics and performance indicators helps organisations identify areas for improvement and optimise their digital strategies over time.

Overall, the unique multi-layered approach of this framework not only aligns with existing digital innovation strategies in the airline industry and enhances them by integrating dynamic capabilities, strategic planning, and a culture of continuous improvement. This ensures that airlines can navigate the complexities of the digital era with agility and resilience, ultimately driving sustained success and competitive advantage.

8.6 REFLECTIONS

Reflecting on this research study, I find myself contemplating the multifaceted experiences I encountered.

From an operational perspective, my professional role within an airline organisation placed me at the heart of a sector characterised by its rapid pace and reliance on disruptive technology. Observing the industry’s dynamic shifts, I was struck by the crucial role of technology in enhancing operations and reshaping them entirely. My reflection on our operational practices underscored an urgent need for adaptive strategies that could withstand and exploit the industry's volatility. This environment compelled me to advocate for a digital innovation strategy that is not just reactive but rather preventive, leveraging technology to create enduring value.

Scientifically, the study ventured to contribute to the existing body of knowledge, carving out a path for future explorations into implementing digital innovation strategies. The experience was intellectually stimulating, compelling me to analyse and synthesise complex data into a clear framework. I realised the potential of the research study to guide both academic research and practical applications, providing a platform upon which future research could be built. This process affirmed the significance of the research and its potential to influence ongoing scholarly dialogue and practical advancements in digital strategy within the airline industry.

Throughout this research, a significant deficit in the scientific field became apparent: The complexities of operationalising digital innovation strategies within the rapidly evolving airline industry have not been adequately addressed in the existing literature. Therefore, this study aimed to bridge this scholarly divide, crafting an understanding of how such strategies can be developed and implemented effectively. It became increasingly clear that while the need for digital transformation is widely recognised, a methodological approach to embedding these innovations within the complex operational framework of an airline organisation required further exploration. My research study offers a theoretical and practical framework that can serve as a cornerstone for future academic inquiry and strategic development.

This research study highlights a notable dearth of seminal works about the operationalisation of digital innovation strategies within the airline sector, necessitating a deeper academic investigation into the strategic integration of such technologies in the aviation industry.

My journey throughout this study was as challenging as it was rewarding. Delving into extensive datasets, I was compelled to identify opportunities and deficiencies within our organisation—a process that refined my analytical expertise and deepened my understanding of strategic digital transformation. The path was not without obstacles; at times, the sheer volume and complexity of the data were challenging. However, each breakthrough was evidence of the perseverance and critical thinking required in research. The experience was a growth trial, instilling me with a profound appreciation for the thoroughness and dedication that underpin meaningful research. This journey has enhanced my professional expertise and personal development, leaving a lasting impression on my approach to challenges and opportunities.

8.7 LIMITATIONS

While thoroughly analysing digital innovation within the aviation sector, the study encountered limitations that must be acknowledged. First, the research was confined to the aviation industry, which, although allowing for an in-depth analysis, might limit the generalisability of the findings to other sectors. The industry's unique challenges and operational dynamics mean the developed digital innovation framework might not apply directly to other industries without adaptation.

Second, the scarcity of seminal work focusing on the aviation industry, specifically addressing the research topic, presents a limitation. This lack of foundational literature restricts the depth of historical academic dialogue upon which the study can draw and benchmark. It also implies that although the proposed framework might be pioneering in this context, it also navigates uncharted territories without the guidance of extensive prior studies.

These limitations highlight areas where caution should be exercised in applying the study's findings and suggest avenues for future research to expand upon the groundwork laid by this research.

8.8 FUTURE RESEARCH

The limitations identified in this study describe its scope and open avenues for future research that could extend its findings and address its constraints.

The specificity of the aviation industry as the research context provides an opportunity for comparative studies across different sectors. Future research could explore how digital innovation strategies are operationalised in other industries that might face unique challenges and regulatory environments. This could enrich the understanding of industry-specific digital transformation and allow for the creation of more universal frameworks.

The maturity level of airline organisations in digital innovation can be assessed and enhanced through a systematic framework. This framework should evaluate technological infrastructures, organisational culture, and digital capabilities. Implementing a maturity model involves benchmarking current practices against industry standards, identifying deficiencies, and creating a phased approach to advancement. This might include the development of competency centres dedicated to digital innovation and establishing clear milestones for digital capability enhancement.

Despite being a limitation, the reliance on legacy technology in aviation sparks a dialogue on integrating new digital innovations with existing systems. Future studies might examine the processes and impacts of technological transitions, offering insights into how legacy systems could be modernised or phased out in favour of more agile and efficient digital solutions.

Lastly, the highly regulated nature of the aviation industry, which poses a constraint to rapid innovation, also suggests an area for in-depth research. Future work could examine how regulations can evolve with technological advancements, ensuring safety and compliance while fostering innovation. The development of regulatory frameworks conducive to digital innovation could be particularly impactful.

These potential research guidelines address the deficiencies identified and build upon the existing knowledge base, expanding the academic and practical understanding of digital innovation strategies in implementing a layered digital innovation framework within complex, regulated industries.

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APPENDIX A: ONLINE QUESTIONNAIRES

This research study employs three web-based questionnaires to gather comprehensive data from different divisions within the airline organisation. Examining the demographic characteristics of the participants, including employment responsibility, experience, departmental affiliation, and geographic location, is the first step in the analysis process. This comprehensive profiling lays the groundwork for comprehending the variety of perspectives and contexts within the organisation.

Web-based questionnaire 1: Employees of Airline organisation

1.1 Organisation Demographics

The Airline organisation (The case study organisation) have an employee base of >1000 and operates in a hybrid organisational structure (Agile organisational structure and Traditional / Conventional structure) as a Low-cost airline carrier.

1.2 Participant's Work Experience

- ☐ <5 years
- ☐ 5–10 years
- ☐ 11–20 years
- ☐ 21–30 years
- ☐ 31–40 years
- ☐ 41 years and above

1.3 Job Category

- ☐ Director
- ☐ Executive
- ☐ Senior Manager
- ☐ Manager
- ☐ Senior Specialist
- ☐ Specialist
- ☐ Supervisory
- ☐ Senior Administrative
- ☐ Administrative
- ☐ Semi-Skilled

☐ Un-Skilled

1.4 Department participants are employed in

☐ Marketing and Commercial

☐ Finance

☐ Flight Operations

☐ Technical Maintenance

☐ Call Centre

☐ Ticket Sales

☐ IT & Innovation

☐ Human Resources

☐ Compliance

☐ Ground Operations

☐ Other

Digital Innovation Function

2.1 How would you describe/define digital innovation ?

2.2 How are your work functions related to digital innovation ?

2.3 What business value can an airline organisation obtain by implementing a digital innovation strategy?

2.4 Please describe what the benefits of digital innovation are in your opinion.

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. The Airline organisation has a digital innovation strategy					
2. Digital Innovation add business value to the organisation					
3. I have been exposed to digital innovation functions within my organisation					
4. There is a high-cost element linked to digital innovation					
5. I believe the organisation is structured correctly to obtain value from digital innovation					
6. Digital Innovation is a technology function					
7. Digital Innovation is a people and process function					
8. Digital Innovation consists of technology, organisational culture, processes, and data					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. Digital innovation creates increased market share					
2. Digital innovation leads to customer satisfaction					
3. Digital innovation attracts potential new customers					
4. Digital innovation improve customer communication					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. Digital innovation is a once-off strategic implementation					
2. Digital innovation is a continuous implementation/process					
4. The organisation follow an agile approach to obtain digital value					
5. The organisation invests in technology to grow the digital innovation strategy					
6. Speed of implementation across digital platforms is essential in the organisation					
7. Digital innovation implementation follows a customer-centric approach					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. Organisational culture is key to the success of a digital innovation strategy					
2. The lack of IT resources is a threat to the success of digital innovation					
3. Budget constraints towards implementing a digital innovation framework is a tangible risk					
4. Data security is a concern for most visionaries as cybersecurity is complex, dynamic and fast-changing					
5. Agile Transformation is the heart of digitisation					
6. Scaling is essential for any successful digital transformation initiatives					
7. The organisation has a meaningful and actionable problem statement based on users' needs.					

Open-ended question

3.1 Do you wish to add any additional comments or feedback?

Web-Based Questionnaire 3 - Suppliers engaging with Airline organisations specific to digital innovation

1.1 Company size

- ☐ Less than 100 Employees
- ☐ 100–499 Employees
- ☐ 500–999 Employees
- ☐ 1000–10000 Employees
- ☐ More than 10000 Employees

1.2 Organisational Structure

- ☐ Agile
- ☐ Exponential
- ☐ Virtual
- ☐ Digital
- ☐ Traditional/Conventional
- ☐ Other, please specify

1.3 What industry do you operate in?

- ☐ Information technology
- ☐ Aviation

☐ Financial institution

☐ Non-industry specific

☐ Travel and tourism

☐ Other, please specify

1.4 What products and services do you supply?

☐ Software as a Service

☐ Hardware

☐ Hosting and Architecture

☐ Software Security

☐ Retail

☐ Other, please specify

Digital Innovation function

2.1 What elements of digital innovation do you concentrate on within your organisation?

2.2 What products and services do you offer the airline that contribute to its digital innovation strategy?

2.3 Why would you suggest that the case study organisation is a digitally innovative organisation?

2.4 Have your business grown over the last six years due to the airline's digital innovation expansion? Please elaborate.

2.5 What challenges does your organisation face towards implementing a digital innovation Strategy?

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. Mature system integration with downstream applications is key to digital innovation					
2. Data availability and quality form part of a digital innovation strategy					
3. My organisation is agile to adapt to the case study organisation's digital innovation strategy					
4. The case study organisation is agile and adapts to my organisation's operations and procedures					
5. The partnership operates at the required speed to deliver digital innovation products and services					
6. Sufficient resources (people, budget, etc) are available to keep up with digital trends					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. Business value increased within my organisation by partnering with the case study organisation towards digital execution					
2. New business opportunities arise by having a digitally focused strategy					
3. Digital innovation leads towards an increase in market share					
4. Digital partnerships lead to increased skill set, learning and experience					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. My organisation has an agile digital framework					
2. My organisation has the required budget to implement digital innovation					
3. The skill set in my organisation is sufficient to operate in digital innovation					
4. My organisation has the necessary tools to implement and operate digital innovation					
5. Organisational culture allows for an agile digital innovation strategy					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. Data security is a crucial factor we consider as an organisation					
2. Alignment of innovation roadmaps and priorities is efficient					
3. The organisation have a meaningful and actionable problem statement based on the airline's needs.					
4. People, money and time, are barriers to implementing digital innovation					
5. The existence of legacy systems adds complexity to executing digital innovation					
6. Regulation within the aviation industry slows down the digital innovation process					

Open-ended question

3.1 Do you wish to add any additional comments or feedback?

APPENDIX B: SEMI-STRUCTURED INTERVIEWS

A critical component of this exploration involved conducting semi-structured interviews with the executive team of the airline organisation, offering invaluable insights into the practical aspects of implementing digital innovation strategies. The interviews were conducted with 12 members of the executive team (Exco) and aimed to obtain first-hand perspectives from those at the helm of decision-making within the airline. Their views provide a unique lens through which the theoretical frameworks discussed in earlier chapters can be examined and applied in a real-world context. The choice of a semi-structured interview format was deliberate, allowing for flexibility in discussion while ensuring that vital thematic areas pertinent to digital innovation were thoroughly explored.

Interviews were conducted and recorded via Microsoft *Teams*.

The following list of questions was discussed with the Exco team during the semi-structured interviews.

Semi-Structured Interview

Digital Innovation Strategy: A framework for creating business value for an airline organisation.

1. What is your job title?
2. What managerial level best describes your position?
3. How many years of experience do you have working within your organisation?
4. What is your experience and knowledge about technology and innovation within the organisation?
5. Could you please define your understanding of digital innovation ?
6. Who, in your mind, is responsible for the digital innovation strategy in the organisation?
7. Do you think the company have implemented a digital innovation strategy?
8. Why does the organisation need to transform and innovate digitally?
9. What, in your opinion, are challenges or barriers to digital innovation ?
10. How do you know whether the digital transformation is working at your organisation?
11. Which digital technologies/solutions should you invest in?
12. What in your mind are four key components that form part of digital innovation?
13. Do you believe digital innovation and experimentation have a sufficient budget?
14. What is digital adoption?

15. Do you believe your organisation would benefit from an increased focus on digital innovation practices? How so?
16. Do you have any further comments or opinions on the impact of a digital innovation strategy for the organisation?

Web-Based Questionnaire 2 - Customers of the Airline organisation

1.1 Customers Demographic information

- ☐ Age 12–18
- ☐ Age 19–24
- ☐ Age 25–35
- ☐ Age 36–45
- ☐ Age 46–60
- ☐ Age 61 and older

1.2 How often do you travel with an Airline organisation

- ☐ Once a year
- ☐ 2–5 times a year
- ☐ 6–10 times a year
- ☐ 11–20 times per year
- ☐ 21–30 times per year
- ☐ >30 times per year

1.3 What is your main reason for travelling?

- ☐ Leisure
- ☐ Business
- ☐ Leisure and Business
- ☐ Other, please specify

1.4 What channel do you use to book your ticket

- ☐ The case study organisation's website
- ☐ The case study organisation's responsive mobile site
- ☐ The case study organisation's mobile application
- ☐ Online travel agencies
- ☐ The case study organisation's call centre
- ☐ Traditional travel agency
- ☐ Ticket sales desk at the airport

☐ Other, please specify

Digital Innovation function

2.1 In your own words, would you describe the case study organisation as a disruptive digital innovator?

2.2 What digital channels do you use to manage your booking and travel experience?

2.3 What makes an airline a digitally innovative organisation?

2.4 Does utilising the available digital applications and features make your experience more seamless?

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. The airlines' digital channels are easy to use					
2. I feel safe using the digital channels–my information is protected					
3. Efficient communication is available throughout the journey					
4. The airlines' digital channels are stable and consistently available					
5. The airline has a high focus on Self-service via digital channels					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. The booking experience is hassle-free via the digital channels					
2. The digital channels make the travel experience seamless					
3. The digital channels are easy accessibility					
4. The use of digital channels leads to customer loyalty					

	Survey Scale: 1=Strongly Disagree 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree				
Questions	1	2	3	4	5
1. My data is secure and stored according to the regulation					
2. The payment process is smooth and trustworthy					
3. Fraud and cyber security is a threat to using digital innovation					
4. Using digital channels is complex					
5. I do not make use of digital channels to manage my travel experience					

Open-ended question

3.1 Do you wish to add any additional comments or feedback?