Cape Peninsula
University of Technology

THE INFLUENCE OF CULTURAL LAG ON INTEGRATION OF ARTIFICIAL INTELLIGENCE IN A SOFTWARE DEVELOPMENT COMPANY IN THE WESTERN CAPE, SOUTH AFRICA

by

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DECLARATION

I, **Roxi Francke,** declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed:  **Date:** 16 Nov. 25

ABSTRACT

This study explores the influence of cultural lag on the integration of Artificial Intelligence (AI) within a software development company in the Western Cape, South Africa. Grounded in Ogburn's Cultural Lag theory, which posits that material culture (technology, tools, and systems) evolves faster than non-material culture (values, beliefs, and social norms), the study explores how this misalignment influences AI integration. Although AI has the potential to transform industries, its successful integration depends not only on technological readiness but also on the cultural and organisational context within which it is introduced. The body of knowledge reveals that the influence of cultural lag in the software development industry in the Western Cape, South Africa, is scant. Therefore, this study employs a qualitative research approach and uses a single-case study design to explore this phenomenon. Semi-structured interviews were conducted with eight employees across different roles in the company. The data were analysed thematically to identify the material and non-material cultures influencing AI integration and to propose strategies to reduce the potential cultural lag. The findings revealed that the company's material culture reflects a multi-tool AI environment integrating platforms such as ChatGPT, Microsoft Copilot, ClickUp AI, Fireflies.ai, Unity AI, and others. However, infrastructure limitations, operational constraints, subscription costs, and procurement choices hindered the full utilisation of these tools. The non-material cultures influencing AI integration included varying levels of comfort, readiness, and trust; limited leadership communication and training; and a supportive yet unstructured environment that encouraged experimentation. The findings also revealed a perceived capability gap between the company's technological advancements and its readiness to integrate them effectively. A strategy model to reduce cultural lag for AI integration is presented, which proposes three key strategies: leadership communication, structured enablement, and operational improvements. These strategies aim to align material and non-material cultures over time, reducing the cultural lag and enabling smoother and more effective AI integration. Theoretically, this study validates the continued relevance of Ogburn's Cultural Lag theory, developed in 1922, in the modern context of AI. Practically, it contributes a strategy model that can assist software development companies and other industries experiencing similar disparities in understanding and addressing the gap between technological innovation and cultural adaptation. By aligning material innovations with non-material values, beliefs, and practices, companies can achieve more sustainable and effective integration of AI.

Keywords: Artificial Intelligence; integration of Artificial Intelligence; cultural lag; software development; material and non-material culture.

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CHAPTER ONE: OVERVIEW OF THE STUDY

1.1. Introduction

“Technology may change rapidly, but people change slowly” (Norman, 2013:xiv). While Artificial Intelligence (AI) has the potential to transform industries, integrating such technologies often faces resistance due to cultural lag. The phenomenon in which technology changes faster than society is a significant source of social dysfunction (Cruz, 2016:65-75). This consequently results in job losses, disillusionment with new technologies, ineffective technological solutions, and broader implications for the economy and societal acceptance of these technologies (Autor, 2015:3-4; Griesmyer, 2018:1; Spencer, 2021:6-7).

Cultural lag, a concept introduced nearly a century ago by William Ogburn in 1922, describes the gap that forms when material culture (technology and tools, etc.) often changes at a faster pace than non-material culture (values, beliefs, social norms, etc.) (Ogburn, 1922). While previous studies have explored technological changes in industries, they have often failed to consider the complex relationship between technological innovations and the cultural environments in which they are introduced (Lee, 2018; Ciniselli et al., 2024). A significant research gap in our understanding remains regarding how both material and non-material cultures influence the integration of AI within the selected software development company.

This study proposes to address the critical research gap by applying Ogburn’s Cultural Lag theory to the modern context of AI. The study intends to explore the influence of cultural lag on the integration of AI within a software development company in the Western Cape, South Africa, to identify the specific material and non-material cultures that influence AI integration, and strategies to reduce the potential cultural lag, fostering smoother technological transitions and more effective integration of AI in the company. The research findings could inform stakeholders at the selected software development company, including software developers and policymakers, in making informed decisions about AI integration. This may reduce cultural lag not only within this software development company but also across the software development industry and other industries facing similar disparities.

Figure 1.1 illustrates the structure of this chapter. This chapter serves as the introduction to the research, presenting the topic, establishing the context, and outlining the research problem, questions, and objectives.

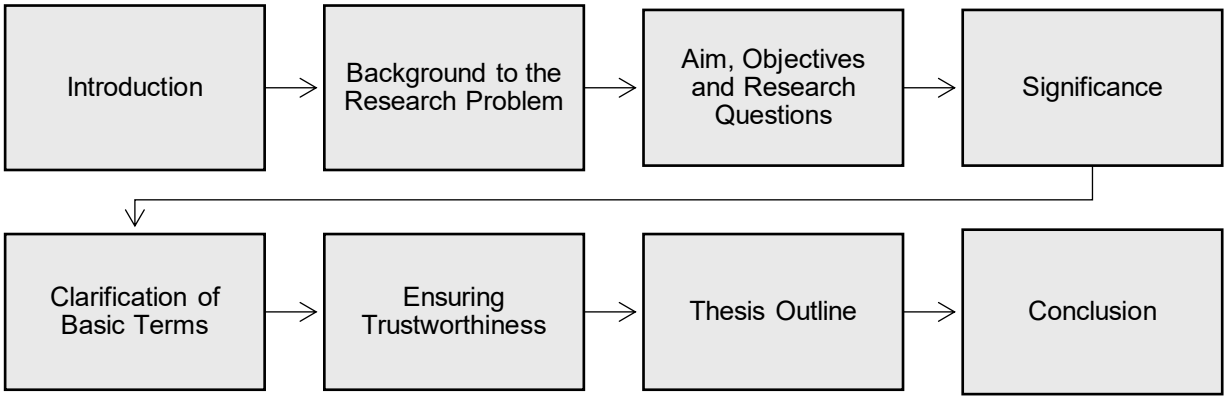

Figure 1.1: Chapter One outline

1.2. Background to the research problem

Ogburn's (1922) Cultural Lag theory states that material culture (technology, tools, etc.) often evolves faster than non-material culture (values, beliefs, social norms, etc.), resulting in a lag or gap between the two and leading to periods of misalignment within society. Based on Ogburn's theory, AI integration in a selected software development company in the Western Cape, South Africa, may face significant challenges due to material and non-material cultures that are not yet fully understood.

This problem arises because the integration of new technologies in industries often requires not just a technological transition, but also cultural adjustments (Ogburn, 1957:171). Technologies designed without considering both material and non-material cultures often fail to gain full integration and can result in cultural lag, potentially leading to dysfunction within society (Ogburn, 1957:171). Bozkuş (2023:14) builds on this idea and suggests that a misalignment between digital transformation (material culture) initiatives and organisational culture (non-material culture) may lead to resistance, disengagement, and, ultimately, the failure of transformation efforts. It is reasonable to infer that AI technologies designed without considering both material and non-material cultures can hinder the effective integration and acceptance of new technologies, influencing social harmony and progress.

The extant literature suggests that the potential problem of cultural lag in AI integration affects various stakeholders. Software developers and IT professionals may struggle to integrate AI effectively, while business leaders and investors may not achieve the expected returns. Academics, researchers, policymakers, and educational institutions may also be impacted as they study and prepare the workforce for technological advancements (Mckee & Bransford, 2023). Additionally, software development companies could face obstacles in fully leveraging AI technologies (Autor, 2015:5,12).

1.2.1. Problem statement

Based on Ogburn's theory, AI integration within a software development company in the Western Cape, South Africa, may face significant challenges due to material and non-material cultures that are not yet fully understood. Ogburn (1922) states that material culture evolves faster than non-material culture when new technologies emerge, creating a cultural lag that misaligns society, hinders AI integration, and causes resistance, potentially leading to failed integration efforts.

If left unaddressed, this misalignment could stall economic growth, weaken global competitiveness, and cause workforce displacement, as workers may not be adequately prepared for new job types (Wheeler, 2014; Autor, 2015:3-4). Griesmyer (2018:1) adds that ignoring this issue could also create disillusionment with new technologies, reducing funding and stalling future innovation. Spencer (2021:6-7) further cautions that this gap could result in ineffective technology that fails to meet society's needs and may even cause harm. This study aims to apply Ogburn's theory to identify the specific material and non-material cultures influencing AI integration and to develop strategies for reducing the potential cultural lag, enabling smoother and more effective AI integration.

1.3. Aim, objectives and research questions

1.3.1. Aim

To explore the influence of the potential cultural lag on the integration of AI within a software development company in the Western Cape, South Africa.

1.3.2. Research objectives

1. To identify the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa.
2. To identify the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa.
3. To identify strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa.

1.3.3. Research question

Main Research Question: How does the potential cultural lag influence the integration of AI within a software development company in the Western Cape, South Africa?

1.3.4. Research sub-questions

1. What are the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?

2. What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?
3. What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?

1.4. Justification of the study

The rationale for conducting this study is to explore the influence of cultural lag on the integration of AI within a software development company in the Western Cape, South Africa. In doing so, this study identifies the material and non-material cultures that influence the integration of AI, along with the strategies to reduce the potential cultural lag.

The body of knowledge reveals that the influence of cultural lag in the software development industry in the Western Cape, South Africa, is scant. As suggested by Creswell (2009:108), the gaps or "shortcomings of the literature" represent "what remains to be explored" in the body of knowledge. This gap, therefore, justifies the need for further research exploring the unique material and non-material cultural factors in a software development company in the Western Cape, South Africa.

1.5. Research methodology

The research is grounded in an interpretivist worldview, employing an inductive approach and qualitative research method rooted in phenomenology. This was chosen to thoroughly explore the lived experiences of individuals interacting with AI in their real-world work environment. Semi-structured interviews were used as the primary data collection method to provide structure and flexibility to uncover rich, detailed insights from participants. These interviews proved well-suited to understanding both the individual and collective experiences, perceptions, and cultural factors that influence AI integration. In addition, Braun and Clarke's (2006) thematic analysis framework, supported by ATLAS.ti™, provided a systematic approach to analysing the qualitative data.

1.6. Significance and contribution

The significance of this study lies in identifying the material and non-material cultures and addressing the resultant cultural lag. The study proposes a strategy model to reduce cultural lag for AI integration, introducing three key strategies, namely, leadership communication, structured enablement, and operational improvements. These strategies aim to align the non-material cultures with the material cultures of the company. In doing so, they reduce the cultural lag and enable the company to integrate AI more smoothly and effectively. In the broader context, the study can contribute to the more effective integration of AI in the software development industry and other industries with similar technological disparities. In addition to this practical contribution, the study also makes a theoretical contribution. This theoretical

contribution is underpinned by Ogburn's Cultural Lag theory and demonstrates the continued relevance of the theory in the modern context of AI.

1.7. Clarification of basic terms

- **Artificial Intelligence (AI):** The technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity, and autonomy.
- **Cultural lag:** A concept introduced by William Ogburn that describes the delay between technological change and society's adaptation, creating a gap between innovation and cultural adjustment.
- **Material culture:** This term refers to the tangible items created or modified by humans, including houses, technologies, tools, machines, manufactured goods, and food products.
- **Non-material culture:** This term refers to the intangible aspects of a society, which include beliefs, art, knowledge, morals, customs, laws, and other skills and habits developed by individuals as members of society.
- **Machine Learning:** The use and development of computer systems that are able to learn and adapt without following explicit instructions, by using algorithms and statistical models to analyse and draw inferences from patterns in data.

1.8. Thesis outline

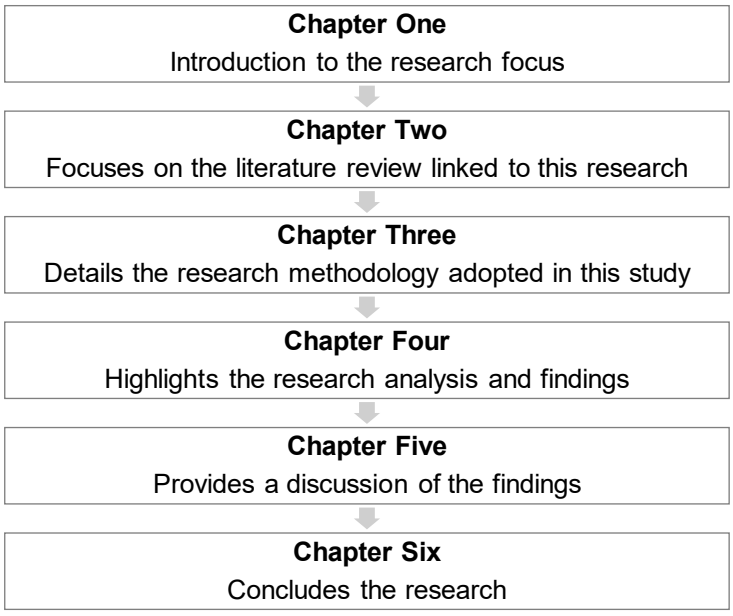

Figure 1.2: Thesis outline

Figure 1.2 outlines the research study. Chapter One provides an overview of the study. Chapter Two, the 'Literature Review', explores the key tenets of the study and establishes the

gap in the body of knowledge. Thereafter, Chapter Three will focus on the research methodology and approach for this study. Chapter Four, 'Data Analysis and Research Findings', will analyse the empirical data and present the findings from the semi-structured interviews conducted with employees working in the selected software development company. Chapter Five, "Discussion and Interpretation", will interpret and discuss the findings from Chapter Four in terms of their meaning, significance, and relationship to the research questions and theoretical lens. The final chapter, 'Conclusion', will address the practical implications of this study's findings and reflect on its significance and contribution.

1.9. Conclusion

This chapter established the need to explore the specific material and non-material cultures influencing AI integration and to develop strategies for reducing the potential cultural lag in a software development company in the Western Cape, South Africa. While AI has the potential to transform industries, integrating such technologies often faces resistance due to a cultural lag that can hinder technological integration. By applying this theory to the modern context of AI, the study aims to benefit stakeholders in the selected software development company by facilitating smoother technological transitions and improving the overall effectiveness of AI integration within the company.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

The background overview of the study, as discussed in Chapter One, indicates that material culture (technology, tools, etc.) often evolves faster than non-material culture (values, beliefs, social norms, etc.), resulting in a lag or gap between the two, and leading to periods of misalignment within society. Technologies designed without considering both material and non-material cultures can hinder the effective integration of new technologies, potentially leading business leaders and investors to not achieve expected returns (McKee & Bransford, 2023). Furthermore, software development companies could face obstacles in fully leveraging AI technologies (Autor, 2015:5,12).

In essence, the study aims to apply Ogburn's Cultural Lag theory to identify the specific material and non-material cultures influencing AI integration and to develop strategies for reducing the potential cultural lag, enabling smoother and more effective AI integration. The purpose of this literature review is to establish an integrated platform for the key tenets of the research. Creswell (2009) states that the literature review serves multiple functions. It assesses the value of the topic for further investigation, informs the researcher about findings from relevant studies, and connects the research to broader conversations within the literature, addressing gaps and expanding upon previous work.

The literature review will provide an understanding of the existing body of literature and will follow the structure illustrated in Figure 2.1.

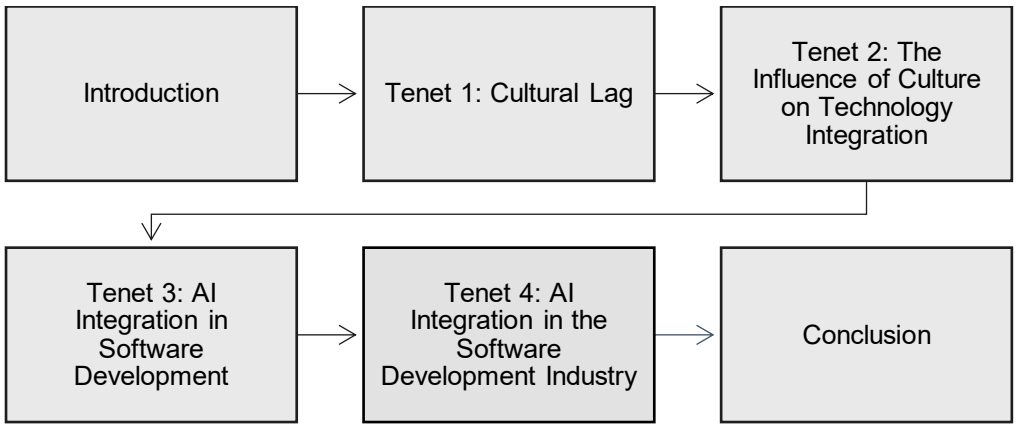

Figure 2.1: Chapter Two outline

In light of this, the literature review provides a foundation built on four tenets, as illustrated in Figure 2.2, that emanate from the study's title, "The Influence of Cultural Lag on Integration of Artificial Intelligence in a Software Development Company in the Western Cape, South Africa". At the end of this chapter, the study seeks to present a holistic understanding of the four tenets.

The central idea is to present a model that illustrates the potential cultural lag within the selected software development company. This model could show how material culture evolves significantly faster than non-material culture. Certain discrete understandings of the four tenets will be developed, and together they will provide a theoretical foundation for the research based on Ogburn's Cultural Lag theory. In this chapter, the information technology and social science literature is reviewed to inform the four tenets. Each of these four tenets is explored individually to understand current perspectives, and a proposition is made for how they come together at a theoretical level.

For clarity and ease of understanding, the researcher briefly outlined the tenets to guide the study within the context of academic discourse. As shown diagrammatically in Figure 2.2, the figure includes all tenets, starting with tenet 1, which is the 'Cultural Lag'. It establishes the theoretical lens of the study, defining and introducing Ogburn's theory, and distinguishing between material and non-material culture. It further explains how these two misaligned aspects cause lag and helps explain why society might struggle to keep pace with rapid technological changes associated with AI. Tenet 2, 'The Influence of Culture on Technology Integration', uses Hofstede's Cultural Dimensions theory to compare cultures and understand how cultural dimensions influence the integration of technology in societies. Tenet 3, 'AI integration in Software Development', explores the practical application of AI within software development processes, highlighting advantages that include enhanced productivity and efficiency, software quality, alongside challenges including heavy data dependency, a shortage of skilled professionals, issues with trust and transparency, and perceived threats to job security. Finally, tenet 4, 'AI integration in the Software Development Industry', shifts the focus to the business level, demonstrating the importance of AI integration in the industry, which helps companies gain a competitive advantage, improve cost-effectiveness, and leverage AI-powered technologies to drive revenue growth. It also discusses enabling factors that help explain why some companies are at the forefront of AI integration, while others trail behind.

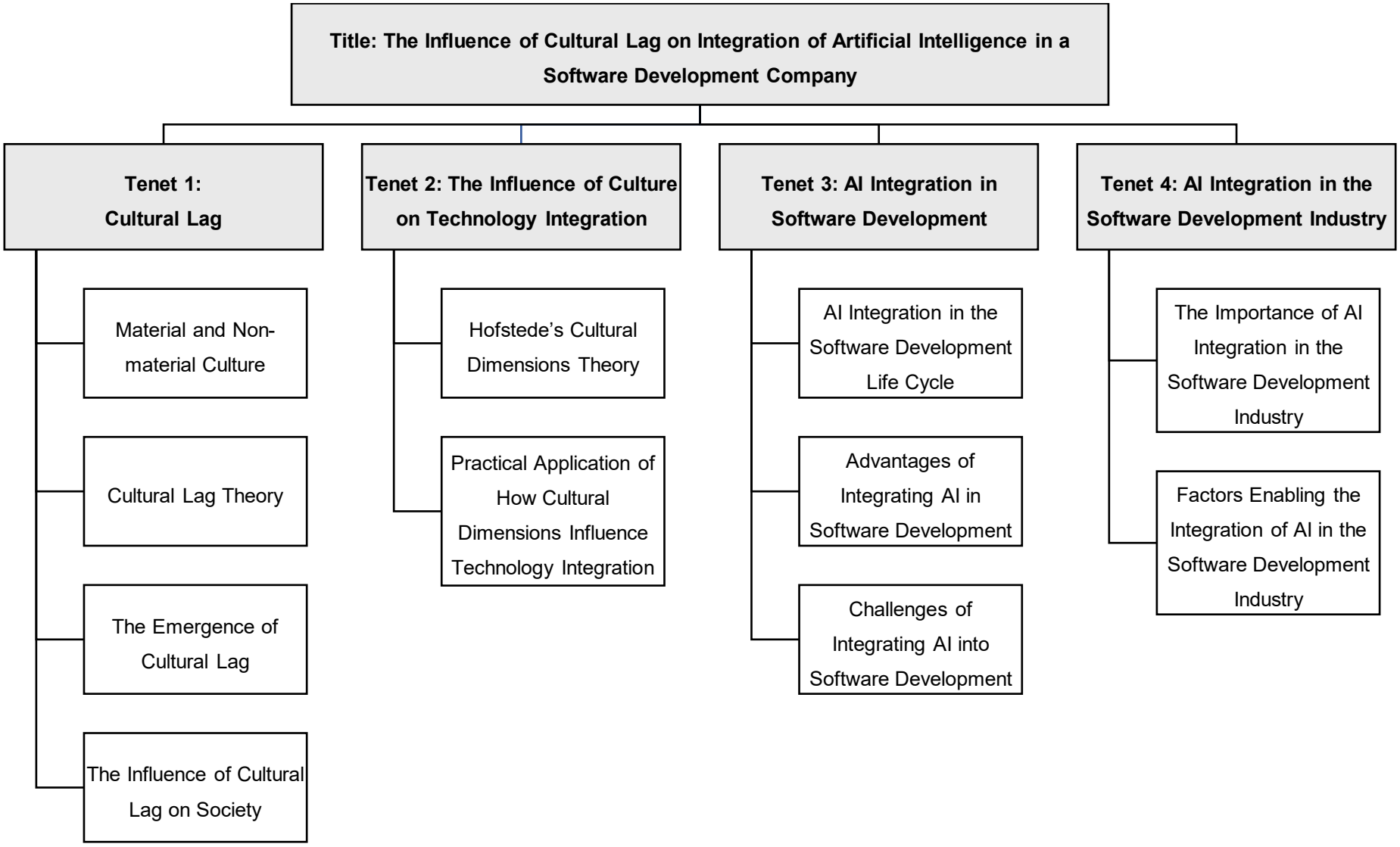

Figure 2.2: Outline of the literature review (researcher's construct)

2.2. Tenet 1: Cultural lag

This study now focuses on the first tenet, which introduces Ogburn's Cultural Lag theory, as illustrated in Figure 2.3.

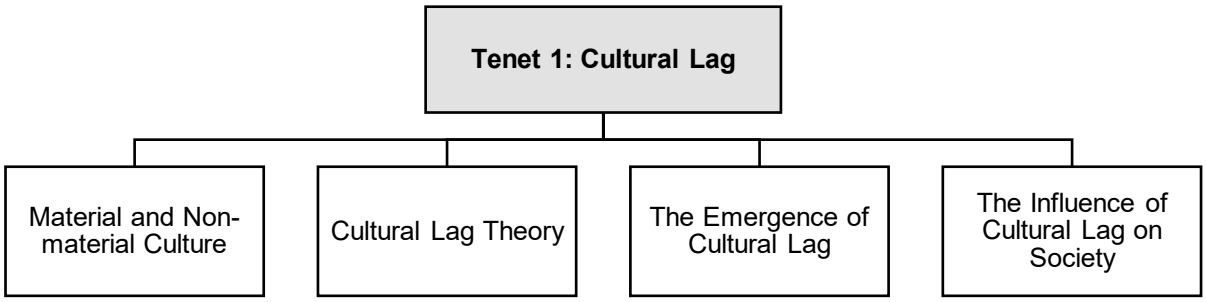

Figure 2.3: Literature review of Tenet 1

2.2.1. Material and non-material culture

Ogburn (1922:4) defines culture as encompassing both material and non-material aspects. The author describes material culture as the tangible items created or modified by humans, such as houses, technologies, tools, machines, manufactured goods, and food products (Ogburn, 1922:202).

In contrast, non-material culture includes beliefs, art, knowledge, morals, customs, laws, and other skills and habits developed by individuals as members of society (Ogburn, 1922:4). The author argues that earlier definitions of culture fail to emphasise the importance of material objects, presenting a view that separates these items. Ogburn (1922:4) argues that material objects are essential to any culture, emphasising the term 'material culture' and asserting that culture should include both material and non-material aspects (Ogburn, 1922:4).

2.2.2. Cultural Lag theory

In 1922, William Ogburn introduced the concept of cultural lag. Ogburn (1922) argued that modern culture develops in two aspects: material culture (technology, tools, inventions, etc.) and non-material culture (values, beliefs, ethics, social norms, etc.). The author observed that these two aspects do not evolve at the same pace, with material culture typically advancing more quickly than non-material culture. Ogburn (1922:274) reasons that this is because material culture diffuses more easily within society. People tend to adopt tangible objects, such as food, shelter, and transportation, into their daily routines more easily than non-material aspects, like languages and beliefs, which are "less readily changed" (Ogburn, 1922:274). Figure **2.4** is the original 1922 representation of this disparity, referred to as 'cultural lag', which highlights the temporary misalignment between these cultural aspects and the challenge

societies face in aligning their behaviours with technological innovation (Ogburn, 1922:199; Schneider, 1945:786).

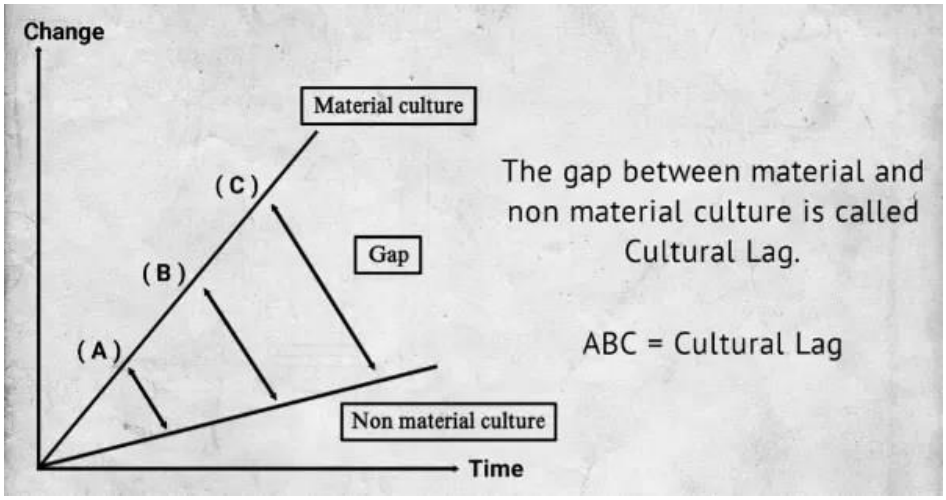

Figure 2.4: Cultural Lag (Ogburn, 1922)

2.2.3. The emergence of cultural lag

This section of Tenet 1 draws on contributions of knowledge from various articles and related academic resources, focusing on the emergence of cultural lag.

2.2.3.1. Cultural lag in the 20th century

Brinkman and Brinkman (1997:616) provide an example of cultural lag within the manufacturing industry, where progress in industrial machinery and factories (material culture) outpaced common-law negligence (non-material culture). According to the authors, in the pre-industrial period, tools were basic, and in the event of an accident, workers could seek compensation through the “common law of negligence”. However, Brinkman and Brinkman (1997:616) state that with the advent of the machine age, the growth of the factory system, and the consequent rise in accidents, the common law of negligence would no longer suffice. Therefore, there was a period of maladjustment or lag until the workmen’s compensation laws came into effect. As a result, a period of cultural lag followed, which the authors note was eventually addressed by implementing strategies such as dedicated workers’ compensation laws for industrial accidents, thereby closing the gap that previously left injured workers without protection.

Goldin (1988:5) offers another example from the mid-1950s, illustrating a notable rise in married women’s workforce participation (material culture) alongside the persistent belief that women should stay at home (non-material culture). Brinkman and Brinkman (1997:617) contend that increasing mothers’ participation in the workforce is one of the most significant and potentially “socially wrenching changes”, challenging traditional beliefs. Brinkman and

Brinkman (1997:617) outline various factors that contributed to this change, including enhanced access to education, the need to restore the economy to full employment after World War II, and the expansion of the secretarial industry. These elements collectively led to the erosion of traditional beliefs that had previously limited job opportunities for married women. Goldin (1988:5) observed that cultural lag was addressed by employers changing their social attitudes towards female employees. For example, older female workers were suddenly praised for their "maturity, reliability, neat appearance, and less chatty nature" (Goldin, 1988:25). Additionally, in retail trade, the older married woman with no prior training became the ideal employee. This was followed by the pregnancy bar, where the best female employee was "a married woman with a mortgage and children partially raised" (Goldin, 1988:26).

2.2.3.2. Cultural lag in the 21st century

In the 21st century, the literature reveals that scholars continue to adopt the cultural lag theory, demonstrating its ongoing relevance and emphasising how society strives to keep pace with constant social changes.

McMahon (2013) explores the concept of cultural lag in the adoption of electronic textbooks in university classrooms. The author demonstrates that e-textbook technology (material culture) has advanced much faster than student study practices, faculty teaching methods, institutional support, and research into learning outcomes (non-material cultures). McMahon (2013:43) highlights a significant push toward e-textbooks. The author states that the Department of Education is promoting e-textbook delivery in K-12 schools, citing the significant rise in textbook costs and the belief that electronic delivery is more cost-effective. Additionally, publishers worldwide are promoting the shift to digital textbooks and related technology to increase their share of the higher education market (McMahon, 2013:5).

However, McMahon (2013:2) reports that advancements in technology and the rise of new methods for accessing educational information sparked controversy and unease among the recipients. This includes social issues and discomfort, as students face challenges with navigation, eye strain, and restricted collaboration in the classroom (McMahon, 2013:52). The author highlights that this gap was addressed through strategies such as empowering educators to choose technology consciously, rather than simply following market-led rollouts without proper understanding. An additional strategy involved improving hardware, such as better screens, faster wireless connections, and more intuitive platforms, with the aim of reducing student discomfort.

Most recently, Prasetyo et al. (2022) explored cultural lag during Indonesia's 2020 regional elections, highlighting a significant transition to online campaigning. According to the authors, the COVID-19 pandemic accelerated the use of digital media as the primary form of interaction

and communication. The authors observe that, despite the growing role of digital media in everyday life, both political candidates and the public were unprepared for this digital transformation. This concept is illustrated in Figure 2.5, which depicts the presence of cultural lag. The community's values, attitudes, behaviours, and actions during the political campaign (non-material culture) failed to adjust to the rapid technological advancements and digital campaigning (material culture), causing confusion and reducing the effectiveness of digital communication technology during the campaign process. Prasetyo et al. (2022:7) propose several interventions to address the cultural lag. Firstly, the infrastructure for information and communication technology has not been equally developed across all areas. Secondly, the digital literacy of candidates, supporters, and the public remains low. Thirdly, there is still a widespread public perception that campaigning is simply equivalent to meeting activities involving large crowds. These strategies aim to address the gap between digital campaigning and societal adaptation, thereby reducing the cultural lag in modern digital campaigns during elections.

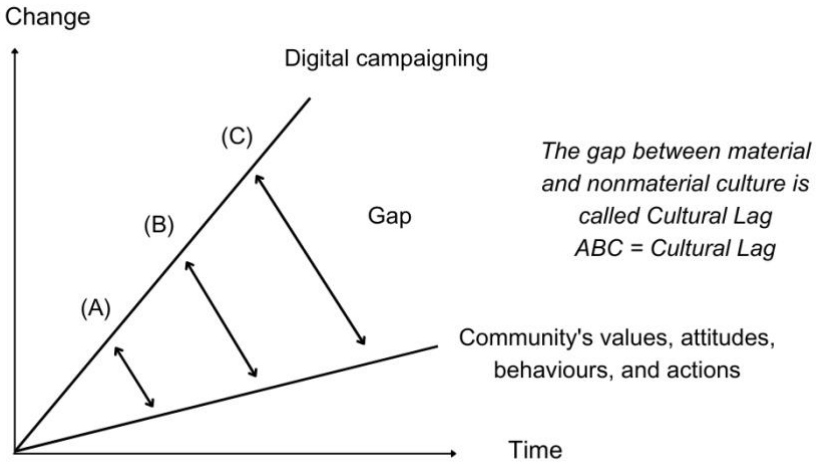

Figure 2.5: Cultural Lag in digital campaigns during 2020 regional elections (researcher's construct)

2.2.4. The influence of cultural lag on society

This section of the tenet explores the practical influences of cultural lag and the issues it creates, including adjustment issues, resistance to change, and a mismatch between the rapid development of technology and the users' readiness to integrate it.

An example of the influence of cultural lag on society is reflected in what Ogburn (1957) calls *adjustment issues*, which are the difficulties individuals face in adapting to rapid technological advancements. As depicted in Figure 2.6, Ogburn (1957:167) notes that around the year 1910, automobiles were slow enough to navigate narrow, winding country roads without much trouble. But as time went on, the automobile underwent many changes, especially in the engine, which developed faster speeds and brakes which could stop the car quickly. However,

the narrow roads with sharp bends did not change as quickly as the automobile. On these roads, the driver had to slow down or risk accidents (Ogburn, 1957:167). This delayed the full use of the technology and hindered the expected benefits until wider roads with gentle curves were constructed to accommodate the automobile's increased speed. This example illustrates that the expected advantages of integrating technology into the environment may be delayed or distorted (Leonard-Barton, 1988:257, 263).

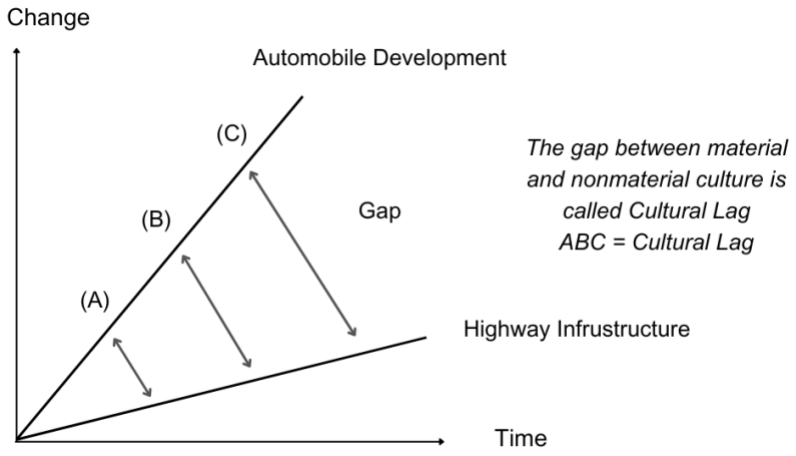

Figure 2.6: The misalignment between automobile development and the slower adaptation of highway infrastructures over time (researcher's construct)

An additional influence of cultural lag is what Ogburn (1957:171) identifies as resistance to change. Laumer and Eckhardt (2011) note that resistance to adopting new technologies is common. Both individuals and companies often resist new technologies due to perceived threats, a lack of understanding, cognitive biases, a preference for the status quo, and concerns about changes in power dynamics (Laumer & Eckhardt, 2011; Khandii, 2019:4; McKee & Bransford, 2023). Additionally, Bateh et al. (2013) point out that these factors may also include the lack of experience or motivation to recognise the urgency of change, fears of the unknown, anxiety about job security, and an unwillingness or lack of readiness to learn and develop new skills. Ogburn (1922) provides a practical example, illustrating that despite innovations, such as enhanced safety measures like workers' compensation and machinery safeguards, workers and managers often resist and still cling to older routines "despite the fact that new customs are superior" (Ogburn, 1922). The author asserts that this attachment stems from habits, nostalgia, and the mistaken belief in the value of outdated practices, which hinders the integration of innovations in the industry.

Another influence of cultural lag is the *mismatch between the rapid development of technology and the users' readiness to adopt it*. Blut and Wang (2020:649) explain that even when technology is widely available, its use by customers is not guaranteed, because access alone does not ensure adoption. Beitinger (2020) and Blut and Wang (2020:649) note that

technology is often released faster than people can learn to use it effectively, and simply introducing new tools or systems does not mean that users are prepared to integrate them into their work or daily lives. According to Blut and Wang (2020:654), one of the biggest barriers to readiness is discomfort; when individuals feel they lack control over a technology and find it unpleasant and overwhelming, they tend to avoid it and are less willing to use it (Blut & Wang, 2020:654).

Similarly, those who are sceptical of technology, due to distrust, are less likely to invest the effort to learn it and more likely to find it difficult to apply (Blut & Wang, 2020:655). According to Beitinger (2020), a technology's effectiveness depends heavily on the knowledge and skills of the people who use, adapt, and improve it. Successfully managing rapid technological change requires providing the right tools and ensuring that people's skills match the demands of the new systems. As Beitinger (2020) concludes, the "social embeddedness of technologies", which refers to their fit within and support from the surrounding social and cultural environment, is just as important as the technology itself.

2.3. Tenet 2: The influence of culture on technology integration

Having explored the first tenet of this study, which focuses on Ogburn's Cultural Lag theory, the literature review now turns to the second tenet as depicted in Figure 2.7.

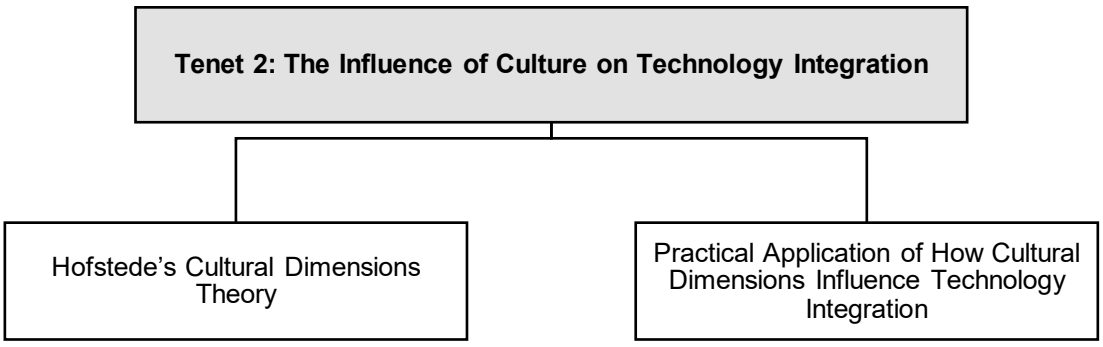

Figure 2.7: Literature review of Tenet 2

2.3.1. Hofstede's Cultural Dimensions theory

Hofstede's Cultural Dimensions theory helps to compare cultures and understand how cultural dimensions influence the integration of technology in societies (Hofstede, 2011; Lee et al., 2013). The theory identifies six dimensions: Power Distance, Uncertainty Avoidance, Individualism versus Collectivism, Masculinity versus Femininity, Long-Term Orientation versus Short-Term Orientation, and Indulgence versus Restraint. Each of these dimensions can influence how societies perceive, integrate, or resist new technologies, and will be explored below based on their potential to either promote or hinder technology integration.

2.3.2. Power distance

Hofstede (2011:9) defines power distance as the degree to which less powerful individuals accept and anticipate an unequal distribution of power. Żemojtel-Piotrowska and Piotrowski (2023:2) suggest that when a society has a larger power distance, there is a greater tendency to accept social and economic inequalities, perceiving the social hierarchy as natural and justified. Meanwhile, a lower power distance indicates that people are motivated to challenge inequalities and seek justification for any unequal distribution of power. The authors further state that individuals living in societies with large power distance are reluctant to voice opinions against their leaders, believing that those at the top of the power hierarchy make autocratic decisions. The authors agree with Hofstede (2011:9), who states that larger power distance is associated with unequal income distribution in society, autocratic governments where elders are respected and feared, and a connection to societies that are violent, gerontocratic, and corrupt. Hofstede (1986:307) emphasises that inequality exists in all cultures, but tolerances vary. The author notes that all societies are unequal, with some being more unequal than others.

In the context of technology integration, Matusitz and Musambira (2013:46) note that individuals from large power distance societies tend to conform more and be less independent, making them more controllable. Therefore, societies with high power distance are cautious about integrating technology, as authorities see it as a threat that could challenge their control over the population. Gallego-Álvarez and Pucheta-Martínez (2019:197) observe that companies in countries with a larger power distance also tend to invest significantly more in R&D compared to those in countries with lower power distance, which has a positive influence on innovation. However, Matusitz and Musambira (2013:46) note that the benefits of such innovation are often unevenly distributed, with access prioritised for the elite. This creates a digital divide, leaving much of the population without technological resources and limiting the overall integration and societal impact of new technologies. So, while innovation exists, it is constrained by unequal access.

2.3.3. Uncertainty avoidance

Griffith et al. (2000:305) describe uncertainty avoidance as an individual's cultural response to the unpredictability of the future. Specifically, Hofstede (1986:208) defines it as a characteristic of a culture that indicates how much people within that culture feel anxious about situations they see as unstructured, unclear, or unpredictable.

In cultures with high uncertainty avoidance, life's unpredictability is perceived as a continual threat that must be addressed (Hofstede, 2011:10). In response, the author suggests that this leads to a strong desire for clarity and order, accompanied by a low tolerance for unconventional people and ideas. Żemojtel-Piotrowska and Piotrowski (2023:3) add that high

uncertainty avoidance results in a society with strict behavioural rules, laws, and acceptance of dogmatism, the belief that something is unquestionably true without considering evidence or other opinions. In contrast, Griffith et al. (2000:305) point out that cultures with weak uncertainty avoidance welcome life's uncertainties, as the author states that these cultures "accept higher levels of risk and therefore do not attempt to control uncertainty, but rather, individuals are socialised to accept it". Individuals in these cultures are more comfortable with ambiguity and chaos, fostering a broader range of opinions and innovative ideas.

In the context of technology integration, Lee et al. (2013:24) note that cultures with weak uncertainty avoidance tend to be more agile, more willing to experiment with new technologies, and more accepting of untested systems. In contrast, Gallego-Álvarez and Pucheta-Martínez (2019:198) state that societies with high uncertainty avoidance tend to enforce more rules and regulations on their members and are generally less receptive to change and innovation. Lee et al. (2013:24) continue and state that these cultures focus on controlling future events to reduce uncertainty and risk. They tend to delay adopting new technologies until the risk is lessened and are generally more hesitant and slower to embrace innovations, driven by a fear of failure, a preference for routine, and strong risk aversion.

2.3.3.1. Individualism versus collectivism

Hofstede (2011:10) defines individualism as the relationship between an individual and others, emphasising how much the individual prioritises their own needs over those of the group. Żemojtel-Piotrowska and Piotrowski (2023:2) agree and further explain that individualists see themselves as independent and define themselves in terms of 'I'. Hofstede (2011:10) adds that in individualistic cultures, connections between people tend to be weak, with an emphasis on self-reliance. The author notes that other characteristics of individualistic cultures include the right to free expression, the right to privacy, and prioritising tasks over relationships. Griffith et al. (2000:305) indicate that these cultures, found in Canada, the United States, and much of Western Europe, tend to focus on their personal interests and goals, or those of their immediate social groups.

In the context of technology integration, Gallego-Álvarez and Pucheta-Martínez (2019:197) note that in individualistic cultures, people have more freedom to develop or experiment with new technologies than in collectivist cultures, and as a result, patents for new technologies are granted more frequently. Zhang and Maruping (2008) also add that these cultures are more independent when it comes to making decisions and are more likely to assess the usefulness of technology on their own, without consulting others. Lee et al. (2013:27) add that these individuals also tend to seek information from direct and formal sources independently. This could include using electronic books, e-learning materials, online courses, sharing learning information on social networks, and producing shared documents with others (Lebeničnik et

al., 2015:105). Conversely, Hofstede (1986:307) defines collectivist nations as those where the interests of the group take precedence over those of the individual. Griffith et al. (2000:305) add that a collectivist culture is characterised by strong social and intimate relationships among its members.

In the context of technology integration, Żemojtel-Piotrowska and Piotrowski (2023:2) highlight that, in collectivist cultures, technology mainly influences team harmony and social fairness, leading to strategies focused on maintaining group cohesion. Lee et al. (2013:27) note that individuals in these societies rely more on the opinions of "early adopters" and "like-minded users" who have already integrated the technology. Consequently, as Zhang and Maruping (2008) indicate, when exposed to differing views on a technology's usefulness, these consumers may place greater trust in others' perspectives than their own decision-making.

2.3.3.2. Masculinity versus femininity

Hofstede (2011:8,12) defines the cultural dimension masculinity versus its opposite, femininity, as the division of emotional roles between men and women. Żemojtel-Piotrowska and Piotrowski (2023:3) refer to it as "the most conceptually problematic dimension" because it merges two distinct ideas into one label: the differences in men's and women's roles within society and what a society values most.

Hofstede and Minkov (2010:140) describe a society as masculine when emotional gender roles are clearly defined, characterising men as confident, strong, and motivated by material success, where work takes precedence over family. In contrast, a society is deemed feminine when gender roles are less defined and tend to overlap. Żemojtel-Piotrowska and Piotrowski (2023:3) note that such societies feature men and women who are more similar, with both valuing modesty and social care. Lee et al. (2013:21) explain that individuals with feminine values tend to prioritise creating a friendly environment, nurturing, modesty, improving quality of life, and developing warm personal relationships. Considering these characteristic differences and regarding technology integration, Gallego-Álvarez and Pucheta-Martínez (2019:198) suggest that individuals in a masculine society tend to be self-assured, positive, and proactive in facing challenges, which makes them more likely to integrate technology. Similarly, Zhang and Maruping (2008) propose that consumers with high masculinity are more inclined to focus on the valuable aspects of technology when making integration decisions, compared to those with high femininity.

2.3.3.3. Long-term versus short-term orientation

Hofstede (2011:8,12) defines long-term versus short-term orientation as a society's time horizon, the focus of individuals' efforts, and its prioritisation of future rewards or delayed

gratification. Similarly, Lee (2013:21) defines it as the degree to which a society does or does not embrace long-term devotion to traditional values.

Żemojtel-Piotrowska and Piotrowski (2023:3) describe a society with a short-term orientation as one that prioritises past and present events over the future, values tradition, consumption, and generosity, and displays strong national pride. In contrast, Hofstede (2011:13) characterises a long-term-oriented society as one that believes the most important life events are anticipated to occur in the future. Individuals are expected to adapt to their circumstances and believe that concepts of good and evil are relative to the circumstances. In these societies, traditions are not sacred but adaptable to changing circumstances, allowing societies to evolve over time. Hofstede (2011:13) also adds that “thrift” and perseverance are important goals, and individuals attribute success to effort and failure to a lack of effort. The author believes that this forward-thinking mindset supports the fast economic growth of countries “up till a level of prosperity”.

In the context of technology integration, Lee et al. (2013:24) observe that a long-term orientation promotes imitation within society and influences how technology spreads through individuals copying one another. In societies with a high long-term orientation, as described by Hofstede (2011:13), traditions and commitments may hinder change; however, once change is socially accepted, its integration accelerates rapidly. Therefore, cultures with a high long-term orientation typically show less innovation but more imitation when it comes to diffusion. This means that most individuals wait until a few trusted users try the tool first, and once these users demonstrate its effectiveness, others quickly follow suit. Zhang and Maruping (2008:410) add that individuals with a long-term orientation also have a preference for future planning and saving costs. These individuals are interested not only in current information about new technology but also in its future prospects. The authors mention that if they perceive the technology’s life cycle to be short, the price to be high, or expect the price to decrease later, their willingness to buy the new technology diminishes considerably.

2.3.3.4. Indulgence versus restraint

An additional dimension includes indulgence versus restraint. According to Hofstede and Minkov (2010:281), indulgence is described as a tendency to allow unrestricted gratification of basic human desires linked to enjoying life and having fun. On the other hand, restraint describes a belief that such gratification should be constrained and governed by stringent social norms.

Hofstede (2011:16) highlights the main differences between indulgent and restrained societies, stating that in indulgent societies, a higher percentage of people declare themselves very happy, perceive a sense of personal control over their lives, view freedom of speech as

important, and place greater importance on leisure. Conversely, the author states that individuals in restrained societies report feeling less happy and often experience a sense of helplessness, believing that what happens to them is beyond their control. They place less emphasis on personal liberties, and freedom of speech is less of a priority, with leisure also being of lower importance. Considering this and regarding technology integration, Gallego-Álvarez and Pucheta-Martínez (2019:200) explain that indulgent societies, which allow the gratification of basic impulses that enable individuals to enjoy leisure, pleasure, and fun, tend to invest more in technological innovation than restrained societies.

2.3.4. Practical application of how cultural dimensions influence technology integration

When exploring the intersection of culture and technology integration, it is important to consider how cultural dimensions influence technology integration in practice.

Power et al. (2010) explore the influence of cultural dimensions, such as individualism and collectivism, on technology integration in Asian and Western countries. The authors claim that collectivism, as a cultural dimension, links to more social connections and a strong desire for relationships, which is particularly evident in Asian countries. Power et al. (2010:209) argue that innovation in these cultures prioritises the development of infrastructure such as human capability building, team-based management methods, and continuous improvement programmes. Power et al. (2010:209) also add that the investment in structural resources in Asian emerging economies is expected to be significantly higher than that in Western industrialised economies. In contrast, Western cultures, characterised by Individualism, self-reliance, and a tendency to make their own choices, may find it challenging to achieve team-based, infrastructure-focused objectives, as company leaders in this culture do not recognise the value of such methods and management styles.

According to the authors, when a society exists where individuals prioritise their personal goals and self-interest over community interests, it can result in “low levels of communication” and a disconnect between individual and group goals. This ultimately diminishes the likelihood of companies investing in improvements through team-based management methods (Power et al., 2010:209). Power et al. (2010:209) also point out that Western companies with an individualistic approach are more likely to invest in structural resources, including policies and regulations for operation and decision-making, rather than in infrastructure resources, such as physical and technological aspects, including buildings and equipment.

2.4. Tenet 3: AI integration in software development

After exploring the influence of culture on technology integration, Tenet 3 will now explore how AI is used in software development, as illustrated in Figure 2.8.

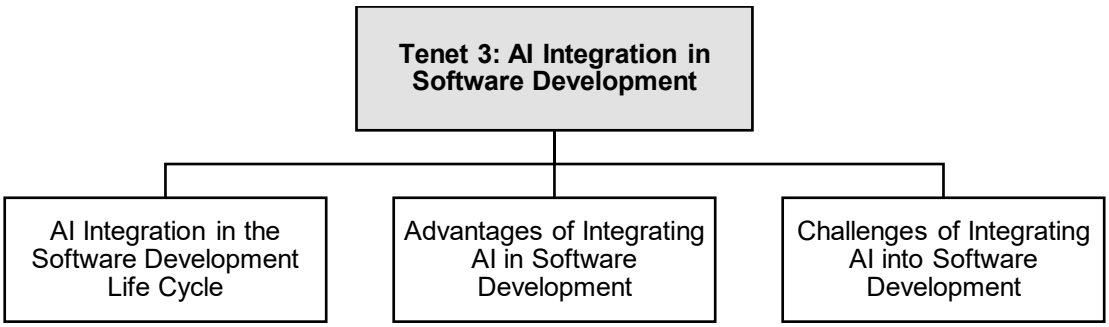

Figure 2.8: Literature review of Tenet 3

2.4.1. AI integration in the software development life cycle

The Software Development Life Cycle (SDLC) serves as a framework for structuring, planning, and completing tasks to assist developers and project team members in developing systems that meet user and technical requirements, while providing quality software (Lemke, 2018:3). Imam (2024:3) states that the core components of the SDLC are planning, design, development, testing, and deployment, and that various process models are derived from these building blocks.

Arshad et al. (2025:74062) observe that SDLC models are beginning to integrate AI features into every stage to automate operations, accelerate development, and enhance productivity and the overall development process.

Figure 2.9 outlines the various stages of the SDLC, including *requirements gathering and analysis, planning documentation, software design, software development, testing, deployment,* and *maintenance*, and illustrates how each stage benefits from AI integration.

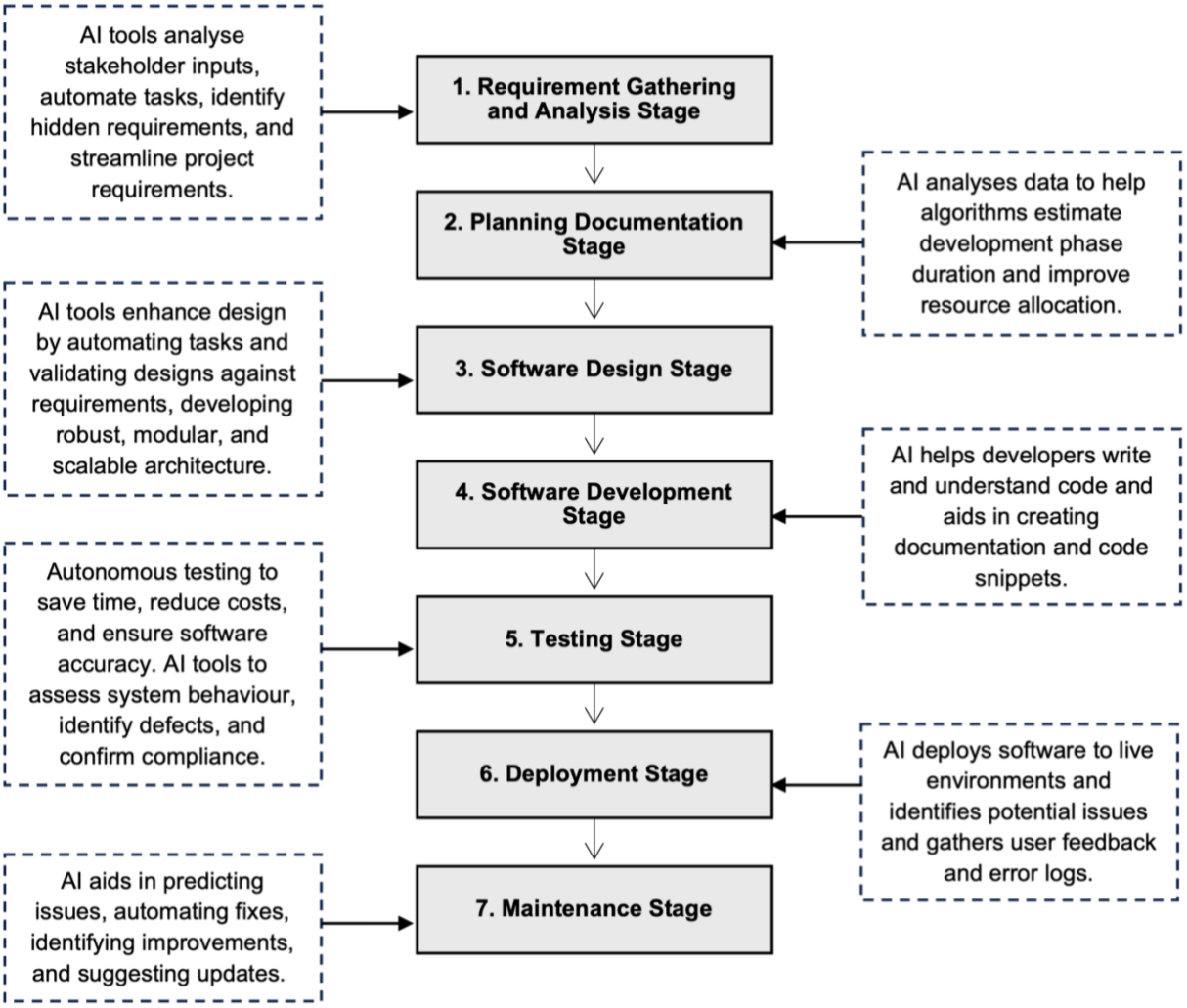

Figure 2.9: Integrated AI features in all stages of the software development life cycle (researcher's construct)

2.4.1.1. Requirement gathering and analysis

The first stage of the SDLC involves gathering and documenting user requirements from stakeholders and determining what the software needs to achieve. This process involves collecting detailed information about system inputs, user interfaces, and the operational processes that define the system's functionality. The goal is to establish a clear project scope and develop precise specifications (Lemke, 2018:6). Similarly, Trinh et al. (2024:1) describe this stage as requirements elicitation, which involves discovering all the necessary functional and non-functional requirements from stakeholders that the system must be able to fulfil.

In this stage, AI can significantly enhance efficiency and accuracy. Trinh et al. (2024:5) explain that Machine Learning (ML) can analyse subjective software requirements specification documents and automatically extract relevant requirements, thereby reducing the time developers spend manually reviewing them. Arshad et al. (2025:74066) highlight that this capability helps clarify what the project should achieve and the methods to do so, improving

both accuracy and efficiency. Similarly, Imam (2024:27) proposes supervised ML algorithms such as K-nearest neighbour (KNN) and Support Vector Machine (SVM). The ML algorithm KNN was used to develop a stakeholder recommender model to predict and prioritise requirements, while the SVM was employed to classify functional and non-functional requirements (Imam, 2024:27). The author explains that these AI-powered approaches automate elicitation, classification, and prioritisation, reducing manual effort while improving precision during the requirements gathering and analysis stage.

2.4.1.2. Planning documentation stage

The second stage focuses on defining the project scope and outlining the product's functionality. This involves establishing timelines, allocating resources, and creating a roadmap for the development process (Imam, 2024:4). The primary aim at this point is to provide a clear framework that guides subsequent development activities while ensuring alignment with stakeholder expectations and overall project objectives.

At this stage, AI can play a critical role in enhancing precision and efficiency. Imam (2024:44) notes that AI can help prevent scope creep beyond the original requirements, keeping the project focused and reducing unnecessary work. Soni et al. (2023:2) add that AI can optimise resource allocation by leveraging historical project data, team performance metrics, and resource availability to distribute resources. This helps improve the overall project efficiency as tasks are allocated with the necessary skills and resources. Furthermore, Soni et al. (2023:3) also explain that AI ensures practical and achievable project schedules, as AI algorithms have the ability to forecast the duration required for each stage of development. Imam (2024:44) further highlights that AI-powered tools can support feasibility studies and risk assessments, streamlining planning documentation, reducing project risks early, and producing more reliable timelines.

2.4.1.3. Software design stage

The software design stage focuses on transforming the collected requirements into a structured design document that guides implementation (Lemke, 2018:6). Imam (2024:6) emphasises that outlining the system's technical details and structure is essential, as these specifications form the foundation upon which developers build the system. In practice, system design can be explored across three key areas: user interface design, software design, and software architecture. Each of these areas ensures that the system's components, interactions, and overall structure align with the intended functionality and user needs.

According to Arshad et al. (2025:74067), AI tools can improve the software design process by automating repetitive tasks, simulating scenarios, and verifying designs against previously defined requirements, ensuring alignment with system objectives. In user interface (UI) and

user experience (UX) design, Imam (2024:29) notes that AI enables real-time analysis of user interactions and preferences, allowing for quick adjustments to design algorithms. According to the author, AI-powered tools such as DiagramGPT can automatically generate system diagrams from language-based prompts, while ChartAI can create charts, user flows, and mind maps from provided specifications. These capabilities speed up the creation of design artefacts, like wireframes, and support UI/UX personalisation based on user data, improving efficiency and adaptability in the design process.

2.4.1.4. Software development stage

The software development stage involves transforming the approved design into a functional and scalable system through coding and implementation (Arshad et al., 2025:74069). Liljavirta (2025:7) explains that this is the stage where actual software development takes place, involving the development of new features or the modification of existing ones to meet the specified requirements. Developers use a range of technologies and tools during this stage to ensure quality and functionality. According to Liljavirta (2025:7), these include “programming languages, integrated development environments (IDEs), version control systems and testing tools”. The author states that this stage focuses on building a system that accurately implements the design specifications while ensuring maintainability and performance (Liljavirta, 2025:15-16).

Imam (2024:30) suggests that AI shows its greatest potential during the development stage, especially in code generation. AI-powered tools, such as ChatGPT, can generate code snippets from natural language prompts. Similarly, GitHub Copilot integrates directly into the developer’s codebase to provide context-specific code suggestions and acts as a debugger, identifying inefficient or redundant code and offering alternatives (Imam, 2024:30). Soni et al. (2023:2) further state that AI enhances developer efficiency by assisting with code writing, understanding, and optimisation, thereby streamlining time-intensive activities and improving overall productivity.

2.4.1.5. Testing stage

The testing stage includes quality checks to verify that the product satisfies performance and security standards, functions as intended, and meets its defined requirements (Arshad et al., 2025:74069-74070; Liljavirta, 2025:8). These tests include security testing, user testing, and acceptance testing to help developers or testers identify bugs and security vulnerabilities before launch (Lemke, 2018:7).

Liljavirta (2025:17-18) and Soni et al. (2023:3) highlight that AI can streamline testing by automating repetitive tasks and analysing test data, thereby reducing testing time and enhancing the overall process. It can also enhance resource optimisation by targeting high-

risk areas, potentially shortening the testing cycle without compromising coverage or quality. Imam (2024:32) notes that developers can use AI tools such as CodiumAI, which employs its AI model TestGPT to generate tests and improve coverage, and Diffblue, which uses reinforcement learning to ensure that tests are runnable and accurate. An additional AI tool, BrowserStack, leverages its AI-powered low-code automated testing to record user actions and convert them into test scripts. Integrating these AI tools into the testing stage improves test coverage, allows for automatic test generation, enables quick execution and analysis of test cases, reduces the manual effort involved in writing and evaluating tests, and increases the likelihood of detecting bugs during testing, which contributes to a more effective system (Imam, 2024:32).

2.4.1.6. Deployment stage

The deployment stage involves multiple phases to deliver secure and reliable production software to end users, including release planning, environment setup, execution, and rollback procedures (Imam, 2024:14). Soni et al. (2023:3) describe this stage as the process of releasing the approved build into a live environment.

Imam (2024:34) suggests that software deployment has traditionally been a complex process, requiring extensive planning and setup of the environment. However, Liljavirta (2025:42) notes that integrating AI into the deployment stage can simplify these processes. The author suggests that AI can achieve this by automatically assessing release readiness through predictive analytics and historical deployment data. For example, an AI system could analyse the risk of deploying particular changes based on historical failure patterns, current system load, and software component dependencies. The author also observes that AI-powered deployment tools can automatically initiate rollback processes if anomalies or performance issues are identified immediately after deployment, thereby reducing downtime and enhancing overall reliability (Liljavirta, 2025:42). Liljavirta (2025:42) further highlights that AI can assist in scheduling release times based on user feedback and usage patterns to minimise disruptions. Arshad et al. (2025:74071) and Soni et al. (2023:3) further state that AI can help automate fixes by applying patches, identifying areas for improvement, and recommending updates to improve the software.

2.4.1.7. Maintenance stage

After deploying the application for end users, the maintenance stage involves ongoing monitoring and continuous improvement of the current build. Monitoring activities involve assessing performance, security, and stability to ensure the system functions as intended (Imam, 2024:14). According to Liljavirta (2025:9), this stage is the longest in the SDLC, spanning from the software's delivery to its retirement. The author states that the aim of this

stage is to maintain the software's operational reliability and adaptability to evolving requirements and environments.

Liljavirta (2025:9) highlights that integrating AI at this stage can improve maintenance by automating routine tasks, increasing efficiency, and enabling software to adapt to evolving user needs. This involves predictive and automated processes that analyse data to anticipate issues, helping to reduce downtime and costs. Imam (2024:35) observes that AI tools such as Cast AI offer an automated platform that continuously monitors and adapts in real-time. It also features AI-powered observability, which consistently tracks performance and health metrics to detect anomalies, auto-scales resources to handle demand, and automatically initiates alerts or fixes without human intervention, allowing the maintenance stage to be proactive rather than reactive.

2.4.2. Advantages of integrating AI in software development

Following the earlier discussion on AI integration within the SDLC, this section presents further benefits of integrating AI into software development practices. These advantages include enhanced *productivity and efficiency*, as well as *software quality*.

An advantage of integrating AI into software development processes is the enhancement of *productivity and efficiency*. Baqar and Khanda (2024:18) and Odeh (2024:125,132) note that AI automates repetitive tasks, including code generation, documentation creation, and test case development. Soni et al. (2023:4) agree and explain that automation enables developers to focus on more creative and strategic tasks. Baqar and Khanda (2024:13) and Soni et al. (2023:4) emphasise that AI-powered automation and recommendations can greatly decrease development time and improve efficiency. An additional advantage of integrating AI into software development is the enhancement of *software quality*. According to Baqar and Khanda (2024:2), AI tools can automatically generate test cases that cover an extensive range of cases, including edge cases that might be "overlooked" by human testers.

According to the authors, these comprehensive test cases lead to enhanced software quality and fewer bugs (Baqar & Khanda, 2024:2). Baqar and Khanda (2024:2), Odeh (2024:130), and Soni et al. (2023:4) highlight that AI can analyse code to detect and predict potential problems such as security vulnerabilities, performance bottlenecks, and code inefficiencies "before they evolve into significant issues". Soni et al. (2023:4) further argue that by increasing test coverage and identifying issues early, AI assists teams in delivering enhanced software quality.

2.4.3. Challenges of integrating AI into software development

Despite the clear advantages of AI, its integration into software development faces significant challenges. These challenges include heavy *data dependency*, a *shortage of skilled professionals*, issues with *trust and transparency*, and *perceived threats to job security*. Each of these challenges can act as a barrier to full-scale integration, slowing the pace of innovation and undermining AI's full benefits.

One of the previously mentioned challenges of integrating AI into software development is the inherent *data dependency*. Abubakar (2024:6-7) suggests that AI models depend on quality datasets to generate accurate predictions. Kusak (2022:210) adds that AI outputs will match the quality of the input, so if the training data is inadequate or biased, then the outputs will be as well. The author states that "poor-quality data, such as incomplete or biased data, can lead to inaccurate, discriminative, or incorrect outcomes, a result that engineers colloquially call 'garbage in, garbage out'" (Kusak, 2022:210).

Another critical challenge of integrating AI into software development is the shortage of *skilled professionals* capable of managing complex algorithms and large datasets. Malinga (2024) and Abubakar (2024:6-7) note that implementing advanced AI techniques such as ML, Natural Language Processing (NLP), or autonomous systems requires deep expertise in data science, statistics, and programming. However, Kayode (2023:6) and Moch and Oberdieck (2024:28-29) point out that many developers lack these essential skills. The problem is compounded by the fact that educational institutions offer limited AI-focused courses and often maintain strict admission policies, thereby producing too few qualified professionals to meet industry demand.

Adding to the list of challenges, Thalpage (2023:31) identifies another challenge related to trust and transparency in complex AI models. The author discusses "the black box problem" in AI, which refers to the difficulty in understanding how AI systems and ML models interpret data and make predictions or decisions. The author states that these models often depend on intricate algorithms that are not easily understandable by humans, leading to a lack of accountability and trust (Thalpage 2023:33). Thalpage (2023:34) adds that in fields like healthcare and finance, where the consequences of AI decisions can be significant, "transparent systems" are essential for ensuring accountability.

Finally, integrating AI into software development is also hindered by concerns over *job security*. Laumer and Eckhardt (2011:66-83) and Khandii (2019:1-4) emphasise that individuals often resist integrating new technologies due to perceived threats, shifts in workplace power dynamics, and anxiety about technological change. Kuhail et al. (2024) and Malheiros et al. (2024:169,173) add that developers, especially programmers who regularly use AI tools, fear these technologies might eventually replace them, eliminating the need for coders altogether.

Consequently, many see AI not as an enabler but as a potential threat to their livelihoods, creating resistance that slows its integration into software development.

2.5. Tenet 4: AI integration in the software development industry

After exploring AI integration in software development and AI-powered tools and technologies used by developers, Tenet 4 will now explore AI integration in the software development industry at a business level, as illustrated in Figure 2.10.

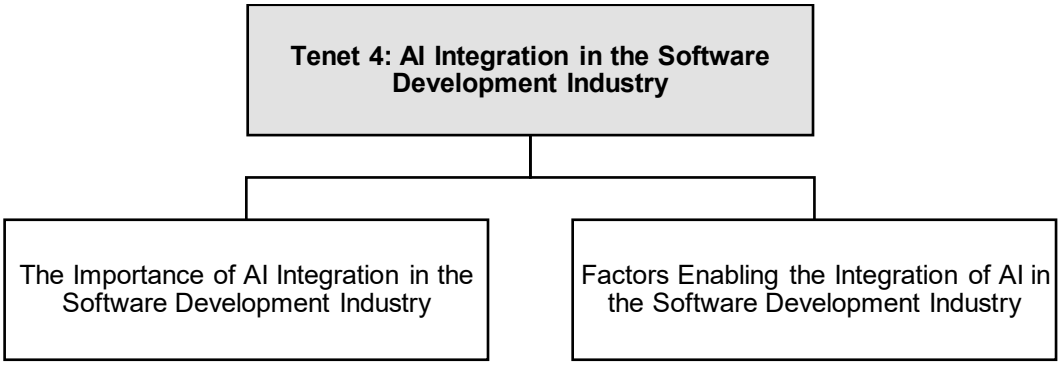

Figure 2.10: Literature review of Tenet 4

2.5.1. The importance of AI integration in the software development industry

According to Ajiga et al. (2024:1897), the importance of AI in high-tech companies is extremely significant. AI is revolutionising software development practices in the industry, providing insights and tools that enhance productivity, quality, and efficiency, enabling more informed decision-making, improving code quality, and facilitating more efficient project management. Several scholars, discussed below, highlight the importance of integrating AI into the software development industry, emphasising AI's role in helping companies gain a *competitive advantage*, improve *cost-effectiveness*, and leverage AI-powered technologies to *drive revenue growth*.

Achumie et al. (2022:13-14) highlight AI's capability to assist companies in creating a *competitive advantage* in the software development industry. The authors claim that companies that integrate AI for code generation, market prediction, and personalisation outperform their competitors that still depend on manual approaches (Achumie et al., 2022:15). The authors note that AI-powered models automate analysis and deliver real-time insights, enabling decision-makers to react quickly to market changes, optimise operations, and improve profitability (Achumie et al., 2022:15). Additionally, the authors state that AI models develop personalised customer profiles by leveraging NLP, resulting in better engagement and higher conversion rates than traditional manual approaches (Achumie et al., 2022:18).

Soni et al. (2023:4) highlight AI's role in assisting companies in improving *cost effectiveness*, stating that AI integration helps reduce errors and accelerate development, resulting in long-

term cost savings. Soni et al. (2023:4) state that AI can automate high-volume, low-value tasks such as quality assurance and user support, thereby freeing resources to manage large and complex projects, while also allowing teams to concentrate on more creative and strategic initiatives. Tiwari et al. (2024:43) and Baqar and Khanda (2024:13) both agree and emphasise that AI automation streamlines the development process, allowing organisations to develop and deploy AI systems more swiftly and efficiently, reducing development time, leading to quicker product launches and a shorter time-to-market. According to Tiwari et al. (2024:43), automation accelerates iteration and experimentation, enabling developers to focus on higher-level responsibilities. According to the authors, this shift in focus may lead to more innovative solutions and better alignment with company objectives. Furthermore, to strengthen the argument for the cost-effectiveness of AI integration, Sager and Wahab (2024), along with Baqar and Khanda (2024:18), assert that employing AI-powered testing frameworks to automate both the generation and execution of test cases reduces reliance on extensive manual testing. This transition leads to savings in labour resources and significantly shortens the time invested.

Rane et al. (2023) highlight several AI-powered technologies that *drive revenue growth* in global markets, such as predictive analytics, personalisation engines, chatbots, and virtual assistants. These tools directly help increase conversion rates, drive higher sales, and enable companies to sustain their leadership positions in their industries. Predictive analytics analyses historical data to help companies forecast trends and behaviours.

The authors also explore an additional AI-powered technology, personalisation engines, which use algorithms to analyse customer data and deliver personalised content that aligns with individual preferences, improving customer engagement and satisfaction. Rane et al. (2023) further explore chatbots and virtual assistants that allow businesses to identify and address issues promptly and personally, thereby improving customer satisfaction and strengthening relationships between businesses and their customers.

2.5.2. Factors enabling the integration of AI in the software development industry

While the literature confirms the importance of AI integration, which offers significant benefits, realising these benefits depends on several enabling factors. In the software development industry, these factors include access to *abundant, high-quality data and robust infrastructure*, a commitment to continuously *upskilling development teams*, and the *creation of strong ecosystems and partnerships*. Together, these factors help explain why some companies are at the forefront of AI integration while others trail behind.

Mir et al. (2020) and Althati et al. (2024:220-221) identify *data abundance and infrastructure* as enablers of AI integration. The authors argue that having large, high-quality, and easily

accessible datasets, combined with the necessary infrastructure for processing and utilisation, creates ideal conditions for AI integration. Gatlin (2024) reinforces this view, noting that extensive access to data contributes to the success of leading AI-powered companies in the software development industry. For example, companies such as Amazon and Google leverage their vast datasets to analyse trends, forecast demand, and personalise customer experiences. Similarly, in the retail industry, companies can analyse customer interactions on e-commerce platforms in real time, allowing for "personalised recommendations" and "dynamic pricing strategies" (Gatlin, 2024). According to Gatlin (2024), this capability allows companies to remain proactive in competitive markets.

Challoumis (2024:135) emphasises the importance of *upskilling development teams* as another factor for successful AI integration. The author observes that progressive companies acknowledge that their future success is linked to "ongoing development of their employees". The author explains that by investing in comprehensive training programmes and providing access to various learning resources, businesses demonstrate their commitment to nurturing talent and empowering individuals. This investment is not just about improving current job performance; it recognises that skill development should be a dynamic and continuous process that allows employees to evolve alongside technological advancements (Challoumis, 2024:135). The author adds that by building AI-ready development teams, companies can strengthen their technical capacity and also position themselves as leaders and innovators in their field (Challoumis, 2024:135).

Finally, Korinek and Vipra (2024) stress that AI integration cannot be achieved in isolation and requires *strong ecosystems and partnerships*. This involves funding for research and development (R&D), workforce training, and "fostering partnerships between government, industry, and academia". Valavanidis (2020:20) notes that in countries such as the United States, public R&D funding is directed towards partnerships between universities and private companies, enabling technology leaders to accelerate AI integration through academic collaboration. Similarly, Germany has launched initiatives to fund groups that connect universities with leading businesses to fast-track disruptive technologies from the lab to the market. Korinek and Vipra (2024:22) further reveal that tech giants, including Microsoft, Alphabet, Amazon, and Nvidia, have made substantial investments in top-tier AI research laboratories located in major innovation hubs across North America, Europe, and Asia. Da Silva (2024:15) concludes that countries with sustained AI R&D funding tend to progress more rapidly, while those with limited resources struggle to keep pace. This disparity is partly due to the fact that most AI R&D is concentrated in North America and Europe, where strong national innovation systems and well-established science and technology policies foster AI integration (Da Silva, 2024:7).

2.6. Conclusion

Chapter Two revealed that the body of knowledge regarding the influence of cultural lag in the software development industry in the Western Cape, South Africa, is scant. Creswell (2009) refers to this as the “gaps or shortcomings of the literature”, which represent “what remains to be explored” in the body of knowledge. This gap highlights the need for further research exploring the unique material and non-material cultural factors in a software development company in the Western Cape, South Africa. The literature also reveals that, despite being introduced in 1922, Ogburn’s Cultural Lag theory remains relevant today. It serves as an appropriate theoretical lens for identifying the specific material and non-material cultures that influence AI integration and for developing strategies to reduce the potential cultural lag, thereby enabling smoother and more effective AI integration.

Having identified this gap, the researcher proposes that each of the four tenets discussed in Chapter Two can support the proposed study. The focus in Chapter Three is on outlining the research methodology and approach used for this study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

The previous chapter established the theoretical foundation and emphasised the relevance of Ogburn's Cultural Lag theory for AI integration within modern software development. Chapter Two also concluded by identifying a gap in the existing literature. The gap lies in the scarcity of knowledge regarding the influence of cultural lag in the software development industry in the Western Cape, South Africa. To address this gap, an appropriate research methodology is required (Haloui & Saïda, 2024).

This chapter focuses on the research methodology and provides a guideline aimed at addressing the initial research questions and achieving the study's objectives as set out in Chapter One. To achieve the aim of the study, the research methodology will follow the process outlined in Figure 3.1, which presents the Research Onion model as proposed by Saunders et al. (2019:130), serving as the foundation for the design illustrated in Figure 3.3.

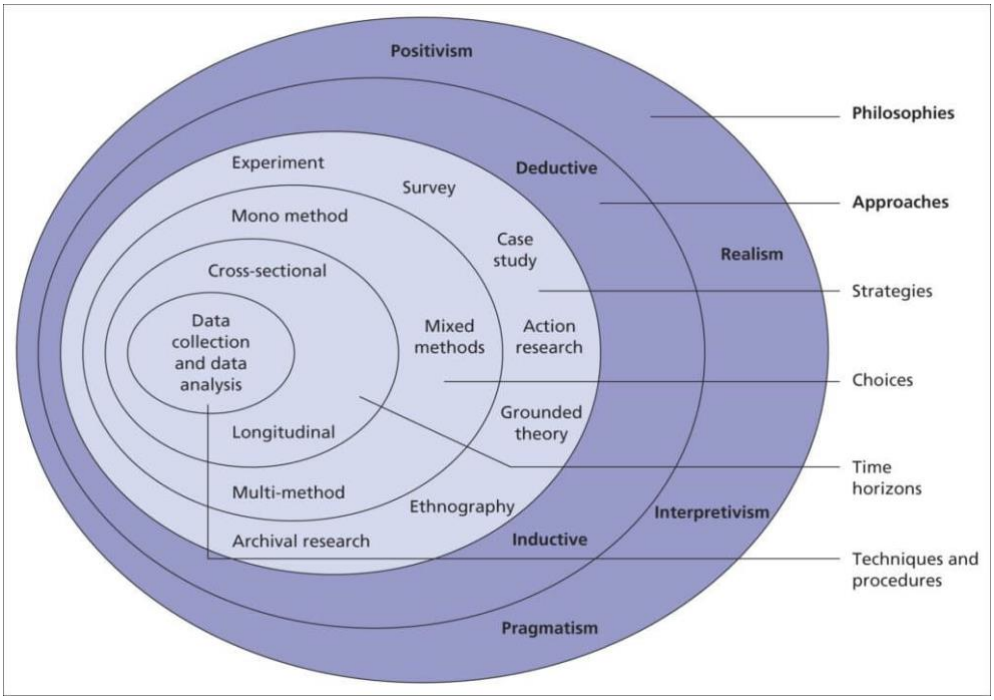

Figure 3.1: Research Onion model by Saunders et al. (2019:130)

Patel and Patel (2019:48) define research methodology as the systematic process of gathering information to solve research problems and the scientific approach to conducting research to provide structure. Figure 3.2 illustrates the structure of this chapter. The following sections will therefore clarify the reasoning behind the research design, strategy, approach, and method. It also reveals the sampling strategy, the selection of data collection tools and techniques used for analysis and interpretation, and the procedures employed for data analysis. Reflexivity,

trustworthiness, and rigour of the research, as well as ethical considerations and data management, will also be discussed.

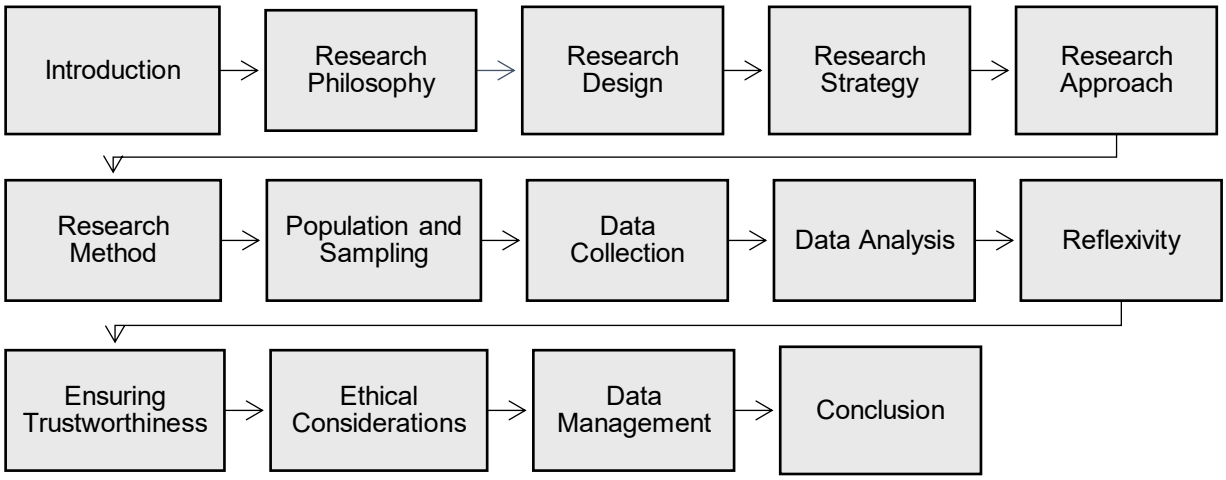

Figure 3.2: Chapter Three outline

By systematically outlining the structural process of the research methodology, this chapter sets the stage for exploring the cultural aspects that influence the effective integration of AI technologies, thereby allowing the researcher to make a meaningful contribution to both theory and practice.

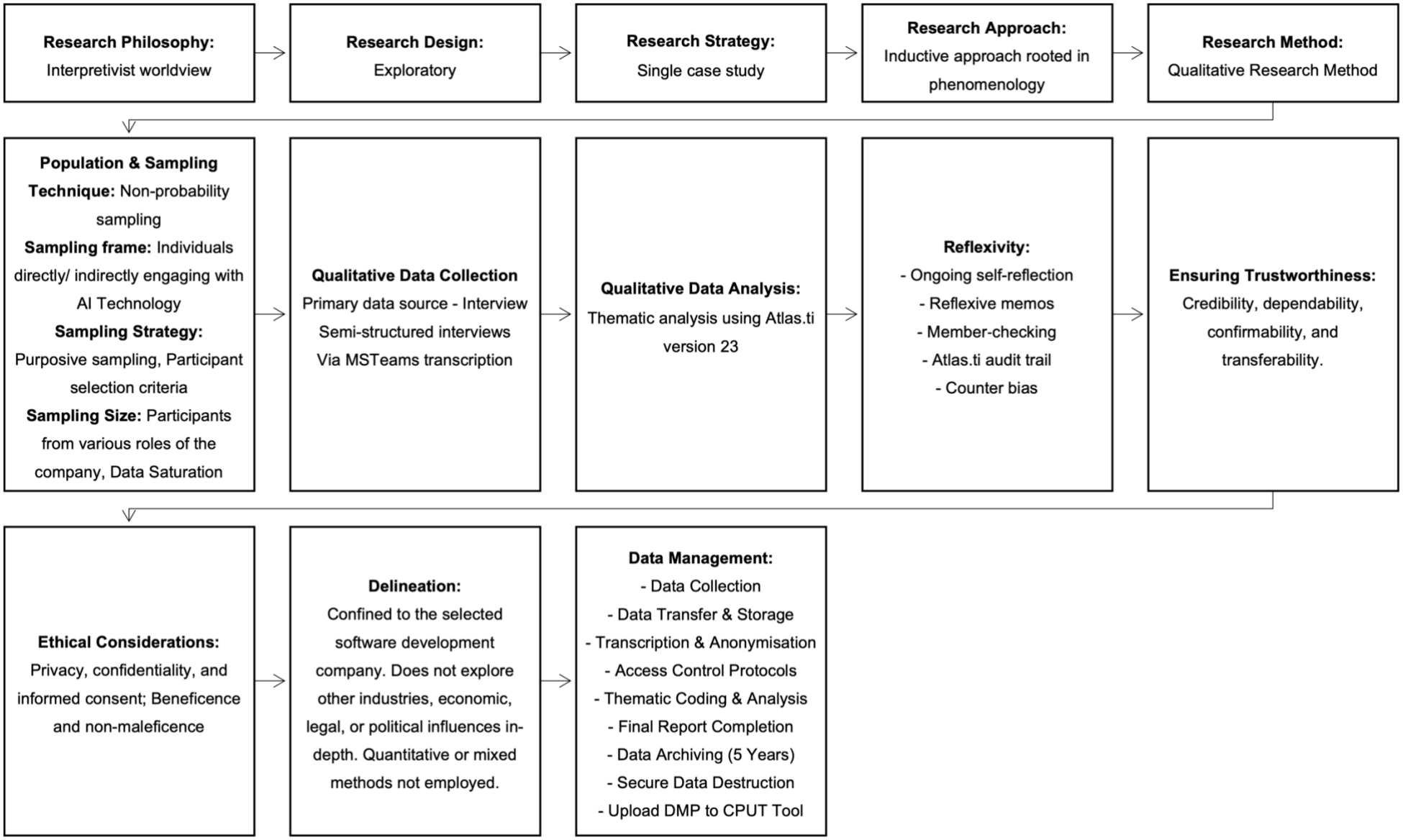

Figure 3.3: The research methodology structural process (adapted from Saunders et al., 2019:130) (researcher's construct).

3.2. Research philosophy

According to Cho and Lee (2014), the driving force behind each research study is its philosophical beliefs and assumptions. These fundamental assumptions, according to Håkansson (2013), influence the entire research process from the beginning. These include positivism, linked to quantitative research, and pragmatism, which relates to mixed-method approaches, as well as interpretivism and constructivism, both associated with qualitative research.

3.2.1. Constructivism

The constructivist stance adopts a subjective perspective, and the constructivist view is that reality is shaped by “meanings and values of the observer” (Allen, 1994:36). According to Creswell (2014), the research depends on interaction with individuals and their viewpoints on the situation to develop meaningful insights into understanding the phenomenon. According to the author, this usually involves asking more open-ended questions to construct subjective meaning based on traditional and societal norms.

3.2.2. Pragmatism

Pragmatism is a fundamental approach for implementing suitable solutions tailored to a specific problem or context (Hammond & Wellington, 2012). Pragmatism stresses that we understand the world and address its issues through both subjective and objective methods (Elgeddawy & Abouraia, 2024). According to the authors, pragmatist researchers are flexible and practical in finding workable solutions to the phenomenon under investigation. Additionally, these researchers acknowledge the importance of incorporating multiple perspectives and worldviews in addressing research problems.

3.2.3. Positivism

According to Park et al. (2020:691), a positivist paradigm asserts that knowledge can and must be developed objectively, without the influence of the researchers’ or participants’ values. According to the authors, the primary aim of positivism is to establish explanatory associations or causal relationships that ultimately enable the prediction and control of the phenomena in question. The positivist paradigm is grounded in the assumption that a single tangible reality exists, one that can be understood, identified, and measured, which facilitates explanation and prediction within a causal framework that operates naturally (Park et al., 2020:691).

3.2.4. Interpretivism

According to Turin et al. (2024:2), interpretivist paradigms suggest that reality is subjective and shaped by individuals through their experiences and social interactions. The authors add that researchers within these paradigms aim to understand the diverse and complex perspectives of individuals or groups, usually employing qualitative methods. Interpretivism emphasises

how people experience and interpret their reality. Additionally, Chowdhury (2014) adds that interpretivists seek to interpret the meaning behind human actions, including behaviours and social interactions within social and cultural contexts.

Therefore, this study adopts an interpretivist philosophy as it aims to explore the cultural aspects that influence the effective integration of AI technologies. The researcher adopts an interpretivist paradigm, recognising that the experience of how employees within the company interact with AI is subjective and shaped by individual perceptions, beliefs, and social contexts of the employees from whom data are collected.

3.3. Research method

Creswell (2009) defines research methods as the framework for conducting research. As indicated in

Figure 3.4, the author explains how three components interact in a study: the researcher's philosophical worldview, the related strategy of inquiry, and the research methods that put the methodology into practice. Creswell (2009) also emphasises that the nature of the research problem affects the choice of research method, the researcher's experiences, and the intended audience. This holistic view helps determine whether a qualitative, quantitative, or mixed methods design is most suitable for the research.

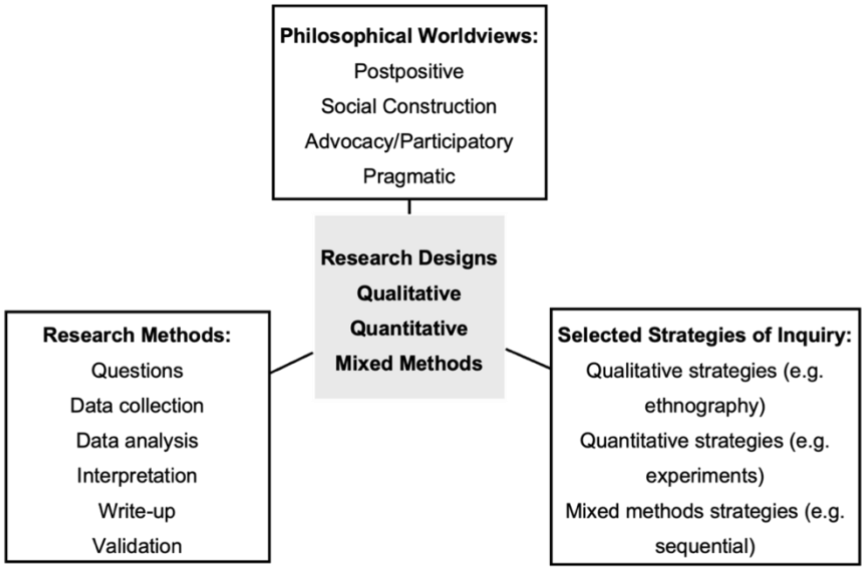

Figure 3.4: A framework for design - the interconnection of worldviews, strategies of inquiry, and research methods (adapted from Creswell, 2009)

Venkatesh et al. (2013) support the views of Creswell (2009) by stating that research methods can broadly be divided into two categories: quantitative and qualitative. Each category has distinct properties and data collection techniques. However, when neither method alone is

sufficient, they can be combined in a mixed methods approach. According to Creswell (2009), these methods should not be seen as polar opposites; instead, they are different points on a spectrum. Mixed methods research sits in the middle, combining elements of both quantitative and qualitative methods. The author observes that, although we often characterise the distinction as using words as qualitative research and numbers as quantitative research, the real differences stem from researchers' philosophical assumptions, the overall strategies they select, such as experiments versus case studies, and the specific data-collection methods they employ.

Creswell (2009) presents the first research method, *qualitative* research, which explores and interprets the meanings that individuals or groups assign to social or human issues. The process involves allowing questions and procedures to emerge as the study progresses, with data usually collected within the participants' environment. The data analysis is an inductive process, as discussed in section 3.6, that moves from specific details to broader themes, emphasising individual meanings and capturing complex situations. The researcher interprets the data to understand its meaning, which will be discussed in greater detail in section 3.8.

On the other end of the spectrum, Creswell (2009) describes *quantitative* research as a method used to test objective theories by analysing the relationships between measurable variables. These variables are typically measured with instruments, producing numerical data that can be analysed statistically. The author notes that researchers involved in this type of research often have assumptions about testing theories deductively. They also take steps to minimise bias, account for other possible explanations, and aim to generalise and replicate their results.

Mixed methods research, positioned in the middle of the spectrum, integrates both qualitative and quantitative approaches, including the philosophical foundations and the combination of these methods within a study (Creswell, 2009). According to the author, it involves not only collecting and analysing both data types but also combining both methods to strengthen the overall research, making it stronger than a study that relies on either qualitative or quantitative methods alone. Venkatesh et al. (2013:21) agree and additionally note that mixed methods research can generate detailed insights into various phenomena that cannot be completely understood through only quantitative or qualitative methods.

Considering all these factors, this interpretivist study will employ a qualitative research method to gain a thorough understanding of individuals' lived experiences, perceptions, and attitudes towards AI within the selected company, gathering rich, detailed insights rather than mere statistics and numbers (Creswell, 2009; Kumar, 2011). Kumar (2011) also states that qualitative research seeks to understand, explain, explore, and clarify specific situations, emotions, attitudes, values, beliefs, and experiences within a group. In this study, as illustrated

in Figure 3.5, this method was chosen for its ability to explore complex phenomena in real-life settings, particularly when the boundary between the phenomenon (the influence of the potential cultural lag on AI integration) and the context (the selected company within the software development industry) is not clearly defined. This blurring between the phenomenon and the context presents a valuable opportunity for in-depth exploration of the influence of the potential cultural lag on AI integration in a software development company in the Western Cape, South Africa.

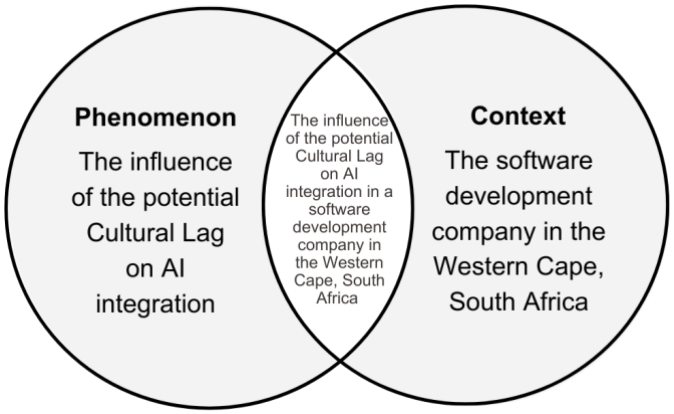

Figure 3.5: The intersection of the potential cultural lag and AI integration in a software development company (researcher's construct)

3.4. Research design

Boru (2018) identifies three types of research designs: *descriptive*, *explanatory,* and *exploratory*. The author indicates that this classification changes depending on the study's goal, as each design is tailored to particular objectives.

Aggarwal and Ranganathan (2019:34) describe a *descriptive* study as among the simplest research designs, enabling researchers to study and describe the distribution of one or more variables without considering causal or other hypotheses. The authors state that in cross-sectional studies, the design provides a "snapshot" of the prevalence and manner of a condition within a population at a specific moment in time. Similarly, Boru (2018) describes it as providing a depiction of a situation, person, or event to show how elements are connected as they naturally occur, but it does not clarify why an event occurs.

The second research design mentioned by Boru (2018) is an *explanatory* research design. George and Merkus (2023) state that explanatory research is used to understand why something happens, especially when limited information is available. Its questions usually start with 'why' or 'how', aiming to explain the reasons or processes behind a known phenomenon. It is mainly preliminary but differs from exploratory research in that it explores the reasons behind a well-documented problem through secondary research. Boru (2018) notes that it

builds upon descriptive and exploratory work to identify the actual reasons why a phenomenon occurs.

The third research design mentioned by Boru (2018) is an *exploratory* research design. The author describes it as a research design conducted when there is limited knowledge about a phenomenon and the problem is not well-defined. Exploratory research does not seek conclusive answers but aims to explore the topic at different levels of depth (Boru, 2018). In consideration of the views of Boru (2018) and George and Merkus (2023), this study adopts the exploratory research design. George and Merkus (2023) indicate that it is typically qualitative and primary in nature, although large-scale exploratory studies can sometimes be quantitative. The authors further note that this strategy is often referred to as interpretive research because of its flexible and open-ended character. Additionally, this type of research is appropriate when the researcher has a general idea or specific question to explore, but lacks existing knowledge or a clear paradigm.

3.5. Research strategy

Yin (2017) mentions commonly used research strategies, including surveys, ethnography, grounded theory, archival research, experiments, and case studies. Following Baxter and Jack's (2008:544) definition of a case study, this study will adopt a single-case study research approach centred around a selected software development company in the Western Cape, South Africa. According to the authors, this qualitative strategy allows for a detailed exploration of a phenomenon within its real-world context. By focusing on a single case, the study thoroughly explores the context and the specific individual experiences of how employees within the company interact with AI, the challenges they encounter, the hesitations they face, and the factors that drive or hinder the process. Therefore, the study gains a much richer and more detailed understanding of the specific cultural aspects involved in AI integration.

The rationale for choosing this study is that the selected organisation is a small software development company based in the Western Cape, South Africa. It develops web and digital solutions for clients. The company has been in operation for over thirteen years and is well established within the Information Technology industry. It was deemed suitable for this research because AI integration is already occurring across multiple roles and workflows, including software development, project coordination, and operational support. This research strategy aligns well with the study's phenomenological approach, which will be discussed in greater detail in the next section, section 3.6. According to Siggelkow (2007) and Gustafsson (2017), single case studies are particularly effective at richly describing the existence of a phenomenon when the study aims to understand the lived experiences of the individuals involved. This view is supported by Quintão et al. (2020:274), who note that it allows the researcher to explore a single unit thoroughly and is helpful in addressing questions where

researchers have limited influence over the phenomenon. It serves as an important tool for understanding both the structure and the reasons behind particular decisions (Quintão et al., 2020:274).

3.6. Research approach

Research approaches are generally divided into *deductive* and *inductive* reasoning (Patel & Patel, 2019:53).

According to Mitchell (2018:104), a *deductive* approach is working from the more general to the more specific, often described as a top-down process. The author outlines the process in which reasoning progresses from theory to hypothesis, then to observation, and finally to confirmation. The researcher starts by developing a theory about the topic, then refines it into specific hypotheses that can be tested, making adjustments based on observations collected. This process allows the researcher to test the hypotheses with specific data, leading to the confirmation or rejection of the original theories. Mitchell (2018:105) points out that this approach is better suited for quantitative analysis and assumes that once an answer is verified as true, it is accepted as such without further consideration or scrutiny.

In contrast, Mitchell (2018:104) explains that the *inductive* approach 'works the other way'. The author explains that in inductive reasoning, the researcher starts with specific observations and measures, identifies patterns and regularities, develops hypotheses for further exploration, and ultimately draws general conclusions or theories. Borgstede and Scholz (2021:8) concur with Mitchell (2018), who describes it as a 'bottom-up' approach. Borgstede and Scholz (2021:8) suggest that this approach is particularly helpful when little is known about a topic, when there is minimal or no existing literature, or when current theories fail to explain observed phenomena. Inductive research is often used to explore a new topic or phenomenon and to gain a deeper understanding of the research context.

In consideration of the views of Mitchell (2018) and Borgstede and Scholz (2021), this study adopts an inductive research approach. Driven by data rather than theory, the study does not begin with a predefined set of expectations; instead, it uses the data to guide its understanding. It begins with clear research questions and defined objectives, then uses interviews within the selected company to draw broader conclusions about the potential cultural lag in AI integration.

Building on the work of Mitchell (2018) and Borgstede and Scholz (2021), Creswell (2007) suggests that phenomenology aims to describe the shared essence of experiences to capture their 'universal essence'. This study acknowledges these perspectives and is therefore rooted in phenomenology, allowing an in-depth exploration of individuals' lived experiences. It goes beyond surface-level observations to uncover the underlying patterns and meanings of those

interacting with AI within the company. According to Creswell (2007:57-58), phenomenology explores the 'how' and 'why' of phenomena from the perspective of those experiencing it rather than merely the 'what'. This study, therefore, focuses both on what participants do with AI and on how they experience it, including the challenges they face and the factors that either help or hinder the integration process (Creswell, 2007:57-58).

3.7. Population and sampling

Memon et al. (2020:2) and Taherdoost (2016:20) define sampling as the subset of a population selected from a larger population, necessary to ensure sufficient data to draw reliable conclusions and generalisations about the population as a whole. According to Mills (2024), researchers employ sampling when it is impractical or often impossible to directly study an entire population due to time, financial, or logistical limitations.

3.7.1. Sampling frame

A sampling frame consists of the specific cases from which a sample is drawn (Taherdoost, 2016:20). According to the author, the sampling frame must represent the entire population to avoid biased results. A misaligned sampling frame can lead to unreliable findings and incorrect conclusions. The sampling frame for this study includes IT professionals directly involved with AI technology within the company, as well as senior management and decision-makers who influence the integration of AI technologies. Additionally, the study includes other relevant staff members who, while not directly working with AI, are still impacted by it.

3.7.2. Sampling strategy

Sampling strategies are designed to ensure that the selected sample represents the population (Taherdoost, 2016:20). The author divides sampling strategies into two types: probability sampling, where each individual in the population has an equal chance of being selected, and non-probability sampling, where samples are selected using non-random criteria, meaning not all individuals in the population have an equal chance of being selected, but a clear rationale for participant selection is required.

This study employs a non-probability sampling technique called purposive sampling. Purposive sampling is predominantly used in qualitative research to identify and choose cases that are rich in information (Palinkas et al., 2015:2). According to Creswell and Clark (2017), this involves intentionally selecting individuals with extensive knowledge about the phenomenon in question. In addition to selecting knowledgeable and experienced individuals related to a specific phenomenon, Etikan et al. (2016:2) stress the importance of choosing participants who are available, willing, and capable of sharing their experiences and opinions clearly, expressively, and reflectively. In this case, participants with knowledge or experience of AI

within the software development company were selected, ensuring the data are rich and directly relevant to the research questions.

Denieffe (2020:662) explains that sampling criteria are the specific conditions or traits participants must meet to be included in a study, highlighting that clearly justifying these criteria in purposive sampling is very important. The sampling criteria for this study include direct involvement with AI, influence on AI integration in the company, relevant experience and knowledge, diverse functional roles, willingness and ability to participate, and accessibility for interviews.

3.7.2.1. Participant selection criteria

- Participants were either working directly with AI technologies (e.g. Senior Developer, VR Developer), had strategic influence or decision-making power over AI integration (e.g. Managing Director, Non-Executive Director, Project Manager), or were influenced by AI integration despite not working with it daily (e.g. Marketing, UX/UI Designer, Junior Developer).
- Participants were currently employed by the selected software development company.
- Participants had been with the company for at least 6 months, as this allows them to offer valuable insights into progressing practices and cultural shifts.
- Participants were members from different departments to gather diverse views on AI integration. This involved technical teams (developers), design (UX/UI), strategic leadership (directors), operational staff (project managers), and support roles (marketing, business development).
- Participants were willing to partake in interviews.
- They provided informed consent and were comfortable having their interviews recorded and analysed in line with ethical protocols.
- Participants had access to Microsoft Teams, as this is the chosen platform for data collection.

3.7.3. Sample size

The sample size of the study comprised various roles from the selected software development company, as illustrated in Table **3.1**.

Table 3.1: The sampling structure

Job Title	Role in this Company
Non-Executive Director	Provides strategic guidance and governance, and contributes to long-term vision and company policy without direct involvement in day-to-day operations.
Managing Director	Leads the company's overall operations, sets strategic direction, manages key relationships, and oversees project delivery, finance, and team performance.

Job Title	Role in this Company
Project Manager	Manages projects, teams, timelines, and budgets are met, and oversees client communication.
Senior Developer	Leads technical implementation, mentors junior developers, makes architectural decisions, and ensures coding standards and project quality.
UX/UI Designer	Designs user-friendly interfaces and ensures seamless user experiences, collaborates with developers and clients to bring design concepts to life.
VR Developer	Builds immersive virtual reality experiences.
Business Developer	Identifies new business opportunities, develops proposals, nurtures client relationships, and helps grow the company's revenue.
Marketing	Manages branding, digital campaigns, and digital content creation.
Junior Developer	Supports development tasks and learns from senior team members.

The study is guided by data saturation principles outlined by Saunders et al. (2018:1895). The authors suggest using data saturation as a criterion in qualitative research for ceasing data collection rather than specifying a specific number of participants. Eight employees from the company agreed to participate, and interviews were conducted with them, while four targeted employees indicated that they were not willing to participate in the study. Data saturation was observed after the seventh interview, with no new themes emerging. However, the researcher still conducted the eighth additional interview to verify the thoroughness of the existing codes and to capture any divergent perspectives. Ultimately, data collection stopped once no new insights emerged, and comparable instances were repeated. This approach helped strengthen the credibility and confirmability of the findings.

3.8. Data collection

George and Merkus (2023) suggest that, as an exploratory study, the researcher can employ primary methods, such as interviews or focus groups. In support of George and Merkus' (2023) views, the study used interviews as the data collection method.

3.8.1. Interviews

Interviews are a primary method of collecting original and first-hand data directly from the subjects related to the research questions (Mazhar et al., 2021:6-10). Alshenqeeti (2014:40) and Schostak (2006) define an interview as an 'extendable conversation' that allows researchers to explore a topic in depth and gain a comprehensive understanding of how participants comprehend and interpret their own experiences. This study used semi-structured interviews, which, as Alshenqeeti (2014:40) describes, are guided enough to keep the researcher on track but flexible enough to allow the conversation to flow. Rubin and Rubin (2005) add that this format allows the researcher to ask follow-up questions and explore deeper when encountering unexpected or interesting topics.

Interviews were conducted via Microsoft Teams because it was convenient and compatible with the company's standard technology stack. These interviews were transcribed in real time, with the transcripts serving as the primary data source. To ensure the study's validity and rigour, the interview protocol was pre-tested with a single participant. Feedback from this pre-test helped refine the interview guide to ensure clarity, relevance, and alignment with the study's objectives.

3.8.2. Interview guide development

The study employed a basic interview guide to steer the conversation and cover all important topics related to the research questions (Creswell, 2009). The interview guide was designed to align with the study's objectives and was based on the four tenets identified from the literature review. These tenets have four focus areas, which guided the formulation of the key questions for the empirical research as illustrated in Table 3.2.

Table 3.2: Interview guide development

Tenet	Focus	Research Sub-Questions	Key Questions
Tenet One	Cultural Lag	RSQ3	Is there a gap between how fast AI is advancing and how the company adapts? Have there been any company initiatives aimed at improving AI understanding or usage? What kind of support would you recommend to make it easier to use AI effectively? What policies or guidelines would you suggest to help everyone get on board with AI?
Tenet Two	The influence of culture on technology integration	RSQ2	How would you describe your personal attitude towards using AI at work? Have you noticed resistance towards AI? How does the company's culture, values, or unwritten rules influence your use or avoidance of AI tools? Has leadership communicated the goals or expectations around the use of AI? What misconceptions do you have towards AI?
Tenet Three	AI integration in software development	RSQ1	What AI technologies do you currently use to complete tasks? How have these AI technologies changed your daily workflow, decisions, or productivity? What challenges have you faced when using AI tools? Are the company's current systems well set up for new AI tools?
Tenet Four	AI integration in the software development industry	RSQ1, RSQ2	Can you describe your general comfort level with AI? Do you work directly with AI in your role? Do you see AI as a threat, a tool, or a partner? Why? Can you share any success stories, failures, or experiences with AI?

The interview guide, shown in Appendix A, was shared with participants beforehand so they could become familiar with the topics to be discussed. It was divided into several sections, beginning with demographic questions such as the participant's job role, years of experience in software development, and years at the company. It then moved into questions aligned with the study's main research objectives and sub-questions.

3.9. Data analysis

Data analysis involves systematically examining, preparing, and interpreting collected data. In this study, the researcher used coding by assigning codes to transcribed interviews to generate insights related to a qualitative study (Håkansson, 2013:7).

Since the study is qualitative, it employed qualitative methods to analyse the gathered data. The study employed thematic analysis, based on the framework of Braun and Clarke (2006), as outlined in Figure 3.6, to analyse the information collected from the interviews. Thematic analysis is a systematic method used to identify themes and patterns of meaning throughout the data, making it particularly suitable for studies that explore complex phenomena and subjective experiences (Braun et al., 2016).

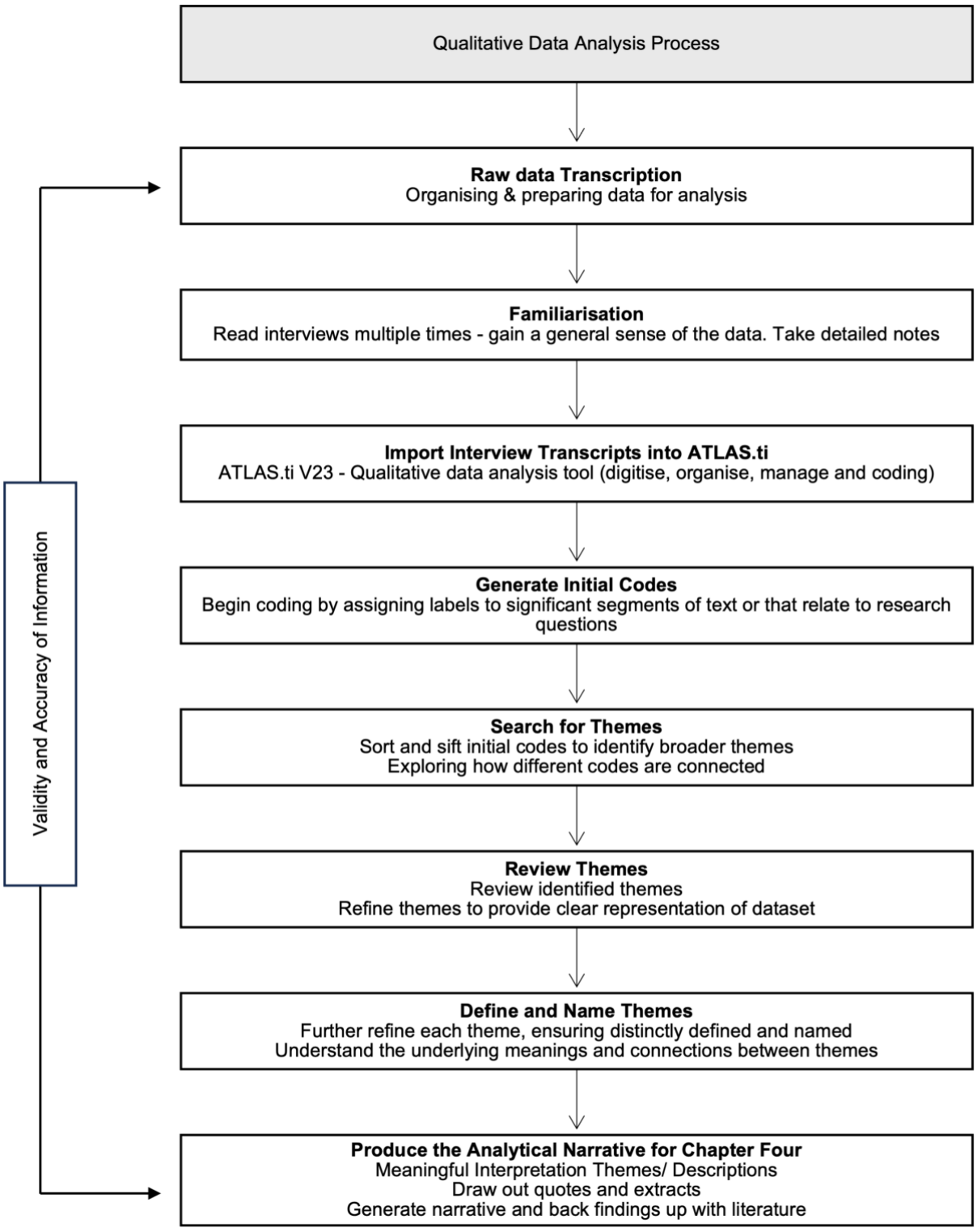

Figure 3.6: Thematic analysis framework (adapted from Braun & Clarke, 2006) (researcher's construct)

Figure 3.6 summarises the thematic analysis framework adapted from Braun and Clarke (2006). As previously mentioned, the interviews were conducted virtually and transcribed in real time using Microsoft Teams' built-in transcription features. The data analysis began with

the researcher organising and preparing the transcripts, including cleaning the data for accuracy and consistency by removing irrelevant information.

Subsequently, the researcher immersed themselves in the interview transcripts to become familiar with the depth and breadth of the content and to gain an overall understanding of the data. The researcher repeatedly read the transcripts to ensure thorough familiarity and searched for meanings and patterns. The researcher also took notes on first impressions, potential patterns, and notable insights, as illustrated in Appendix B.

Once the researcher was familiar with the data, the researcher began using ATLAS.ti™, a software programme for computer-assisted qualitative data analysis, to manage and organise the research materials digitally. This involved importing all relevant data, including interview transcripts and notes, into this software. Through this tool, the researcher began the formal coding process and started to generate initial codes from the data. The researcher identified, highlighted, and labelled significant phrases that captured key concepts directly linked to the research questions and aligned with Ogburn's Cultural Lag theory. For example, 'AI Usage and Workflow Integration' and 'Employee Attitudes and Integration Readiness' were codes that were applied and were central to understanding the phenomenon of cultural lag.

The researcher started to analyse the codes and considered how different codes may combine to form an overarching theme. The researcher then organised the various codes into these potential themes and subthemes and arranged all the relevant coded data extracts within these identified themes. For example, the code 'Employee Attitudes and Integration Readiness' was grouped under the theme 'Attitudes & Integration Readiness'.

The next stage involved the researcher reviewing and refining the identified themes. The themes were reviewed in relation to the coded data and the entire dataset to ensure they were coherent, consistent, and accurately reflected the coded data. Themes were modified, combined, or split as necessary. The themes were articulated to ensure a thorough understanding of the data and their alignment with the research questions and objectives. At the end of this stage, the researcher gained a clear understanding of the various themes, how they interconnect, and the overall narrative they present about the data.

Thereafter, the researcher defined and further refined the themes by identifying the 'essence' of what each theme is about (as well as the themes overall) and determining what aspect of the data each theme captures. Having established a set of fully developed themes, the researcher conducted the final analyses and composed the analytical narrative to be included in Chapter Four. This narrative included data extracts to illustrate the prevalence of each theme and built an argument related to the research questions as well as the final themes, which

provided a thorough understanding of how material and non-material cultural factors influence the integration of AI in the software development company. These were contextualised within and supported by the existing literature.

Thematic analysis provided a rigorous approach that directly addressed the study's objectives. It allowed the researcher to identify recurring themes, capture the main opinions, views, and insights from participants' narratives, and develop a cohesive understanding of the phenomenon. Following the inductive approach adopted in this study, themes emerged directly from the data. The analysis was driven by the information gathered, letting patterns and themes emerge naturally without forcing preconceived ideas. This approach laid a foundation for addressing the main research questions and contributing to the theoretical and practical understanding of the topic.

3.10. Reflexivity

According to Palaganas et al. (2017:426), researchers need to be aware of their contributions to constructing meanings and lived experiences during the research process. The authors emphasise that researchers cannot fully detach themselves from their study topic during research. The authors further emphasise that reflexivity involves an ongoing process in which researchers regularly reflect on their values and acknowledge how their social background, geographic location, and assumptions influence their research practices (Palaganas et al., 2017:427).

With this in mind, the researcher acknowledged that their background in information technology and personal assumptions may have subtly influenced the data analysis process. This may have made the researcher more sensitive to specific narratives shared by participants. To manage this influence, the researcher kept reflexive notes throughout the study, which allowed for critical self-reflection. These notes enabled the researcher to remain aware of their own biases, particularly when engaging in thematic coding. For example, the researcher initially coded INT1's frustration, "*when the AI tools aren't integrated into your databases or into your systems, it doesn't actually know who you are as a company, so you actually land up having to repeat yourself with instructions*", as "Resistance to Complexity". However, after re-evaluation and member checking, the researcher recoded it as "Cost and Procurement Barriers", emphasising cost and integration challenges instead of user frustration.

3.11. Ensuring trustworthiness

To establish trustworthiness in this qualitative study, the researcher employed a range of practical strategies recommended by Ahmed (2024), specifically focusing on *credibility*, *dependability*, and *confirmability*. According to the author, this helps researchers improve the quality of their research and contribute meaningfully to the existing body of knowledge.

3.11.1. Credibility

McKim (2023:45) states that member checking, a process where data transcripts are presented to some or all participants for feedback, enhances data credibility. With this in mind, the researcher conducted member checking, evident in Appendix C, where interviewees were sent an email with their transcription and a summary of the main points from their interview. If the interviewee had any amendments, the researcher made the necessary adjustments to ensure the transcription accurately reflected their responses.

3.11.2. Dependability

To ensure the results were dependable and allow other researchers to reproduce the study, the researcher was guided by Ahmed (2024:2) to create and preserve an audit trail, outlined in Appendix D, that included the interview process, audio recordings, transcription notes, and data analysis. ATLAS.ti™ was used to organise the transcripts by coding them systematically, keeping track of how themes developed, and ensuring the analysis process stayed consistent and reliable.

3.11.3. Confirmability

To ensure the confirmability and impartiality of the findings, the researcher kept reflexive notes throughout the study, depicted in Appendix B, to capture personal assumptions and ensure that the findings were unaffected by the researcher's biases.

3.12. Ethical considerations

The study adhered to the highest ethical standards to maintain integrity and ethical practices, as outlined by Varkey (2021).

- Ethical approval was obtained from Cape Peninsula University of Technology's Faculty Research Ethics Committee prior to the commencement of the data collection phase, and all research activities complied with both institutional and national ethical guidelines, as illustrated in Appendix E.
- Participants were fully informed about the nature and objectives of the research and provided written informed consent to participate voluntarily, as illustrated in Appendix F. Participants were also able to withdraw whenever they wished.
- Confidentiality was strictly upheld. Data are securely stored and accessed only by the supervisor and the researcher. Audio recordings were stored in a secure location for five years, after which they will be permanently deleted.
- The study aimed to eliminate discomfort or offence by implementing measures to address concerns. The researcher ensured that personal information and questions that might expose participants in the workplace were not asked.

- The study aims to enhance AI understanding, benefiting participants, the industry, and the wider academic community. There were no incentives for participation.
- The study ensured that participants were treated fairly and equitably, with selections made without bias and representing all relevant groups within the company.
- The research was conducted with honesty and transparency, ensuring that any potential conflicts of interest were disclosed and the process was fully documented.

By adhering to these ethical considerations, this study upholds the principles of privacy, confidentiality, and informed consent, protecting the rights and well-being of participants. The core ethical principles of beneficence (doing good) and non-maleficence (avoiding harm), as outlined by Kling (2025), have been upheld.

3.13. Delineation

This study focuses on the integration of AI in a software development company in the Western Cape, South Africa. It explores both material (technological tools, systems, etc.) and non-material (values, beliefs, social norms, etc.) cultures influencing AI integration. The research is confined to participants from the selected software development company. Employing a qualitative phenomenological approach, the study does not explore other industries, economic, legal, or political influences in depth, nor does it use quantitative or mixed methods.

3.14. Data management

According to Michener (2015:1), a data management plan (DMP) is a document that describes how data will be handled during a project and what happens to it once the project is completed.

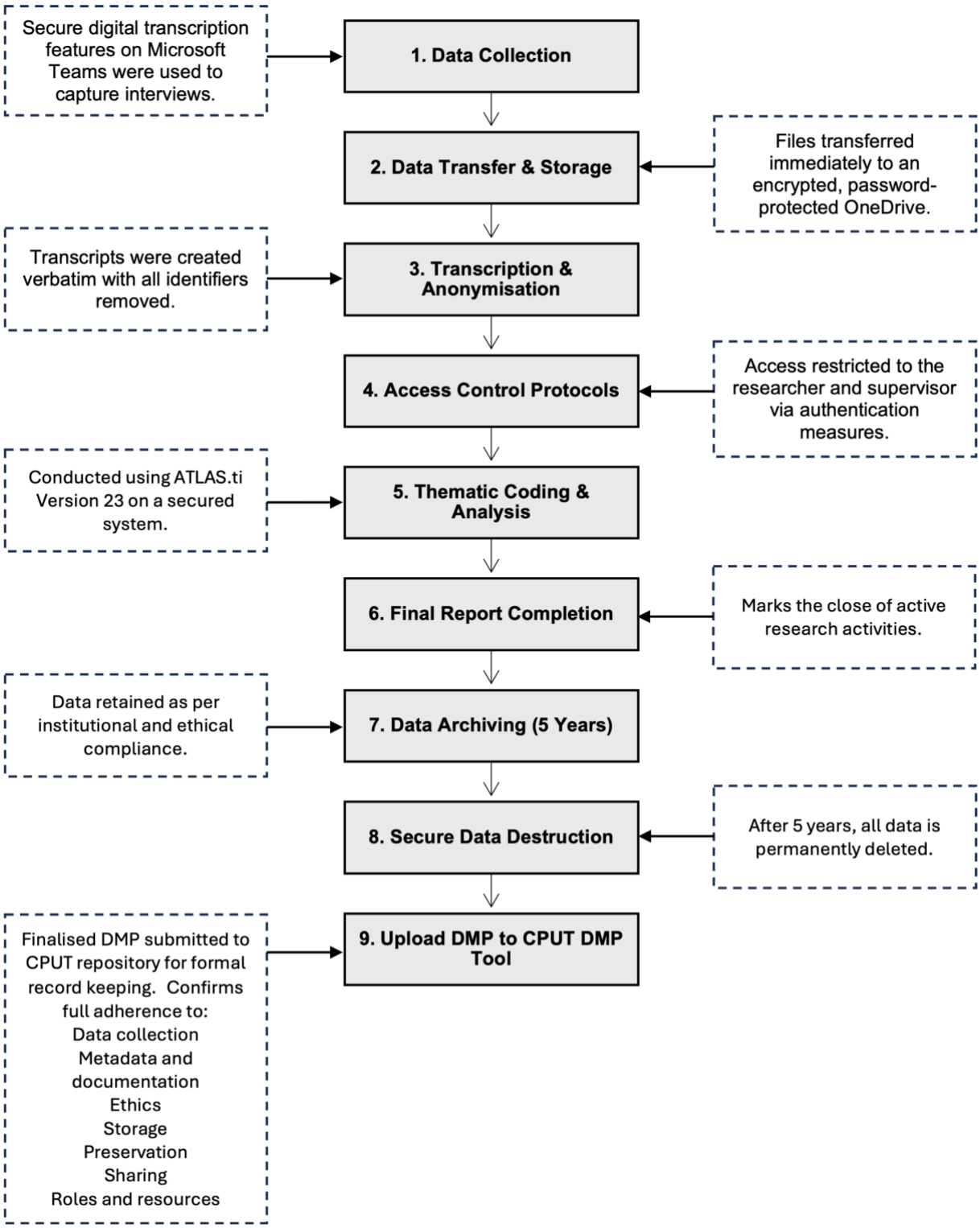

Figure 3.7: Data management plan (researcher's construct)

Outlined in Figure 3.7, the study follows a clear data management plan throughout the research process to ensure the integrity, confidentiality, and security of all collected data. Using secure digital transcription features on Microsoft Teams, interview recordings were captured verbatim and immediately transferred to a password-protected folder on OneDrive, an encrypted cloud storage drive. All personal identifiers were removed during transcription to protect participant

anonymity. Only the researcher and supervisor have access to the raw data, transcripts, and analytical files, with access restricted through authentication protocols. The transcripts were imported into ATLAS.ti™ Version 23 for thematic coding and analysis, which was also conducted on a password-protected system. After the study's completion and the final report has been produced, all identifiable data will be securely archived for five years, in compliance with institutional and ethical guidelines. Thereafter, all data, including audio files and digital transcripts, will be permanently deleted using secure data destruction methods. At the final stage, in compliance with the CPUT Data Management Policy, the DMP aligns with institutional expectations and the structure required by the CPUT DMP tool. This tool is designed to assist researchers in crafting a comprehensive DMP and serves as an official record of how research data is managed throughout the project. This final version was uploaded to the official CPUT DMP tool repository as part of institutional compliance and research integrity practices.

3.15. Conclusion

In conclusion, this chapter, supported by Figure 3.3, outlined the research methodology process used to explore the influence of cultural lag on AI integration within a software development company in the Western Cape, South Africa. A qualitative research method, rooted in phenomenology, was chosen to thoroughly explore the lived experiences of individuals interacting with AI in their real-world work environment. The study employed semi-structured interviews as its primary data collection method, which, as suggested by the literature, provided both structure and flexibility to uncover rich, detailed insights from participants. Interviews with the participants proved well suited to understanding the individual and collective experiences, perceptions, and cultural factors influencing AI integration. Braun and Clarke's (2006) framework facilitated the identification of recurring patterns and themes across the data, helping the researcher organise and interpret participant responses in a way that directly addressed the research questions. Supported by ATLAS.ti™, the thematic analysis provided a systematic approach to analysing the qualitative data.

In summary, the chosen research methodology proved well-suited for exploring the potential influence of cultural lag on AI integration. These methods supported the study's aim of uncovering the deeper cultural aspects, both material and non-material, which influence the effective integration of AI technologies in the selected company. Chapter Four will present and outline the research findings without extensive analysis and interpretation.

CHAPTER FOUR: DATA ANALYSIS AND RESEARCH FINDINGS

4.1. Introduction

Chapter Three presented the research methodology of the study. It outlined the methodological approach employed in the study, including the research design, data collection techniques, and data analysis procedures. Figure 4.1 illustrates the structure of this chapter. It will therefore analyse the empirical data and present the findings from semi-structured interviews conducted with employees working in the selected software development company. The aim was to explore the influence of the potential cultural lag on the integration of AI within a software development company in the Western Cape, South Africa.

Figure 4.1: Chapter Four outline

Thematic analysis was used to analyse the in-depth interviews through the lens of Ogburn's Cultural Lag theory. This chapter strictly presents raw data organised by emergent themes aligned with the study's research sub-questions (RSQs).

4.2. Participant demographics

The participants' demographics were analysed to create Table 4.1 which provides a clear overview of the eight participants' demographic details. The participants are anonymised and are referred to as INT1 to INT8. The participants were purposively selected based on their roles within the company, using a set of criteria previously outlined in section 3.7.2.1 in Chapter.

According to Hammer (2011:261), a thorough description of participants allows readers and researchers to make comparisons across studies. Table 4.1 presents the participants' demographics and illustrates the diversity of participants' expertise, ranging from senior executives to technical and creative employees, and reveals varying levels of engagement with and attitudes towards AI integration. This variety strengthens the validity of the study by capturing a broad range of experiences and perspectives in the company. The participants' characteristics provide important context for interpreting AI integration experiences across different organisational roles. This diversity supports the study's aim of exploring both technical and cultural dimensions of AI integration. In addition, the participants held various roles, including business developers, website developers, virtual reality developers, and marketing and project managers.

Table 4.1: Overview of participant demographics

Attribute	INT1	INT2	INT3	INT4	INT5	INT6	INT7	INT8
Role in this Company	Develops business growth strategies, writes proposals, attends client meetings,	Oversees projects, finances, legal issues, HR, programme and finance director	Provides strategic input on innovation, finance, and company direction	Supports design, content uploads, auditing spreadsheets	Front-end development, problem solving, site changes, training	Develops marketing strategy, manages social media	Worked on VR projects using Unity, Blender; implemented AI animation tools	Manages projects end-to-end, debriefs team, ensures deadlines and milestones are met
Years in Software Development Industry	3 years	34 years	20 years (within 30 years in IT)	1 year (advanced work)	4 years	5 years	6 years professional (10+ years dabbling)	13 years
Familiarity with AI Tools	Very comfortable; uses ChatGPT, Supergrow; introduced ChatGPT for proposal development	Comfortable and strategic user; uses ChatGPT, ClickUp AI, QuillBot	Very comfortable; uses ChatGPT 4.0 Enterprise, Copilot, Canva, Napkin AI	Moderately comfortable; uses ChatGPT and Gemini for tasks and troubleshooting	Comfortable but cautious; ChatGPT, Gemini, DuckDuckGo	Comfortable but still learning; uses ChatGPT, Canva AI, Grammarly	Very comfortable; used Cascadeur, Meshy, ChatGPT, Claude for development	Neutral stance; uses Copilot for tone-checking emails, limited AI integration due to package restrictions
Other Relevant Notes	Sees AI as tool/partner/threat, advocates privacy policies, believes in innovation culture	Advocates for workshops and ethical AI use, sees AI as a partner and tutor, believes in closing the cultural lag	Promotes responsible AI use, fact-checking, suggests training/consultants, encourages intrapreneurial AI initiatives	Encouraged by company culture, fact-checks AI results, sees AI as tool to speed up work	Paranoid about data security, AI good for explanations not full code generation, onboarding policies and training	Sees AI as tool but warns of dependency, suggests workshops every 2-3 months	Sees AI as a tool, appreciates company culture encouraging experimentation, notes hardware limits as challenge	Initially negative towards AI, now open to its benefits, suggests training and knowledge-sharing workshops

4.3. Analysis of the data

As previously indicated, eight employees from the company agreed to participate, and interviews were conducted with them, while four targeted employees indicated that they were not willing to participate in the study. Although data saturation was observed after the seventh interview, with no new themes emerging, the researcher still conducted the additional eighth interview to verify the thoroughness of existing codes and capture any divergent perspectives.

Interviews were conducted virtually using Microsoft Teams and transcribed with its built-in transcription features. All documents were imported into ATLAS.ti™ for analysis, as evident in Figure 4.2.

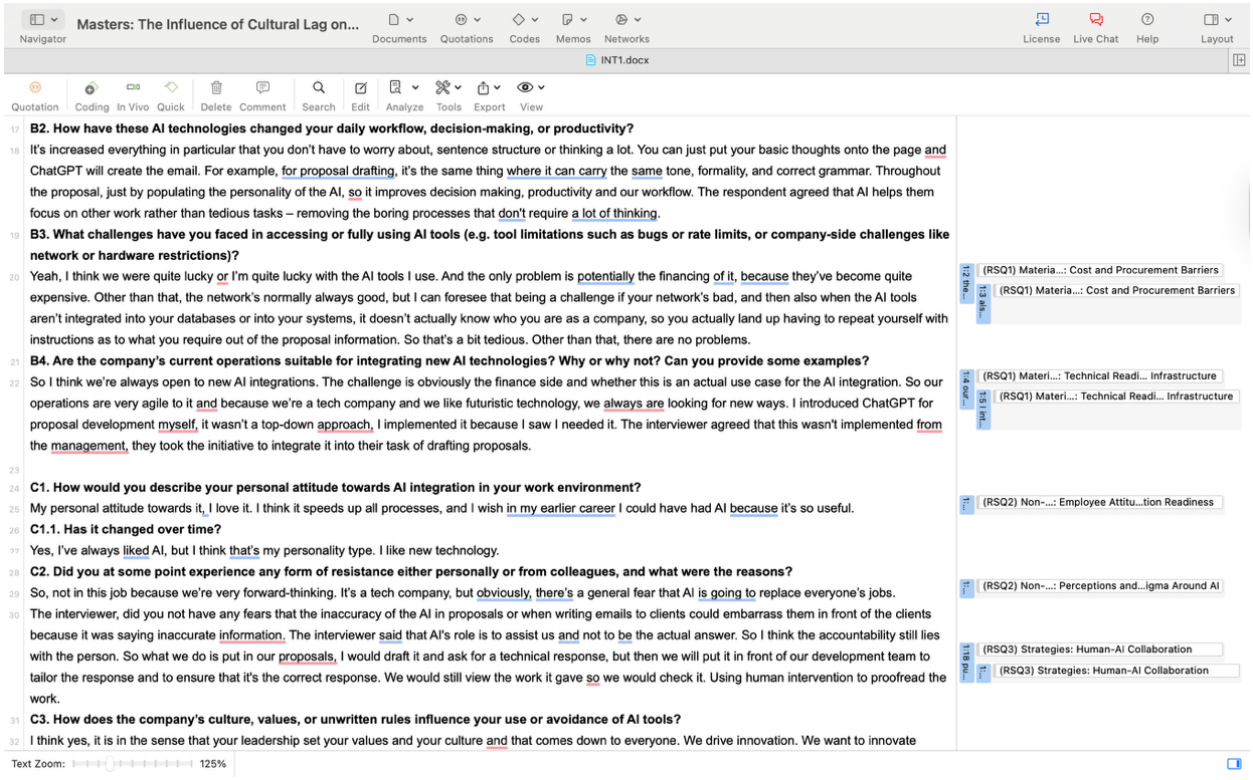

Figure 4.2: Code manager view in ATLAS.ti™

The data were analysed using thematic analysis as proposed by Braun and Clarke (2006), as indicated in Chapter Three, Figure 3.6, which enables the systematic identification and interpretation of themes across the interview data.

To begin condensing and making sense of all the rich information in the qualitative data, the researcher selected each relevant or interesting piece of data and created quotations. Quotations formed the most basic unit of analysis, from which the researcher built the coding and analysis of the patterns and themes underlying the data. After reducing and coding the data, the researcher began developing themes. Table 4.2 presents the four key themes and their corresponding subthemes that emerged during the coding process, aligning with the

study's research questions. These themes either expand on or support the literature related to Ogburn's Cultural Lag theory and specifically the influence of both material and non-material cultures on AI integration within the company, as well as potential strategies for reducing the cultural lag. Essentially, the thematic analysis served as a validating tool that clarified and confirmed the study's aim and research questions.

Table 4.2: The connection between the themes and the RSQs aligned with the main research question

Themes	Subthemes	Coded Quotations	Research Sub-Questions (RSQ1-RSQ3)	Main Research Question
Theme 1: AI Usage and Integration	(1) AI Usage and Workflow Integration	42	RSQ1 & RSQ2	How does the potential cultural lag influence the integration of AI within a software development company in the Western Cape, South Africa?
	(2) Technical Readiness and Infrastructure	17		
	(3) Capability and Reliability of AI Tools	14		
	(4) Human-AI Collaboration	18		
	(5) Prompting and Technique Development	6		
Theme 2: Skills, Training, and Cultural Readiness	(1) Training and Enablement Programmes	19	RSQ2 & RSQ3	
	(2) Cultural Alignment with Technology	22		
	(3) Employee Attitudes and Integration Readiness	21		
	(4) Skill Development and Human-AI Interaction	4		
	(5) Leadership communication and framing of AI initiatives	10		
Theme 3: Trust, Risk, and Governance	(1) Trust, Risk, and Overreliance Concerns	9	RSQ2 & RSQ3	
	(2) Security, Privacy, and Governance Measures	17		
	(3) Company Alignment and Decision-Making	11		
Theme 4: Costs, Perceptions, and Value	(1) Cost and Procurement Barriers	12	RSQ1 & RSQ3	
	(2) Perceptions and Stigma Around AI	15		

4.4. Presentation of findings by themes

All four themes' findings are presented with a consolidation of the raw findings from all eight participants, and each theme is supported by illustrative quotations from participants.

Additional quotations and codes can be found in Appendix H. The presentation of findings is structured thematically, with each section addressing a specific research question as indicated in Figure 4.3.

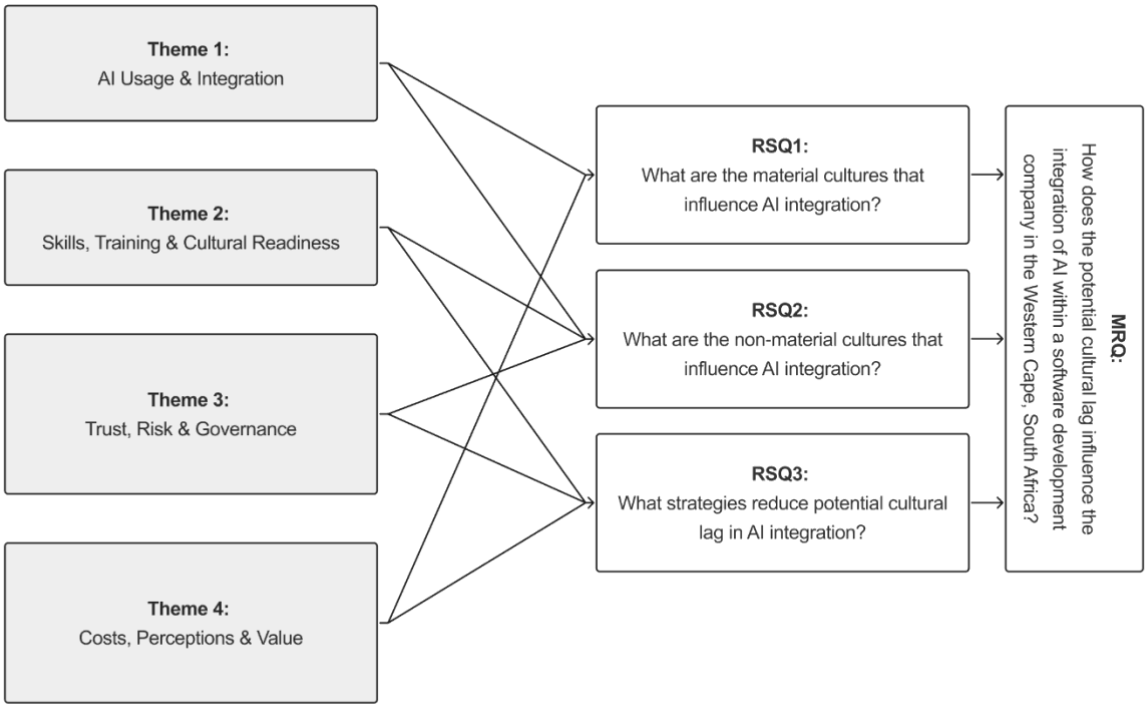

Figure 4.3: Links between themes and RSQs

Table 4.3 presents the complete list of codes along with their associated theme in a co-occurrence analysis table. Co-occurrence analysis helped the researcher identify potential subthemes and themes, as well as explore the relationships between the coded data in ATLAS.ti™. It also provided the researcher with insight into how many codes are closely related within the dataset. The numbers under each theme indicate how many times two codes appeared together during coding; higher numbers suggest that those codes were frequently discussed simultaneously and are likely connected. Co-occurrence analysis is valuable because it helps researchers recognise relationships between themes that might not be immediately apparent without a visual representation (Scharp, 2021:552).

Table 4.3: Co-occurrence analysis table

x	Material Culture Gr=77	AI Usage and Workflow Integration Gr=32	Capability and Reliability of AI Tools Gr=9	Cost and Procurement Barriers Gr=9	Generative and Creative AI as a Source of innovation Gr=3	Human-AI Collaboration Gr=1	Security, Privacy, and Governance Measures Gr=7	Technical Readiness and Infrastructure Gr=15	Training and Enablement Programs Gr=3	Non-material Culture Gr=83	AI Usage and Workflow Integration Gr=5	Capability and Reliability of AI Tools Gr=4	Cultural Alignment with Technology Gr=22	Employee Attitudes and Integration Readiness Gr=21	Generative and Creative AI as a Source of innovation Gr=2	Leadership Communication and Framing of AI initiatives Gr=7	Perceptions and Stigma Around AI Gr=15	Prompting and Technique Development Gr=2	Security, Privacy, and Governance Measures Gr=1	Trust, Risk, and Overreliance Concerns Gr=4	Strategies Gr=76	AI Usage and Workflow Integration Gr=5	Capability and Reliability of AI Tools Gr=1	Company Alignment and Decision-making Gr=11	Cost and Procurement Barriers Gr=3	Human-AI Collaboration Gr=13	Leadership Communication and Framing of AI initiatives Gr=3	Prompting and Technique Development Gr=4	Security, Privacy, and Governance Measures Gr=9	Skill development and human-AI interaction Gr=4	Technical Readiness and Infrastructure Gr=2	Training and Enablement Programs Gr=16	Trust, Risk, and Overreliance Concerns Gr=5
Material Culture Gr=77	0	36	10	14	4	3	9	18	3	0	0	0	0	0	0	0	0	0	0	0	15	0	1	0	6	4	0	0	4	0	1	3	0
AI Usage and Workflow Integration Gr=32	36	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	1	0	1	0	0
Capability and Reliability of AI Tools Gr=9	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost and Procurement Barriers Gr=9	14	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0
Generative and Creative AI as a Source of Innovation Gr=3	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Human-AI Collaboration Gr=1	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Security, Privacy, and Governance Measures Gr=7	9	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0
Technical Readiness and Infrastructure Gr=15	18	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Training and Enablement Programs Gr=3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0
Non-material Culture Gr=83	0	0	0	0	0	0	0	0	0	0	5	5	22	21	2	7	17	3	1	4	8	0	0	3	0	2	1	0	0	0	0	0	0
AI Usage and Workflow Integration Gr=5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capability and Reliability of AI Tools Gr=4	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Cultural Alignment with Technology Gr=22	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0
Employee Attitudes and Integration Readiness Gr=21	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Generative and Creative AI as a Source of Innovation Gr=2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leadership Communication and Framing of AI Initiatives Gr=7	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Perceptions and Stigma Around AI Gr=15	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prompting and Technique Development Gr=2	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Security, Privacy, and Governance Measures Gr=1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trust, Risk, and Overreliance Concerns Gr=4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategies Gr=76	15	3	0	4	0	1	2	2	3	8	0	1	5	0	0	1	0	1	0	0	0	5	1	12	3	15	3	5	11	5	2	23	5
AI Usage and Workflow Integration Gr=5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
Capability and Reliability of AI Tools Gr=1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Company Alignment and Decision-making Gr=11	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	12	0	0	0	0	1	0	0	0	0	0	0	0
Cost and Procurement Barriers Gr=3	6	0	0	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Human-AI Collaboration Gr=13	4	1	0	0	0	1	0	2	0	2	0	1	0	0	0	0	0	1	0	0	15	0	0	1	0	0	0	1	0	0	0	0	0
Leadership Communication and Framing of AI Initiatives Gr=3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Prompting and Technique Development Gr=4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0
Security, Privacy, and Governance Measures Gr=9	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	1	0	1	0
Skill development and human-AI interaction Gr=4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	0	0
Technical Readiness and Infrastructure Gr=2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Training and Enablement Programs Gr=16	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	1	0	0	0	0
Trust, Risk, and Overreliance Concerns Gr=5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0

Similarly, using the data, the researcher developed an additional co-occurrence diagram known as a Sankey diagram in ATLAS.ti™, which illustrates the flow between themes. This diagram, as illustrated in Figure 4.4, allows the researcher to visualise the connections between themes, revealing which ones overlap most across the three RSQs and how strongly they relate to each other.

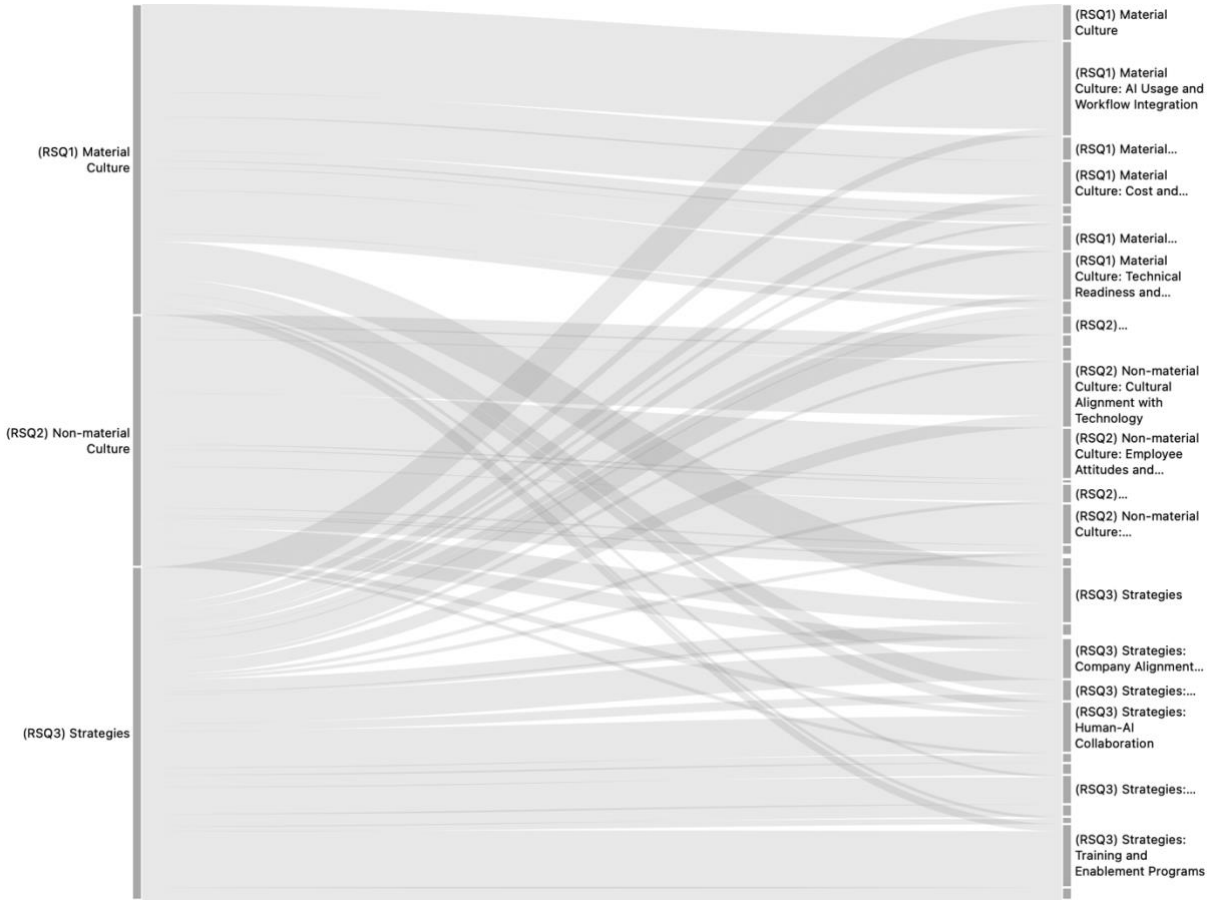

Figure 4.4: Co-occurrence Sankey diagram

4.4.1. Theme 1: AI Usage and Integration

Theme 1 presents the perspectives of all eight participants on how AI tools are used and integrated into their daily work. As illustrated in Figure 4.3, Theme 1 directly addresses RSQ1, “What are the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?” and RSQ2, “What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?”. The findings are organised into five subthemes as indicated in Table 4.4: (1) AI Usage and Workflow Integration, (2) Technical Readiness and Infrastructure, (3) Capability and Reliability of AI Tools, (4) Human-AI Collaboration, and (5) Prompting and Technique Development.

Table 4.4: Matrix of participant mentions across Theme 1

Theme	Subtheme	INT1	INT2	INT3	INT4	INT5	INT6	INT7	INT8
Theme 1: AI Usage and Workflow Integration	(1) AI Usage and Workflow Integration	✓	✓	✓	✓	✓	✓	✓	✓
	(2) Technical Readiness and Infrastructure		✓	✓		✓	✓	✓	✓
	(3) Capability and Reliability of AI Tools	✓	✓	✓	✓	✓		✓	✓
	(4) Human-AI Collaboration	✓		✓	✓	✓	✓	✓	✓
	(5) Prompting and Technique Development			✓	✓	✓	✓	✓	✓

4.4.1.1. Subtheme 1: AI Usage and Workflow Integration

This subtheme emanated from the interview questions B1, B2, and B4:

B1. What AI technologies do you currently use to complete company tasks?
B2. How have these AI technologies changed your daily workflow, decisions, or productivity?
B4. Are the company's current systems well set up for new AI tools? Why or why not? Can you provide some examples?

Therefore, this subtheme, discussed by all eight participants, revealed how participants use AI within their daily workflows, including where in the task workflows AI is integrated, which resources it helps to draft, and how AI outputs are incorporated into shared documents or code.

The analysis of the data indicated that all eight participants mentioned using AI for content drafting, meeting summarisation, basic coding, and assembling deliverables:

> *"I use ChatGPT to write proposals and emails for drafting and so forth"* (INT1).

> *"They give nice AI summaries of the projects that we are working on. ClickUp AI will give you an executive summary or case study of the current project of each project that we can use when writing our proposals"* (INT2).

> *"When I'm busy with a report or preparing a presentation, I will often use AI to help me draft the first version"* (INT3).

> *"I know we did a training manual for a client and we used ChatGPT for that"* (INT4).

> *"I… use it for like to create skeleton code… if I need certain code that I know is going to be repetitive"* (INT5).

"You don't need… to make notes because you can link it to AI and AI can summarise that meeting and send it to us via e-mail… Fireflies.ai Notetaker" (INT6).

"ChatGPT is great for templates and boilerplate, which saves a lot of time when I run into a specific issue…" (INT7).

"It spat out an entire inception report. I then took that report and tweaked it where relevant" (INT8).

Three participants described ChatGPT as the main tool for everyday writing and forming ideas:

"I use ChatGPT…I use ChatGPT to write proposals and emails for drafting and so forth" (INT1).

"ChatGPT as the main source for AI… I personally do rely heavily on ChatGPT … ChatGPT will guide me in the right direction, so I use it as a learning tool. It's basically my tutor when it comes to IT" (INT2).

"When I was using ChatGPT, I found that more than one person was also using ChatGPT" (INT6).

Four participants also described AI use as varying across roles and tasks:

"I know the developers might use different tools, but I'm not really worried about that. I utilise ChatGPT and a tool called Supergrow" (INT1).

"Most of our colleagues are developers or operational and they are not using it as strategically. They do have the development qualifications, so if they are utilising it and their code is not working the way they want to, then as developers it's on them" (INT2).

"Strategically, I would say that the senior staff that would need it, the proposal writing, those are the staff members that are quite confident and comfortable with AI and the developers and designers, they basically use their own accord" (INT2).

"I don't think we've ever gone to the point where we're actually probing our own developers and saying, "Hey, how much of AI are you actually using for the rudimentary coding that you might be doing?"" (INT3).

"As a project manager, my job is not as easy as simply going to AI and requesting certain things … it's not something that I directly need or I directly work with in my specific role" (INT8).

Five participants said the company's AI toolset extends beyond a single model:

"I utilise ChatGPT and a tool called Supergrow. Supergrow is an AI LinkedIn branding platform and I use ChatGPT to write proposals and emails for drafting and so forth" (INT1).

"So, we use ChatGPT as the main source for AI. However, I am aware that we do have many other tools like ClickUp, QuillBot, and many of them … even Microsoft … have AI features" (INT2).

"I work with generative AI in particular … I use ChatGPT 4.0 … Copilot in the Microsoft suite, Canva, and Napkin AI" (INT3).

"Sometimes I'll use Copilot, sometimes I'll use ChatGPT" (INT5).

"When I was using ChatGPT, I found … more than one person was also using ChatGPT" (INT6).

Three participants also mentioned that platform-native features are common:

"I am aware that we do have many other tools like ClickUp, QuillBot, and many of them … even Microsoft … have AI features" (INT2).

"I use Copilot in the Microsoft suite, Canva, and Napkin AI … these built-in tools make work more efficient" (INT3).

"ChatGPT… AI features of Canva" (INT6).

Table **4.5** illustrates the various AI tools that are being used by the employees in the company.

Table 4.5: AI tools used in the company

AI Tools	Primary Use
ChatGPT	Generative AI chatbot.
Microsoft Copilot	A conversational, AI-powered assistant integrated into Microsoft applications, offering contextual assistance.
Canva (AI/Magic tools)	A conversational AI-powered assistant that helps visualise ideas, generate text, and produce designs.
Fireflies.ai	Fireflies.ai transcribes and summarises meetings, generates sound bites, and allows easy collaboration.
Google Gemini	A generative AI assistant that helps with writing, planning, brainstorming, etc.
ClickUp AI	ClickUp AI is a collection of conversational, contextual AI features available in ClickUp, which is a project management platform.
Unity (AI/3D)	Unity AI is a suite of AI tools that provides contextual assistance, automates tedious tasks, and generates assets within Unity, which is a platform that allows developers to create 3D games, apps, and virtual reality experiences.
Claude	Claude is a generative AI chatbot trained to have natural, text-based conversations, and assists with tasks like summarisation, editing, Q&A, decision-making, code-writing, etc.

AI Tools	Primary Use
Meshy	An AI tool that lets you create 3D models, textures, and animations.
Sora	A generative text-to-video AI model that assists with the creation of images and videos.
Cascadeur	3D software that has AI assistance with creating keyframe and character animation.
DuckDuckGo AI	An AI chatbot and anonymised AI-assisted answers in search results that offer AI-generated summaries displayed at the top of search pages.

4.4.1.2. Subtheme 2: Technical Readiness and Infrastructure

This subtheme emanated from the interview questions B3 and B4:

B3. What challenges have you faced when using AI tools (e.g. tools side: bugs, rate limits, or company side: network or hardware issues)?

B4. Are the company's current systems well set up for new AI tools? Why or why not? Can you provide some examples?

Therefore, this subtheme describes the technical environment that enables AI use, including platform integrations, meeting tools, access policies, hardware capacity, connectivity, and methods for integrating application programming interfaces (APIs) or custom models.

The analysis of the data suggested that four participants described easy access to AI features in existing tools:

> *"ClickUp … QuillBot … even Microsoft … have AI features" and "ClickUp … has integrated AI … They give nice AI summaries of the projects that we are working on"* (INT2).
>
> *"I use Copilot in the Microsoft suite"* (INT3).
>
> *"Because we've been working on Canva, we used AI-generated templates from Canva … [In] Teams you don't need to make notes because you can link it to AI and AI can summarise that meeting and send it to us via e-mail"* (INT6).
>
> *"AI is constantly being shown to me in the different tools that we use, all the way from ClickUp … to even just Googling something"* (INT8).

Two participants also expressed that hardware and resource demands were a recurring friction point. Participant 1 stated:

> *"It can take so much from my machine like so much resources… I do sometimes have network issues with it"* (INT5).

Participant 7 highlighted performance limits when running demanding creative and development tools simultaneously:

> *"When I have Unity open and a 3D suite or another website open, it is too heavy, but I feel like just the hardware hasn't caught up yet"* (INT7).

Two participants distinguished between basic access to AI features and deeper integrations:

> *"We use ChatGPT as the main source for AI… ClickUp… QuillBot… even Microsoft… have AI features … We are integrating AI into our websites using chatbots"* (INT2).

> *"We're currently using ChatGPT… via the API, but we may switch to a different model in the future… I know people integrating it in the editor for different models… one is using their own, personally trained model… based on DeepSeek with a database of common mistakes"* (INT7).

4.4.1.3. Subtheme 3: Capability and Reliability of AI Tools

This subtheme emanated from the interview questions B2 and B3:

B2. How have these AI technologies changed your daily workflow, decisions, or productivity?
B3. What challenges have you faced when using AI tools?

Therefore, this subtheme presents participants' perceptions of the strengths and limitations of AI tools, including aspects such as rate limits, timeouts, and performance differences between tools.

Seven participants referred to operational constraints, such as limits, timeouts, and variable output quality, which influence their daily workflows:

> *"When the AI tools aren't integrated into your databases or systems… you end up having to repeat yourself"* (INT1).

> *"We were using the free version… our information is not secure… hallucination… I've even found that when I do a quick calculation the calculation was incorrect"* (INT2).

> *"I'm of the habit not to simply accept… because of hallucination" and "Using the free versions, one was limited to so many prompts per day… the enterprise version opened up the ability to just use it"* (INT3).

> *"I'm using the free version… I would upload PDFs, but then I'd get this error saying ChatGPT cannot complete the request… ChatGPT's like, hold up, let me take a break"* (INT4).

"It can take so much [resources] from my machine… I sometimes have network issues… there are rate limits" along with "It just doesn't understand sometimes… it can get you in some type of loop" (INT5).

"Using those AI tools has always been very expensive… when it comes to performance… with Unity and a 3D suite… it gets too heavy; the hardware hasn't caught up yet … When it comes to bugs, I have accepted it as part of using [AI]… maths… it struggles a bit… the bugs waste a little time" (INT7).

"Sometimes… when I add… a table, it can't differentiate my table… it doesn't give it back the way that I want" (INT8).

4.4.1.4. Subtheme 4: Human-AI Collaboration

This subtheme emanated from the interview questions B2, E1, and E2.

B2. How have these AI technologies changed your daily workflow, decisions, or productivity?
E1. Reflecting on your journey with AI in this company, do you see AI as a threat, a tool, or a partner? Why?
E2. Can you share any success stories, failures, or experiences you have witnessed with AI?

Therefore, this subtheme reveals how employees and AI work together in the company. It explores bottom-up integration, agile practices that accommodate varied comfort levels, and attitudes ranging from enthusiasm to job-impact concerns, as well as a workflow where AI drafts and humans verify and decide. The analysis of the data shows that one participant described introducing AI in a bottom-up approach:

"I introduced ChatGPT for proposal development myself; it wasn't a top-down approach. I implemented it because I saw I needed it" (INT1).

Six participants highlighted both enthusiasm and concerns in their accounts:

"I've always liked AI, but ... there's a general fear that AI is going to replace everyone's jobs... A concern was putting private information on the ChatGPT platform... [and] that AI can completely replace them in the process of writing these proposals" (INT1).

"Open to AI ... we see AI as an opportunity rather than a threat... [but] the concerns and misconceptions [are] that we can't trust what AI does... is it hallucinating?... what is the bias?" (INT3).

"My personal attitude... would be encouraging... [but] I was very sceptical and had like a negative outlook on it... I don't think AI is 100% accurate" (INT4).

> *"I wouldn't say I'm hyped or overly excited about AI... It felt much cooler, much more accessible... but I obviously have a great fear when it comes to AI in terms of coding... and fears around data"* (INT5).

> *"With Wix... it can be beneficial... the notes from AI are helpful... [but] at first... it was scary because it was unknown... I still need to do the work myself... AI might make people lose their jobs"* (INT6).

> *"I would definitely say positive... it's better to be able to use those tools instead of letting them replace you... I understand the controversy... people have a negative attitude towards AI because it may replace their job"* (INT7).

In addition, five participants' accounts describe how tasks are divided between employees and AI, specifically where AI drafts and employees make the final decisions:

> *"AI's role is to assist us and not to be the actual answer… So, what we do is put in our proposals, I would draft it and ask for a technical response, but then we will put it in front of our development team to tailor the response and to ensure that it's the correct response. We would still view the work it gave so we would check it. Using human intervention to proofread the work"* (INT1).

> *"We need to use AI responsibly and we mustn't treat AI's responses as being gospel… without interrogating what it is giving back to us… I will actually probe the AI even further to test whether I am getting a factual response"* (INT3).

> *"Sometimes I would ask, for example, ChatGPT a question… maybe I need a second opinion. So, I go to Gemini sometimes and compare those answers… I'm fact checking what AI is giving me… but would continue using the tool and push through the inaccuracy"* (INT4).

> *"AI… can be beneficial… [but] I still need to do the work myself as well. I can't fully depend on AI"* (INT6).

> *"What [the owner] did was take the requirements, put them into ChatGPT, and it spat out an entire inception report. I then took that report and tweaked it where relevant. That's when my mind really changed on how AI can be useful"* (INT8).

Five participants also described fact-checking and testing claims in their workflows:

> *"There needs to be human intervention to check that the work written by AI is correct"* (INT1).

> *"I will actually probe the AI even further to test whether I am getting a factual response"* (INT3).

"Sometimes I … go to Gemini … and compare those answers" (INT4).

"It's … a tool… there's a lot of trial and error" (INT7).

"Exactly. I mean, I've tested it" (INT8).

4.4.1.5. Subtheme 5: Prompting and Technique Development

This subtheme emanated from the interview questions C4 and D2.

C4. Have leadership communicated the goals or expectations around the use of AI?
D2. Have there been any company-led initiatives aimed at improving AI understanding or usage? If any existed, how were they received?

Therefore, this subtheme focuses on participants who observed that effective use of AI tools requires developing and refining prompting techniques.

Four participants indicated that usage limits in unpaid AI tools influenced how prompts could be structured when using these AI tools:

"When we were using the free versions, one was limited to so many prompts per day, and that already was a limitation… You also had to frame your question differently to make it fit" (INT3).

"I'm using the free version, so I would upload PDFs, but then I'd get this error saying ChatGPT cannot complete the request" (INT4).

"Sometimes it's the rate limits or it just times out, so you structure the prompt to be shorter, like giving it less context" (INT5).

"ClickUp has the ability to integrate with an AI tool, but we're not on that package. If you ask for more details, it asks you to upgrade. So, I just cut my requests shorter" (INT8).

Three participants also mentioned that the way a prompt is structured influences the quality and speed of AI responses:

"When it comes to ChatGPT and you make sure you word your question correctly, then this decision is instant" (INT4).

"It's how you feed… the information to ChatGPT… the persona… brand kit needs to be given… otherwise the result might not match your brand" (INT6).

"The human is… important… because you need to give it a good prompt" (INT6).

"If I give it all the details it needs, sometimes it gets it perfectly; other times it still needs a little pushing to get it where you want it to go" (INT7).

The next theme, "Theme 2: Skills, Training, and Cultural Readiness", reports what participants said about training, skill development, and cultural adaptation related to AI.

4.4.2. Theme 2: Skills, Training, and Cultural Readiness

This theme reports what participants said about training, skills, and non-material culture that support or slow AI integration. Figure 4.3 illustrates that Theme 2 addresses RSQ2, "What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?" and RSQ3, "What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?" by focusing on five subthemes as indicated in Table 4.6: (1) Training and Enablement Programmes, (2) Cultural Alignment with Technology, (3) Employee Attitudes and Integration Readiness, (4) Skill Development and Human-AI Interaction, and (5) Leadership Communication and Framing of AI Initiatives.

Table 4.6: Matrix of participant mentions across Theme 2

Theme	Subtheme	INT1	INT2	INT3	INT4	INT5	INT6	INT7	INT8
Theme 2: Skills, Training, and Cultural Readiness	(1) Training and Enablement Programmes	✓	✓	✓	✓	✓	✓		✓
	(2) Cultural Alignment with Technology	✓	✓	✓	✓	✓	✓	✓	✓
	(3) Employee Attitudes and Integration Readiness	✓	✓	✓	✓	✓	✓	✓	✓
	(4) Skill Development and Human-AI Interaction			✓		✓	✓		✓
	(5) Leadership Communication and Framing of AI Initiatives	✓	✓	✓	✓	✓	✓		✓

4.4.2.1. Subtheme 1: Training and enablement programmes

This subtheme emanated from the interview questions B5, D2, D3:

B5. Was any formal technical support, onboarding, or training provided? If so, how effective was it in enabling your use of AI?

D2. Have there been any company-led initiatives aimed at improving AI understanding, usage, or acceptance? If any existed, how were they received?

D3. What kind of support would you recommend to make it easier for you and your colleagues to integrate AI technologies effectively?

Therefore, this subtheme reports what participants say about structured learning, upskilling, and the kinds of enablement they believe would make AI integration more effective.

Six participants mentioned company-led initiatives aimed at improving AI understanding or usage:

> *"We should have workshops… open conversations around AI… informative workshops"* (INT2).
>
> *"We need to invest… getting people to come and speak to us, going to seminars, going on training… we send our staff on training… we should be doing exactly the same for AI"* (INT3).
>
> *"If there was an AI training session similar to [our client training] for us… that would be cool"* (INT4).
>
> *"Even YouTube video training would be helpful… maybe set up rules… whatever you can get to make it easier for us to understand and use AI"* (INT5).
>
> *"Workshops… pre-planned every 2-3 months… short courses plus practising… workshops will help… training"* (INT6).
>
> *"It should start with training, and once that's done, move into knowledge-sharing workshops… We don't have a strong AI mentor… yet"* (INT8).

Seven of the eight participants also responded with "No.." when asked if they had taken part in any leadership-led AI training sessions:

> *"We actually haven't been communicated to about how to utilise it… so no, there hasn't been any communication"* (INT1).
>
> *"No, there hasn't been, unfortunately not"* (INT2).
>
> *"Formally no … perhaps leadership can do more to promote the effective use of AI"* (INT3).
>
> *"No, I don't think there was ever like a formal talk about AI with like goals or expectations… I don't think so"* (INT4).
>
> *"Not to my knowledge, no… I didn't remember anything like that"* (INT5).
>
> *"It was so short time we didn't discuss much about AI…"* (INT6).
>
> *"No, I don't think there's any expectation"* (INT8).

4.4.2.2. Subtheme 2: Cultural alignment with technology

This subtheme emanated from the interview questions C3, D1, and D4:

C3. How does the company's culture, values, informal norms, or unwritten rules influence your use or avoidance of AI tools?
D1. In your view, is there a noticeable gap between how fast AI technologies are evolving and how the company culture is adapting? Can you share an example?
D4. What policies or cultural changes would you recommend to better align people and processes with AI integration?

Therefore, this subtheme describes how the company's values, identity, and desire for innovation set the tone for AI integration, as well as perceived cultural gaps that still need closing.

All eight participants described a company culture that supports the use of AI:

> *"We drive innovation. We want to innovate more. We are at the forefront of technology innovation. So, there's no avoiding the use of AI"* (INT1).

> *"The culture of the company is that we embrace innovation… we've always just embraced it from the word go … There's still a gap… we are slow adopters… We're not automating fast enough"* (INT2).

> *"The company's values set up for us to adopt and embrace AI… the culture does foster [innovation]" also saying, "This technology has developed much faster than what we in the company could keep up with… we tend to use the basic stuff"* (INT3).

> *"There are AI projects… in the company which makes a company spirit where AI is encouraged … We are moving towards it… I don't think we're completely aligned with it"* (INT4).

> *"The company culture… immersed me more into the AI culture than I would have been at a different company … there is a gap… we aren't moving at the same speed… we still take manual meeting notes"* (INT5).

> *"People were open to use AI… more than one person was also using ChatGPT"* (INT6).

> *"Oh, definitely encourage it… I was encouraged to use it out of curiosity … There is a gap, and it's very real… it takes time"* (INT7).

"I'm 100% encouraged by the company… the culture of AI is very strong… there's openness about AI" and "I definitely see a gap between how fast everyone else is adapting and how fast our company is embracing AI" (INT8).

4.4.2.3. Subtheme 3: Employee attitudes and integration readiness

This subtheme emanated from the interview questions C1, C2, and D1:

C1. How would you describe your personal attitude towards AI integration in your work environment? C1.1. Has it changed over time?
C2. Did you at some point experience any form of resistance either personally or from colleagues, and what were the reasons?
D1. In your view, is there a noticeable gap between how fast AI technologies are evolving and how the company culture is adapting? Can you share an example?

Therefore, this subtheme reports employees' perceptions of AI, their motivations to engage, and the concerns that influence their readiness to use it effectively.

The data analysis shows that all eight participants described their initial encounter with AI integration:

"I introduced ChatGPT for proposal development myself, it wasn't a top-down approach, I implemented it because I saw I needed it" (INT1).

"I latched on to it very quickly, simply because we're [the company] always looking for innovative methods" (INT2).

"It has grown on me … Initially I was … circumspect … I also thought, oh, this is just one of those trendy … things that's just gonna fade … [now] I understand the inherent value of AI" (INT3).

"In the beginning when I first learned about AI, I was a bit scared to use it. I was opposed to it" (INT4).

"I assumed that [AI] would at least know code… I only started using AI a couple of like weeks or so after it had been deployed or rolled out" (INT5).

"At first… it was scary because it was unknown to me. But I think later, the more I was practising on different platforms. It made it easier for me" (INT6).

"Earlier, before I started using AI tools, I would come out with a similar result, but the time investment was a very different story; it would take hours to do something that can be done in 10 minutes by using a specific or specialised AI tool" (INT7).

"I was definitely negative… I've only been using AI since the beginning of April this year. Before that, I was very against it" (INT8).

All eight participants described their comfort levels with AI:

"My personal attitude towards it, I love it… I've always liked AI" (INT1).

"I latched on to it very quickly… It's always been a positive view" (INT2).

"Personally, I'm very comfortable with AI" (INT3).

"I wouldn't say I'm 100% comfortable… maybe… 60% comfortable" (INT4).

"Paranoia… I'm still apprehensive, still just like watching it from the sidelines…" (INT5).

"At first… it was scary because it was unknown to me" (INT6)

"I would definitely say positive…" (INT7).

"My general comfort level… is… medium… I'm definitely neutral" (INT8).

4.4.2.4. Subtheme 4: Skill development and human-AI interaction

This subtheme emanated from the interview questions B5 and D3:

B5. Was any formal technical support, onboarding, or training provided? If so, how effective was it in enabling your use of AI?
D3. What kind of support would you recommend to make it easier for you and your colleagues to integrate AI technologies effectively?

Therefore, this subtheme explores how participants develop skills through practice and which interaction patterns they said were effective.

The data analysis shows that four participants reported strategies for developing AI skills:

"It must be like a standing item on our weekly meetings where people report… what have I learned of the potential of AI in the role that I perform" (INT3).

"It would be helpful… if anyone is joining the company, that they are told about AI… maybe have like an AI use guidebook, maybe some infographics, rather for shorter information or cards… to make it easy for people to use" (INT5).

"Workshops… pre-planned every 2-3 months… short courses plus practising… workshops will help [and] training" (INT6).

"It should start with training, and once that's done, move into knowledge-sharing workshops with the rest of the team… someone getting the training and coming back and sharing that information with us" (INT8).

4.4.2.5. Subtheme 5: Leadership communication and framing of AI initiatives

This subtheme emanated from the interview questions C4 and D2:

C4. How clearly has leadership communicated the purpose, goals, or expectations around AI integration?

D2. Have there been any company-led initiatives aimed at improving AI understanding, usage, or acceptance? If any existed, how were they received?

Therefore, this subtheme explores how participants desire leaders to craft the narrative and establish support structures around AI to ensure integration is effective.

Seven of the eight participants described limited formal direction from leadership:

"We actually haven't been communicated to about how to utilise it… so no, there hasn't been any communication" (INT1).

"No, we have not… we have not communicated any form of policies to our colleagues" (INT2).

"Formally no … perhaps leadership … can do more to promote the effective use of AI" (INT3).

"I don't think there was ever like a formal talk about AI with like goals or expectations… I don't think so" (INT4).

"Not to my knowledge, no… I didn't remember anything like that" (INT5).

"It was such a short time we didn't discuss much about AI…" (INT6).

"No, I don't think there's any expectation" (INT8).

Five participants also reported that there was no pressure on employees to use AI:

"No, we have not [communicated expectations]… it's left up to them… At the end of the day, they just need to produce the project that is required" (INT2).

"I don't think there was ever like a formal talk about AI with like goals or expectations…" (INT4).

"Whilst we don't necessarily prevent and tell people that they cannot use it…" (INT3).

"Not to my knowledge, no… I didn't remember anything like that" (INT5).

"No, I don't think there's any expectation… anything is not really forced on anyone… there's this openness about AI… there's no sort of expectation that you have to use AI for everything" (INT8).

The next theme, "Theme 3: Trust, Risk, and Governance", focuses on trust and overreliance of AI tools as well as security and privacy governance, and company alignment and decision-making.

4.4.3. Theme 3: Trust, Risk, and Governance

This theme explores what participants said about trusting AI in daily work, the risks they look out for, and the governance conditions they believe influence responsible use. Figure 4.3 illustrates that Theme 3 addresses RSQ2, "What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?" by presenting non-material cultures that influence integration, and RSQ3, "What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?" by identifying strategies for reducing potential cultural lag. The theme is organised into three subthemes as indicated in Table 4.7: (1) Trust, Risk, and Overreliance Concerns; (2) Security, Privacy, and Governance Measures; and (3) Company Alignment and Decision-Making.

Table 4.7: Matrix of participant mentions across Theme 3

Theme	Subtheme	INT1	INT2	INT3	INT4	INT5	INT6	INT7	INT8
Theme 3: Trust, Risk, and Governance	(1) Trust, Risk, and Overreliance Concerns		✓	✓	✓	✓	✓	✓	✓
	(2) Security, Privacy, and Governance Measures	✓	✓	✓	✓	✓	✓	✓	✓
	(3) Company Alignment and Decision-Making	✓	✓	✓	✓	✓	✓	✓	✓

4.4.3.1. Subtheme 1: Trust, Risk, and Overreliance Concerns

This subtheme emanated from the interview questions B5, D2, and D3:

B5. Was any formal technical support, onboarding, or training provided? If so, how effective was it in enabling your use of AI?

D2. Have there been any company-led initiatives aimed at improving AI understanding, usage, or acceptance? If any existed, how were they received?

D3. What kind of support would you recommend to make it easier for you and your colleagues to integrate AI technologies effectively?

Therefore, this subtheme discusses trust, as influenced by task context, cautious use, and the need for clear prompts and verification.

The data analysis shows that six participants reported concerns about trust and distrust in AI:

> *"Also, initially I found that with hallucination of ChatGPT or any AI tool that was a problem at the beginning. I've even found that when I do a quick calculation that the calculation was incorrect"* (INT2).

> *"My initial challenges were always the aspect of hallucination … The trustworthiness of what it is giving me … So, the constant fact checking was important for me"* (INT3).

> *"I don't think AI is 100% accurate. I think it's getting there. But I don't think it's 100% correct"* (INT4).

> *"...then still look up what it's saying is correct because I can't just trust it"* (INT5).

> *"Sometimes also I find that even with AI it's not enough… I still need to do the work myself as well. I can't fully depend on AI"* (INT6).

> *"...it was a huge trust thing for me because I really am just a conspiracy theorist"* (INT8).

Additionally, six participants explained that trust in the AI tool depends on the specific task or its application:

> *"I've seen hallucinations with calculations… if we had to use it just in simple Microsoft Excel, the calculations would have been better when it came to timekeeping"* (INT2).

> *"Concerns… can we trust its interpretation… when we probe it for a legal opinion… is it hallucinating? … what is the bias?"* (INT3).

> *"There's certain things that you can use it for, and there's certain things that it fails at… I wouldn't use AI to generate an entire blog… but I could ask it… to formulate a short meta description…"* (INT5).

> *"In Teams… AI can summarise that meeting… I felt that it was beneficial… It didn't miss any information … I still need to do the work myself… I can't fully depend on AI"* (INT6).

> *"I do see the benefits in certain instances… if somebody's stuck on code… Fix this, and boom… but I'm uncomfortable about certain things it's used for"* (INT8).

> *"It can help in the right situation or it cannot"* (INT7).

4.4.3.2. Subtheme 2: Security, Privacy, and Governance Measures

This subtheme emanated from the interview questions C5 and D4:

C5. What concerns or misconceptions about AI have you heard from colleagues or experienced yourself?

D4. What policies or cultural changes would you recommend to better align people and processes with AI integration?

Therefore, this subtheme highlights participants' perspectives on securing information and implementing governance structures for the company's AI use.

The data analysis shows that four of the eight participants who discussed this subtheme expressed privacy concerns:

> *"A concern was putting private Information on the ChatGPT platform… my concern is always about the privacy of the information … We were forced to purchase the premium version of ChatGPT because we wanted our information to remain private"* (INT1).

> *"We did not have a subscription… we were using the free version, and… with ChatGPT, our information is not secure… hence the reason we then moved over to a paid subscription"* (INT2).

> *"In the initial stages… with us acquiring the enterprise version… the privacy aspect… who's accessing what I am feeding [it]"* (INT3).

> *"We do handle sensitive information at times… so that would be training… policies and guidelines… an AI use guidebook… mainly in terms of security"* (INT5).

Six participants discussed policies related to AI:

> *"Just about having the correct policies … to stop employees from utilising client Information on open platforms … respecting privacy and intellectual property needs to be placed in a policy"* (INT1).

> *"We don't have policies in place, but I do think we could put policies in place … to make sure that everyone is using it ethically"* (INT2).

> *"Formally no … perhaps leadership … can do more to promote the effective use of AI"* (INT3).

> *"You can't let AI do everything … add that as a policy. Use it wisely. Don't let that take away your own thinking"* (INT4).

"Have like an AI use guidebook … policies and guidelines would really come from having a team discussion … mainly in terms of security" (INT5).

"The persona … brand kit … needs to be given to AI, otherwise the result might not match your brand" (INT6).

Seven participants described a gap between advancements in the industry and the company's current practices:

"There's still a gap… we are slow adopters… not automating fast enough" (INT2).

"This technology has developed much faster than what we… could keep up with… we tend to use the basic stuff" (INT3).

"We are moving towards it… I don't think we're completely aligned with it" (INT4).

"Yes, there is a gap… every week or so I'm hearing about something new about AI, but… we aren't moving at the same speed… we still take manual meeting notes down, whereas we can be using the transcription" (INT5).

"Yes, there is this gap… maybe [a] skill [gap]… the skill of dealing with AI… I wasn't trained how to deal with AI. It was just there and every time it's like a different way of integrating AI here and there, and all the platforms" (INT6).

"There is a gap, and it's very real. It is the main, saddest thing about it: it's completely avoidable" (INT7).

"I definitely see a gap between how fast everyone else is adapting and how fast our company is embracing AI" (INT8).

4.4.3.3. Subtheme 3: Company Alignment and Decision-Making

This subtheme emanated from the interview questions C4 and D4.

C4. How clearly has leadership communicated the purpose, goals, or expectations around AI integration?

D4. What policies or cultural changes would you recommend to better align people and processes with AI integration?

Therefore, this subtheme explores AI's role, the boundaries for responsible use, and strategies to reduce the potential cultural lag.

The analysis of the data indicated that all eight participants viewed AI as either a tool, a partner, or a threat:

"All three of them, because I think one day AI will replace us. I don't know when, but it will be more efficient and more intelligent than us, and I utilise it as a tool and as a partner to ask questions, and I use it to speed up my internal processes" (INT1).

"Yeah, I definitely don't see it as a threat. I see it as a tool, but I also see it as a partner… like I mentioned earlier that it is like a tutor. This is having a better version of Google in your back pocket at all times" (INT2).

"I don't see it as a threat. It is a tool that… must be used… to become a partner of the company… we could have an AI agent that specialises in marketing… So, I would say my belief is we must use AI as a tool in our business" (INT3).

"I'd say AI is definitely a tool that can help you in many ways with work, speeding up work efficiently" (INT4).

"A tool like everything else in web development. I see it as a tool like WordPress or anything like that" (INT5).

"It can be a threat if it is gonna take over humans in some cases. And a threat to even the elder generation. It's a tool because we use it every day" (INT6).

"I see it more as a tool. I don't feel there is a need to look at it as anything else… It's something that you're looking for a result, and it helps you achieve that result… It can help in the right situation or it cannot" (INT7).

"I would say a tool, and I suppose that's just me… It's really just a tool… It's not something that everything is derived from" (INT8).

Source-checking was also mentioned by one participant, who questioned the origin of the code and strategy to ensure quality and fit:

"I'm always cognisant when somebody sends me a strategy or when somebody sends me something, a piece of code, I question, 'Where did you generate it from?'" (INT8).

An additional participant reported:

"[I] tried not to say I am using AI to help me because I feel I am incompetent" (INT6).

The next theme, "Theme 4: Costs, Perceptions, and Value", will focus on the costs and procurement, perceptions and stigma, and generative and creative AI in content generation.

4.4.4. Theme 4: Costs, Perceptions, and Value

This theme reports what participants said about the cost of tools, procurement considerations, perceived benefits, and wider attitudes that influence the use of AI. Figure 4.3 illustrates that

Theme 4 addresses RSQ1, “What are the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?” by describing the material cultures that influence integration, and RSQ3, “What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?” by recording statements that identify strategies for reducing cultural lag. The theme is organised into three subthemes as indicated in Table 4.8: (1) Cost and Procurement Barriers and (2) Perceptions and Stigma around AI.

Table 4.8: Matrix of participant mentions across Theme 4

Theme	Subtheme	INT1	INT2	INT3	INT4	INT5	INT6	INT7	INT8
Theme 4: Costs, Perceptions, and Value	(1) Cost and Procurement Barriers	✓	✓	✓					
	(2) Perceptions and Stigma around AI	✓	✓	✓	✓	✓	✓	✓	✓

4.4.4.1. Subtheme 1: Cost and procurement barriers

This subtheme emanated from the interview questions B3 and D1:

B3. What challenges have you faced in accessing or fully using AI tools?
D1. In your view, is there a noticeable gap between how fast AI technologies are evolving and how the company culture is adapting? Can you share an example?

Therefore, the first subtheme focuses on what participants revealed about the price of tools, subscription choices, and practical constraints that influence their use.

The data analysis shows that two participants mentioned direct cost pressures related to AI integration:

> *“The only problem is potentially the financing of it, because they’ve become quite expensive … The challenge is obviously the finance side and whether this is an actual use case for the AI integration”* (INT1).

> *“…we then moved over to a paid subscription, which is quite pricey for the company … It made us ensure that we subscribed and paid to the premium version”* (INT2).

Three participants explained why they shifted from free to paid tools:

> *“We were forced to purchase the premium version of ChatGPT because we wanted our information to remain private”* (INT1).

"…we then moved over to a paid subscription, which is quite pricey for the company, but I think it's important that we do utilise a paid version" (INT2).

"In the initial stages when we were using the free versions, one was limited to so many … prompts … per day … With us acquiring the enterprise version, it … opened up the ability to just use it … And then of course the privacy aspect … who's accessing what I am feeding [it]" (INT3).

4.4.4.2. Subtheme 2: Perceptions and Stigma around AI

This subtheme emanated from the interview questions C1, C2, C5, and E1:

C1. How would you describe your personal attitude towards AI integration in your work environment? C1.1. Has it changed over time?
C2. Did you at some point experience any form of resistance either personally or from colleagues, and what were the reasons?
C5. What concerns or misconceptions about AI have you heard from colleagues or experienced yourself?
E1. Reflecting on your journey with AI in this company, do you see AI as a threat, a tool, or a partner? Why?

Therefore, this subtheme focuses on the concerns, social narratives, and stigma that participants expressed regarding how AI is viewed and used.

The data analysis shows that eight participants expressed concerns about job impact or role changes:

"There's a general fear that AI is going to replace everyone's jobs" (INT1).

"I think it's the fear of jobs… especially with the high unemployment rate in South Africa" (INT2).

"People were concerned … how's this going to impact my role? Is it threatening my job?" (INT3).

"In my family talks… there was mention of that AI is going to take away jobs" (INT4).

"Definitely, the AI is going to take over developer jobs" (INT5).

"AI… might… make… people lose their jobs… replacing a human" (INT6).

"People have a negative attitude towards AI because it may replace their job…" (INT7).

"There are some elements that AI could potentially risk not only taking jobs, but make our society… lazier…" (INT8).

4.5. Conclusion

In conclusion, this chapter presented the analysed data and empirical findings of the study, collected through semi-structured interviews with employees at a software development company in the Western Cape, South Africa. It was organised into four main themes and subthemes that illustrate both material and non-material cultures influencing AI integration within the company, along with strategies to reduce the potential cultural lag.

In Theme 1, participants listed tools and platforms in use, noted role and task patterns, described access via platform features and APIs, reported reliability checks, and explained that effective AI use depends on deliberate prompt design and refinement. In Theme 2, participants called for workshops, short courses, recurring knowledge sharing, and simple resources; reported encouragement with slower uptake in places; varied comfort; practice-based skill growth; and limited formal leadership communication. Additionally, in Theme 3, participants described task-constrained trust, human verification, boundaries for sensitive use, privacy and data handling concerns, requests for policies, and strategies including policy development, secure configurations, structured learning, expert guidance, and regular practice. Finally, in Theme 4, participants noted subscription costs, free tier limits, repeated context entry without integrations, perceived data handling differences in paid options, and attitudes about job impact and disclosure.

These findings provide a foundation for the next chapter, Chapter Five "Discussion and Interpretation", where their meaning, significance, and relationship to the research questions and theoretical lens are interpreted and discussed in detail.

CHAPTER FIVE: DISCUSSION AND INTERPRETATION OF FINDINGS

5.1. Introduction

The previous chapter presented the analysed data and empirical findings of the study, collected through semi-structured interviews with employees at a software development company in the Western Cape. These findings provide a foundation for this chapter, in which the relationships between the research questions and the theoretical lens will be interpreted and discussed.

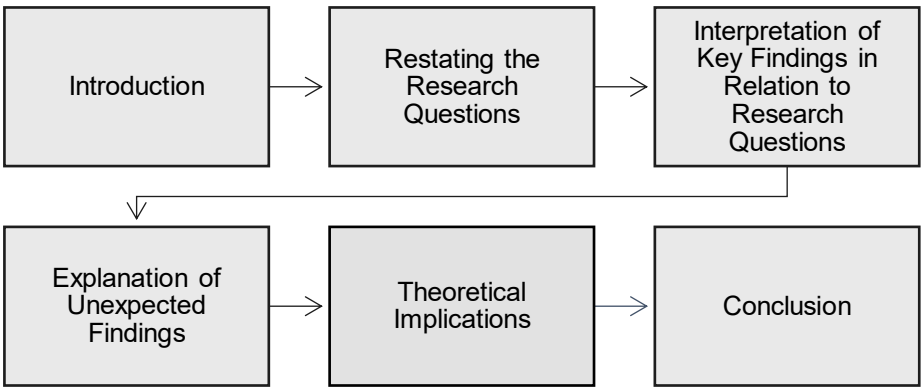

Figure 5.1: Chapter Five outline

Figure 5.1 illustrates the structure of this chapter. The chapter is divided into five additional sections related to the findings presented in the previous chapter. The research questions are restated in the second section. The third section interprets the key findings in relation to each research question. The unexpected findings are discussed next, followed by the study's theoretical implications. The chapter then concludes by summarising the main points covered.

5.2. Restating the research questions

The main aim of this study is to explore the influence of the potential cultural lag on the integration of AI within a software development company in the Western Cape, South Africa. From this aim, the following main research question arises: How does the potential cultural lag influence the integration of AI within a software development company in the Western Cape, South Africa?

In support of the main research question, the research sub-questions outlined below explore how both material and non-material cultural factors influence AI integration, as well as the strategies to reduce the potential cultural lag. The following research sub-questions were used to achieve the main aim:

1. What are the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?
2. What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?
3. What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?

5.3. Interpretation of key findings in relation to research questions

This section interprets and discusses the key findings that emerged in the themes from the data analysis in Chapter Four, in direct relation to the study's research questions, with quotations from participants as support.

5.3.1. RSQ1: Material cultures influencing AI integration

The following findings are key to addressing RSQ1, "What are the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?" in the study.

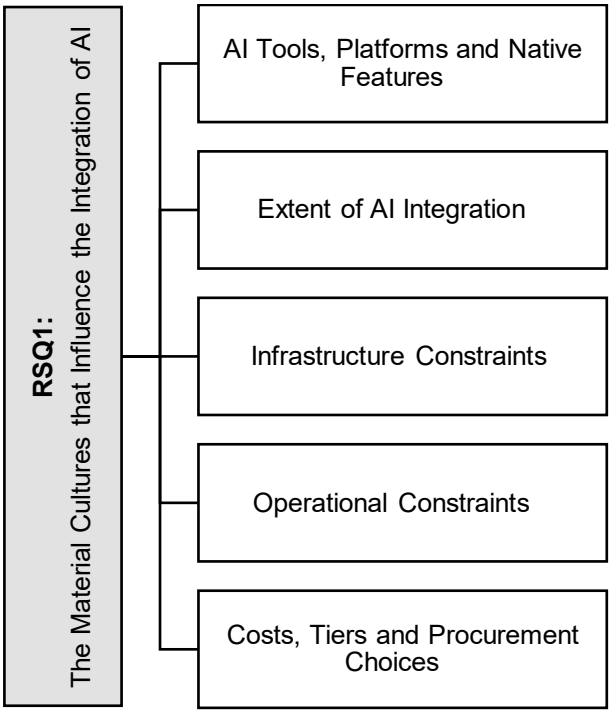

Figure 5.2: The key findings in relation to RSQ1

Figure 5.2 illustrates the key findings in relation to RSQ1, including the AI tools, platforms, and native features; extent of AI integration; infrastructure constraints; operational constraints; and costs, tiers, and procurement choices that influence integration.

5.3.1.1. AI tools, platforms and native features

The findings revealed that the AI tools most commonly mentioned by all eight participants was ChatGPT, followed by Microsoft Copilot, ClickUp AI, Canva AI, Claude, Fireflies.ai, Gemini, DuckDuckGo AI, Meshy, Sora, Cascadeur, Unity AI, WordPress, and Wix AI integrations. Most participants indicated that they use AI for drafting content, summarising meetings, basic coding, and assembling deliverables that are then repurposed and used in code, proposals, emails, briefs, and case studies shared externally with clients. Three participants described ChatGPT as the “main source of AI” they rely on for everyday writing and idea development, while the others used a variety of those listed above.

Similarly, four participants highlighted the convenience of native AI platforms, with two noting that the capability is already built into collaborative suites, allowing employees to use AI tools effortlessly within the platforms they regularly use. The remaining two participants mentioned website builders and content management systems that incorporate AI features, such as Wix and WordPress. It was also revealed that tools like Sora, Cascadeur, and Meshy, along with other AI tools, provide creation capabilities for smaller developers that were previously available only to larger companies.

Together, these findings on AI tools, platforms, and native features align with Imam (2024:30), who highlights tools such as ChatGPT and Copilot for code generation and support. They also align with the literature by Arshad et al. (2025:74062), who discuss how the software development life cycle (SDLC) models are beginning to integrate a range of AI features into every stage to automate operations, accelerate development, and enhance productivity throughout the development process. These findings indicate that the software development company operates a multi-tool AI environment, where more than half of the participants indicated that the company’s AI toolset extends beyond a single model and integrates AI into various company workflows.

5.3.1.2. Extent of AI integration

While all eight participants discussed the simple plug-and-play AI features, one participant spoke about a more advanced custom application programming interface (API) configuration. The participant referenced custom work involving trained models built on open systems.

These findings are consistent with Imam (2024:29), who references similar AI tools that seamlessly integrate into workflows at various stages of the SDLC with minimal setup, alongside more advanced supervised algorithms such as K-nearest neighbour (KNN) and Support Vector Machine (SVM). A participant compared basic access to AI with deeper integration through APIs, emphasising that this software development company is interested in both basic AI integration and the extensive, deeper forms of AI integration.

5.3.1.3. Infrastructure constraints

The findings further revealed that the company already has broad access to AI tools and that all participants use AI. However, hardware performance and intermittent connectivity act as bottlenecks.

The findings are consistent with the literature by McMahon (2013) and Ogburn (1957). First, McMahon (2013) emphasises infrastructure constraints through the concept of cultural lag in the adoption of electronic textbooks in university classrooms. The author specifically points out hardware, user experience improvements, and connectivity as important requirements for successful integration. Second, Ogburn (1957) provides an example of 'adjustment issues' relating to the advancement of engines and brakes in automobiles, which allowed for higher speeds. However, the narrow highway infrastructure, with its sharp curves, remained unchanged. As a result, drivers had to reduce speed to avoid accidents, thereby delaying the technology's full potential and limiting its expected benefits. This highlights that infrastructure constraints, particularly hardware load and intermittent connectivity, are common sources of frustration in this software development company, preventing users of these AI tools from leveraging them effectively and to their full potential.

5.3.1.4. Operational constraints

An additional finding highlighted the operational constraints of AI tools. Seven participants discussed these constraints, while the remaining participant did not address this but described task limits instead. One of the seven participants discussed rate limits and occasional timeouts, while another mentioned that due to hallucination and inaccuracy, they double-check the reliability of outputs before including them in external documents. The other five participants reported issues with network connectivity, bugs, the need to repeat themselves when systems are not integrated, as well as performance differences between tools, all of which influence participants' daily workflows.

It was also revealed that inadequate outputs often lead participants to switch or test different models to compare their performance and results. Participants indicated that they switch models, for example, from ChatGPT to Gemini to get a second opinion, aiming to achieve the best overall output.

These findings somewhat align with Kusak (2022:210), who suggests that AI outputs will match the quality of the input, so if the training data is inadequate or biased, then the outputs will be as well, highlighting a result that engineers colloquially call "garbage in, garbage out" (Kusak, 2022:210). However, this does not consider that AI models are simply not reliable enough due to their potential for hallucination and inaccuracy. Similarly, Thalpage (2023:31) raises trust issues as a challenge of integration by discussing the "black box" problem. According to the

author, this refers to the mystery of how AI systems generate their decisions (Thalpage 2023:33). Therefore, the majority of the participants do not fully trust AI models' outputs, and this may explain why AI performance can vary and why participants opt to switch tools. This underscores that the company faces a range of operational constraints that hinder the effective integration of AI.

5.3.1.5. Costs, tiers and procurement choices

The findings identified direct cost pressures, comparisons of free and paid tiers, usage limits, and perceived differences in data handling across tiers. Two participants described direct subscription cost pressures and concerns about costs influencing AI integration. The other six participants did not mention any cost-related matters. Instead, they discussed usability, skill, and ethics.

Three participants further compared the free and paid subscription tiers, noting that shifting from free to paid is viewed as expensive but essential for dependable and secure use. One of the three participants mentioned that the free-tier version limited them to a certain number of prompts per day and that acquiring the enterprise version unlocked the full potential of the tool. Security and privacy were also highlighted as central to responsible use. Four participants expressed caution about entering client or private information on open platforms. Consequently, three of these four participants highlighted the differences in data handling between the free and paid versions, and reported choosing to purchase the premium version of ChatGPT because they wanted to keep their information private.

Together, these participants highlighted the importance of upgrading to overcome limitations in access, privacy, and functionality. The other five participants either did not comment on the distinction between free and paid tools, or else believed that paying was unimportant, or opposed paying because they felt that AI had not provided enough benefits to justify the cost.

The costs, tiers, and procurement choices correspond with the findings of Soni et al. (2023), Tiwari et al. (2024), and Baqar and Khanda (2024), who discuss economic considerations in integration. Soni et al. (2023:4) highlight AI's role in improving cost-effectiveness by reducing errors and speeding up development, leading to cost savings. Soni et al. (2023:4) argue that AI can automate high-volume, low-value tasks such as quality assurance and support, freeing resources for complex projects and strategic initiatives. Tiwari et al. (2024:43) and Baqar and Khanda (2024:13) agree that AI automation streamlines development, enabling faster, more efficient deployment, and thereby reducing time-to-market. The literature frames the economic case for AI (time and labour savings), which is the rationale for paying for tools. This highlights that, although premium versions of AI tools are costly, only a minority of participants in this

software development company prefer the premium options due to the limitations in access, privacy, and functionality of free versions.

5.3.2. RSQ2: Non-material cultures influencing AI integration

The following findings are key to addressing RSQ2, “What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?” in the study.

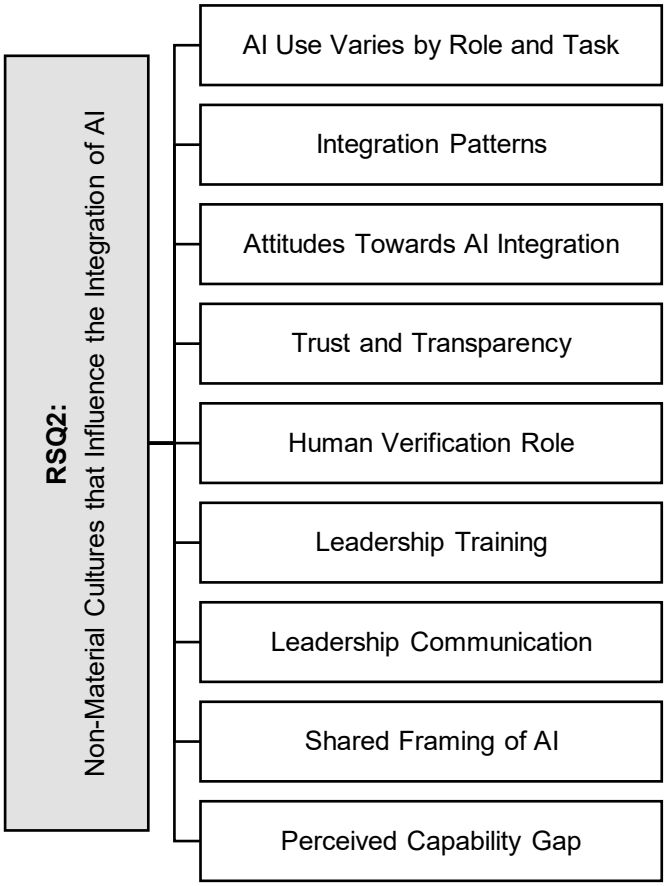

Figure 5.3: The key findings in relation to RSQ2

Figure 5.3 illustrates the key findings in relation to RSQ2, including AI use varying by role and task, integration patterns, attitudes towards AI integration, trust and transparency, the human verification role, leadership training, leadership communication and shared framing of AI, and the perceived capability gap that influences integration. Each of these will be discussed below.

5.3.2.1. AI use varies by role and task

The findings revealed that four participants described AI use as varying across roles and tasks. Two participants further highlighted a distinction between strategic and operational use. For example, a participant noted that admin roles or junior developers may not be as comfortable with AI as senior developers are.

The observations from this study are consistent with the literature in Tenet 3, 'AI Integration in Software Development', which focuses on developers' technical use across the SDLC, and Tenet 4, 'AI Integration in the Software Development Industry', which explores AI integration in the industry at a business level.

The findings also revealed employees' personal initiative when dealing with AI. Four participants stated that developers and designers act on their own initiative, while another participant described integration as situational rather than habitual. This highlights that approximately half of the participants in this software development company will use AI as a tool based on their roles within the company and the specific functions they need to perform, but do not necessarily rely on it on a daily basis.

5.3.2.2. Integration patterns

The findings revealed that the company culture supports the use of AI and encourages experimentation. However, it also revealed that six participants stated that the company's systems are not well set up for AI integration due to limited infrastructure, lack of formal system integration, no workflow alignment, and systems lagging behind. Two participants were more neutral and recognised some capability, but acknowledged that it is not fully integrated, while no participants agreed that the systems are well set up.

The findings also revealed that the company's experimental culture encourages employees to adopt a bottom-up approach within their personal workflows. One participant provided an example of integrating AI into their own workflows by stating, "I introduced ChatGPT for proposal development myself; it wasn't a top-down approach" (INT1).

The above-mentioned observations are consistent with Hofstede's Cultural Dimensions theory (Hofstede, 2011). The findings also indicate that the company has traits of a low uncertainty avoidance culture. This is consistent with Lee et al. (2013), who suggest that cultures with low uncertainty avoidance tend to be more flexible and open to trying new technologies. Similarly, the findings reveal that the company has traits of an individualistic culture. Gallego-Álvarez and Pucheta-Martínez (2019) and Zhang and Maruping (2008) highlight that, in individualistic cultures, people tend to have greater freedom to experiment with new technologies compared to those in collectivist cultures. This highlights that, due to this software development company's low uncertainty avoidance traits, it is more flexible and open to trying new technologies. Similarly, because of its individualistic culture, it gives its employees greater freedom to experiment with these technologies, which is evident in the majority of participants' initiative and bottom-up approach within their workflows.

5.3.2.3. Attitudes towards AI integration

The findings revealed that five out of eight participants were initially sceptical about AI because it was either unfamiliar to them or they lacked the necessary skills and trust in it. In contrast, the other three participants were already comfortable and optimistic about AI.

The findings also indicated that almost all participants highlighted both enthusiasm and concerns in the same accounts. For example, one participant stated, “My personal attitude towards it, I love it. I think it speeds up all processes”, while also noting, “there’s a general fear that AI is going to replace everyone’s jobs” (INT1).

All eight participants expressed concerns about job security or role changes. Four participants expressed fear or uncertainty about their own jobs or roles, while the other four did not fear losing their jobs themselves but described concerns among others in the company or externally. One participant tried to calm fears by comparing current concerns to past reactions to new technology, stating, “people who used to drive horse carriages, they had the same fear about the car when it came out” (INT7).

Additionally, all eight participants reported their comfort levels with AI. Four participants described themselves as mostly comfortable or comfortable with AI, while the other four revealed that they were not very comfortable or had mixed feelings. Several participants also noted that comfort depends on the task, with some reporting uncertainty about when AI is the “right tool for this job” (INT7) and others referencing caution related to data concerns. One participant was concerned about appearing incompetent when using AI and therefore avoided referencing AI use.

Together, these findings are supported by Beitinger (2020) and Blut and Wang (2020:649), who note that technology is often released faster than people can learn to use it effectively. Blut and Wang (2020:654-655) continue to state that one of the biggest barriers to readiness is discomfort; when individuals feel they lack control over a technology, they are less willing to use it.

Similarly, the authors mention that those who are sceptical of technology, due to distrust, are less likely to invest the effort to learn it and more likely to find it difficult to integrate. According to Beitinger (2020), a technology’s effectiveness depends heavily on the knowledge and skills of the people who use, adapt, and improve it. Therefore, as the majority of participants became more familiar with and practised using AI in this software development company, along with gaining trust and skills, their perceptions shifted from scepticism to acceptance.

5.3.2.4. Trust and transparency

Six participants stressed the importance of trust in AI use. These six participants implied that trust is situational and depends on the specific task or its application. One of the six participants also expressed hesitancy to use AI in sensitive areas, such as for financial or legal advice. The two remaining participants did not explicitly mention trust but emphasised human verification and privacy concerns.

Additionally, five of six participants also expressed a consistently cautious attitude towards using AI for content and coding generation, particularly for complete site builds and full end-to-end content generation, describing it as “not good practice” and outside acceptable use.

These observations are consistent with Thalpage (2023:31-33), who discusses trust issues in complex AI models, referring to the “black box” problem, which pertains to the mystery of how AI systems generate their decisions. The author also highlights how it is a challenge of integration and explains how teams establish boundaries when using AI due to a lack of trust. Thalpage (2023:34) adds that in fields like healthcare and finance, where the consequences of AI decisions can be significant, “transparent systems” are essential for ensuring accountability. This highlights that the software development company trusts AI in specific situations, depending on the task or its application, meaning that humans must remain involved in verification and quality control. It also demonstrates that participants use AI to generate snippets of their work rather than allowing AI to produce the entire deliverable.

5.3.2.5. Human verification role

Additionally, several participants’ accounts describe how tasks are divided between employees and AI, revealing the role of AI in the workflow process. Five participants stated that AI tools generate initial drafts, summaries, or templates. Then, employees are responsible for the final verification of the AI outputs, including adjustments through editing, adding context, and refining the content for the specific audience and project. One participant was also sceptical about the source of employees’ task responses and questioned, “Where did you generate it from?” (INT8) because tasks require “environment-specific nuances” that AI may not fully understand.

It was therefore also revealed that participants emphasised the importance of verifying and sourcing outputs as standard practice before sharing them with clients. Five participants also described fact-checking and testing claims, for example, “I will actually probe the AI even further… to test whether I am getting a factual response” (INT3). An additional participant said, “I would ask… ChatGPT a question… and then I cross-reference those answers… sometimes I go to YouTube, Google*”* *(*INT5) while another stated, “doing my own research… and then I compare my research to ChatGPT answers*”* *(*INT6).

The observations made support existing literature on verification testing, as mentioned by Arshad et al. (2025) and Liljavirta (2025), as well as the importance of transparency cited by Thalpage (2023). This emphasises that the software development company values the practice of mandatory human review, fostering a culture where humans oversee and approve AI-generated work before it is released.

5.3.2.6. Leadership training

The findings revealed that no leadership-led AI training was provided to employees. Seven of the eight participants indicated that they had not participated in any leadership-led AI training sessions. However, one participant noted their involvement in an AI-related conference.

This aligns with Power et al. (2010), who explore the influence of individualism and collectivism on technology integration. In a society where individuals prioritise their personal goals and self-interest over community interests, the authors argue that the resulting weak connections between individuals and the expectation of self-reliance can lead to reduced communication and a disconnect between individual and group objectives. This ultimately diminishes the likelihood of companies investing in improvements through team-based management methods (Power et al., 2010:209). It also aligns with Zhang and Maruping (2008:406), who agree that these cultures are more independent in making decisions and are more likely to assess the usefulness of technology on their own, without consulting others. This highlights that this software development company has individualistic traits that do not prioritise developing processes, such as team-based management approaches, improving human skills, and launching improvement initiatives, despite the lack of leadership-led AI training provided to employees, there is a desire for the company to become AI-led.

5.3.2.7. Leadership communication

The findings revealed that all eight participants described a culture that supports AI use, while also noting limited formal communication from leadership about AI goals, expectations, and policies. Seven participants said they were unclear about expectations around AI use, with one stating, “No, I don’t think there’s any expectation” (INT8). Although this participant also did not receive any formal communication, they did not express the same uncertainty as the others. Six participants also spoke about policies related to AI, either noting the absence of policies or proposing policy development and what they should cover, such as data handling, usage policies, intellectual property (IP) policies, and brand identity policies. Overall, due to the lack of leadership communication relating to AI, participants have requested that “perhaps leadership … can do more to promote the effective use of AI” (INT3). These leadership communication strategies will be discussed further in section 5.3.3.2.

At the same time, five participants acknowledged a supportive tone from leadership that avoids pressuring employees into using AI. One participant described the company's culture as open but not forced upon: "There's this openness about AI, which [the company] 100% welcomes. But there's no sort of expectation that you have to use AI for everything" (INT8).

This links back to the literature on Hofstede's cultural dimensions theory, specifically traits of a weak uncertainty avoidance culture. Griffith et al. (2000:305) point out that cultures with weak uncertainty avoidance accept higher levels of risk and therefore do not attempt to control uncertainty with strict regulations, laws, and rules; instead, they welcome life's uncertainties. Low uncertainty avoidance cultures typically impose fewer rules on their members and are more open to change and innovation. They tend to adopt and integrate new technologies quickly without excessive concern about risks and are generally less hesitant and faster to embrace innovations (Gallego-Álvarez and Pucheta-Martínez, 2019:198). This highlights this software development company's weak uncertainty avoidance culture, which accepts higher levels of risk, imposes fewer rules on its employees, and is more open to change and innovation. As a result, the company is generally less hesitant and quicker to integrate innovations.

5.3.2.8. Shared framing of AI

The findings revealed that all participants viewed AI as a tool and, at times, a partner supporting their manual work, rather than replacing human judgment. Only two participants perceived it as a threat, with one participant framing it as all three (tool, partner, and threat).

This aligns with the literature that frames AI as a supportive tool rather than a threat. Soni et al. (2023:2) describe AI as a development assistant that helps with autocomplete, snippet generation, and real-time debugging guidance, making time-consuming tasks more efficient and boosting productivity. This highlights that the software development company largely views AI as a supportive tool to assist with time-consuming tasks such as proposal drafting, project summarisation, writing training manuals, creating skeleton code, explaining code, and helping draft emails.

5.3.2.9. Perceived capability gap

The findings revealed a gap between industry advancements and the company's current integration practices. Seven participants acknowledged that the company's skills and processes need to catch up to address this gap. Only one participant mentioned that there was no noticeable gap between AI development and the company's integration. This participant viewed the company as being at the forefront of technology innovation and already aligned with technological change.

This aligns with Ogburn's (1992) cultural lag theory and the idea that technology outpaces non-material culture. It also aligns with Beitinger (2020) and Blut and Wang (2020:649), who note that technology is often released faster than people can learn to use it effectively, and simply introducing new tools or systems does not mean that users are prepared to integrate them into their work or daily lives. This highlights that, according to the majority of the participants, a cultural lag exists in the software development company, manifesting as a capability gap, which can be attributed to technology advancing faster than this company's knowledge, technical readiness, skills, and processes.

5.3.3. RSQ3: Strategies to reduce the potential cultural lag

The following findings are key to addressing the RSQ3, "What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?" in the study.

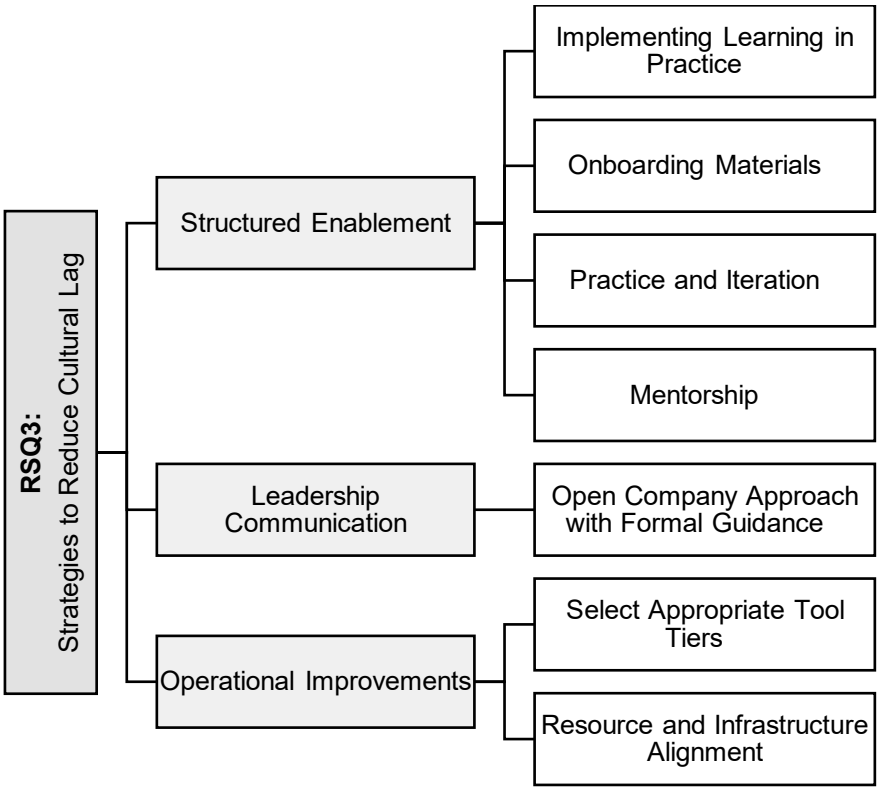

Figure 5.4: The key findings in relation to RSQ3

Figure 5.4 illustrates the findings in relation to RSQ3, including structured enablement, leadership communication, and operational improvements as key strategies to reduce the potential cultural lag, which will be discussed below.

5.3.3.1. Strategy 1: Structured enablement

The findings identified structured enablement as a key strategy to reduce the cultural lag in the software development company. It was noted in section 5.3.2.6 that no leadership-led AI

training was provided to employees. Despite this, the findings revealed a strong interest in training and enablement programmes. All eight participants viewed AI as a skill to be developed and improved. Six participants requested either workshops, short courses, simple learning resources, or clear rules. In contrast, the other two participants did not propose formal training or workshop initiatives, yet both mentioned learning by experimentation and skill development through practice.

i) Implementing learning in practice

As part of the structured enablement strategy, the findings identified the implementation of learning in practice by incorporating updates on AI tools, prompts, and use cases as standard agenda items during meetings. Of the four participants who reported strategies for developing AI skills, two proposed turning AI learning into a recurring team habit, where employees meet regularly to discuss what they have learned. Additionally, another participant proposed using peer learning as a way to improve employees' AI skills. A participant recalled that "on a call about [a client] about the testing for the site and then because we didn't know what a certain word was, we looked it up on ChatGPT and [a colleague] shared it with us*" (*INT4). In this account, a real-time question triggered a quick lookup, which was immediately shared with other employees.

The findings also revealed that the company has traits of a long-term orientation culture. These findings align with Lee et al. (2013:24), who observe that a long-term orientation promotes imitation within society and influences how technology spreads through individuals copying one another. In cultures with a long-term orientation, as described by Hofstede (2011:13), traditions may hinder change; however, once change is socially accepted, its integration accelerates rapidly. This means that most individuals wait until a few trusted users try the tool first, and once these users demonstrate its effectiveness, others quickly follow suit. The strategy also aligns with the literature of Challoumis (2024:135), who emphasises the importance of skills development and upskilling as a factor for successful AI integration. The author emphasises that by investing in training programmes and providing access to diverse learning resources, businesses demonstrate their dedication to developing talent and empowering employees. This investment goes beyond improving existing job performance; it also recognises that skill development should be a continuous and evolving process, allowing employees to grow alongside technological advancements (Challoumis, 2024:135). This highlights that by implementing learning in practice, the company can capture small wins and turn individual experiments into shared knowledge.

ii) Onboarding materials

The findings revealed that of the four participants who reported strategies for developing AI skills, one suggested using simple learning materials and guidebooks on AI to assist with onboarding and help new employees learn to use AI more effectively.

The findings also indicated that the company exhibits traits of an individualistic culture. This aligns with Lee et al. (2013:27), who note that in individualistic cultures, individuals tend to seek information from direct and formal sources independently. This includes using electronic books, e-learning materials, online courses, sharing learning resources on social networks, and producing shared documents with others (Lebeničnik et al., 2015:105). This highlights that by providing onboarding materials such as simple learning materials and AI guidebooks, this software development company can assist new employees in using AI more effectively.

iii) Practice and iteration

Furthermore, practice and iteration emerged as a further key strategy for reducing cultural lag.

The findings indicated that comfort levels, as discussed in section 5.3.2.3, were reported to improve with use and practice, as participants' perceptions shifted towards acceptance. The findings also indicated that to ensure high-quality, accurate outputs, prompting practices must be deliberately refined. A few participants noted that prompts with detailed context, specific expert roles, and precise wording improved both the quality of the prompts and the speed of the outputs.

The literature points back to Challoumis (2024:135), who emphasises the importance of upskilling development teams as a factor for successful AI integration. Therefore, since the majority of participants said that practice helped reduce their uncertainty about AI, this software development company should encourage daily hands-on practice and iteratively refine prompts to improve the quality of responses, relevance, and accuracy of AI outputs.

iv) Mentorship

The findings highlighted the absence of a strong AI mentor to guide the company into the AI space. As a result, one participant recommended finding an AI mentor to increase the company's confidence and awareness of AI, thereby reducing the cultural gap.

The findings also revealed that the company exhibits traits of a collectivist culture. This aligns with Lee et al. (2013:27), who note that individuals in these societies depend on early adopters and like-minded users who have already integrated the technology. Consequently, Zhang and Maruping (2008:406) indicate that when exposed to differing views on a technology's usefulness, these individuals may place greater trust in others' perspectives than their own

decision-making. This also aligns with Korinek and Vipra (2024), who stress that AI integration cannot be achieved in isolation and requires strong ecosystems and partnerships. This highlights that this software development company is in favour of mentorship, which consists of training, expert input, and partnerships.

5.3.3.2. Strategy 2: leadership communication

As illustrated in Figure 5.4, leadership communication is the second strategy revealed from the findings.

i) Open company approach with formal guidance

In section 5.3.2.7, the findings revealed that despite its limited formal leadership communication, the company is open to the use of AI but does not compel employees to use it. The majority of participants said leadership had not clearly communicated the goals, expectations, and policies related to AI. Participants wanted leadership to establish a clear vision for how AI fits into the company's strategy, what outcomes are expected, and what ethical or operational boundaries exist. Additionally, participants noted a lack of formal frameworks governing AI use. They wanted leadership to introduce clear policies and communication channels to create a structured environment in which guidance on approved tools, ethical use, data protection, and best practices is clearly communicated.

This strategy aligns with the literature on uncertainty avoidance as discussed in section 5.3.2.2. This shows that cultures with lower uncertainty avoidance tend to support experimentation with fewer rules. In contrast, those with higher uncertainty avoidance require more explicit guidelines. Additionally, it aligns with Power et al. (2010:209), who assert that individualistic cultures are more inclined to invest in resources such as policies and regulations for operations and decision-making. This highlights that the majority of participants preferred this software development company to maintain an open approach, allowing employees to integrate AI as needed, while also providing basic guidance from leadership on AI use.

5.3.3.3. Strategy 3: Operational improvements

As illustrated in Figure 5.4, 'operational improvements' is the third strategy revealed from the findings.

i) Select appropriate tool tiers

As part of the operational improvements**,** the findings revealed that it is important to select appropriate tool tiers to help reduce cultural lag within the company. Section 5.3.1.5 discusses the usage limits of the free tier and the differences in data handling across paid versions.

This aligns with the literature discussed in section 5.3.1.5 regarding costs, tiers, and procurement choices, which supports the findings of Soni et al. (2023), Tiwari et al. (2024), and Baqar and Khanda (2024). The literature frames the economic argument for AI, emphasising time and labour savings that help justify the cost of AI tools. This highlights that the company should opt for safer paid subscriptions because these options improve data handling and remove usage limits.

ii) Resource and infrastructure alignment

Additionally, as part of the operational improvements, the findings revealed that to reduce the cultural lag, the company should prioritise aligning resources and infrastructure. The findings from section 5.3.1.3 indicate that technical readiness is constrained by hardware performance and intermittent connectivity. Therefore, to enable employees to fully use AI without friction, the company must upgrade hardware and network systems and integrate AI tools with core systems and databases.

This aligns with the views of Mir et al. (2020) and Althati et al. (2024:220-221), who link resource and infrastructure alignment directly to improving AI integration. They argue that successful AI integration is not just about access to data, but also about ensuring that the necessary infrastructure, hardware, storage, processing capacity, and networks are in place to process the data effectively. The authors' position is that infrastructure alignment acts as an enabler of AI integration, meaning AI cannot deliver value unless the company's systems are capable of handling its computational and integration demands.

5.4. Additional findings

This section, based on the findings from Chapter Four, highlights additional insights that emerged as the questions were probed. The researcher chose to include these because they stand out from general patterns in the data and represent new understandings.

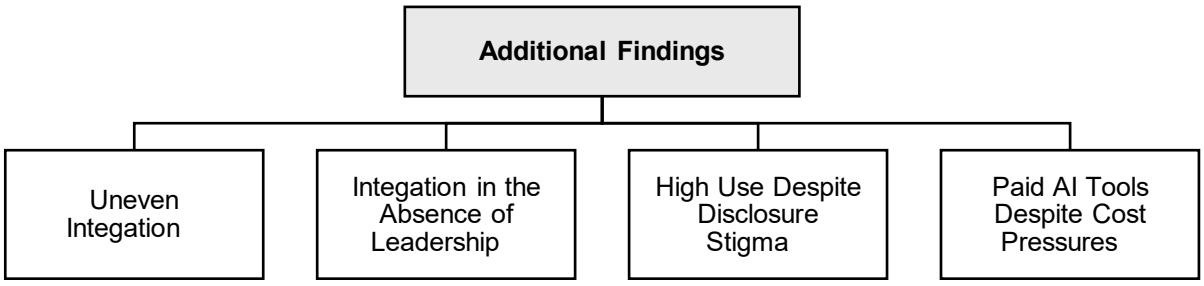

Figure 5.5: Additional findings

As illustrated in Figure 5.5, these four additional findings include uneven integration, integration in the absence of leadership, high AI use despite disclosure stigma, and a preference for paid AI tools despite cost pressures. The first additional finding was that, although most participants described a culture that “embraces” AI and encourages experimentation, a few participants also identified the company as “slow adopters”. This resulted in uneven integration in the company. Additionally, a second unexpected finding was that all participants began using AI on their own initiative, without leadership direction. The third was that although all participants used AI to greatly improve their workflow, there was hesitance to reveal their AI use to colleagues or leadership because they worried about appearing incompetent. The final additional finding was that, despite cost pressures, participants still favoured paid AI tools, as they offer better data protection and reduce the risk of leaks.

5.5. Theoretical implications

The study’s theoretical lens is Ogburn’s Cultural Lag theory, which is applied to a modern software development company in the context of AI integration. It serves as an appropriate theoretical lens for identifying the specific material and non-material cultures that influence AI integration and for developing strategies to reduce the cultural lag, thereby enabling smoother, more effective integration. Table 5.1 interprets the Chapter Four findings through the lens of Ogburn’s Cultural Lag theory, categorising the implications into ways the findings support, challenge, and expand the theory.

Table 5.1: Interpretations of the study through the lens of Ogburn’s Cultural Lag theory

Implications to the theory	Findings in relation to the theory	Interpretation of findings in relation to the theory
How the findings support the theory	Technology is moving faster than employees and processes	Most participants describe rapid growth in AI tools, but note that skills, policies, and daily habits are still developing. They request more structured training, clearer regulations, and stronger leadership guidance, indicating that the social aspects are still catching up with the technological advances.
	Material cultures slow integration	Hardware limitations, weak integrations, and subscription costs all hinder the seamless use of AI. These material cultures limit day-to-day practice from reaching the full potential of the tools.
	Non-material cultures lag behind	Different comfort levels, concerns about privacy, fears of job loss, and uncertainty about trusting AI indicate that societal norms and attitudes change more gradually than the technology itself.
	Humans hold the ultimate authority in the workflow through human verification	Some participants check sources, verify facts, and establish boundaries. This human oversight indicates that social norms are still developing around rapidly advancing technology.

Implications to the theory	Findings in relation to the theory	Interpretation of findings in relation to the theory
How the findings challenge the theory	Social change varies in speed, some shifts happen faster than others	Most participants are already open to new tools, leading to uneven progress as some employees integrate quickly, while others wait for leadership guidance. This reduces the classic lag pattern because most participants in the company are already aligned, rather than the entire company being misaligned.
	Practical rules emerge quickly	Some participants have developed informal rules for themselves. These rules appear before formal policies, demonstrating that social change can keep pace in specific contexts.
How the findings extend the theory	Strategies to reduce the lag	By identifying strategies to reduce the gap in the company, it extends the theory by showing specific ways that can reduce the lag in similar contexts.
	Regulations as accelerators	Transitioning from free to paid plans to improve privacy, and establishing clear rules, demonstrate how policy and regulations can reduce the gap.
	From top-down to bottom-up alignment	Ogburn's theory emphasises institutional adjustment, but findings highlight a bottom-up approach, where employees initiate practices that spread company-wide and can still drive change.

As illustrated in Table 5.1, Ogburn's (1992) Cultural Lag theory is supported by showing that, despite rapid AI advances, effective use is hindered by developing skills, policies, habits, practical limits, uneven trust, and the need for human oversight on tasks, indicating that the company's non-material culture is still catching up. However, the findings also challenge the theory by revealing that some employees quickly integrate AI through bottom-up experimentation and informal rules, while others wait for policies. Additionally, the findings extend the theory by identifying strategies such as moving from free to paid plans to improve privacy and implement employee-led practices. This provides practical ways to align culture with technology and implement a bottom-up approach to reduce lag.

5.6. Conclusion

This chapter interpreted and discussed the relationship between the research questions and the theoretical lens, as well as the meaning of the findings, their significance, and their relevance to the existing literature. The findings were aligned with the body of literature, drawing on insights from Hofstede's Cultural Dimensions and other scholars such as Thalpage (2023), Challoumis (2024), and Arshad et al. (2025). These authors provide complementary perspectives for understanding how cultural lag influences the integration of AI within the selected software development company. In particular, Ogburn's Cultural Lag theory serves as an appropriate theoretical lens for identifying the specific material and non-material cultures

that influence AI integration and for developing strategies to reduce cultural lag, thereby enabling smoother, more effective integration.

The findings and interpretations of this study reveal the specific material and non-material cultures that either support or slow down AI integration. Key strategies to reduce the cultural lag were identified, as illustrated in Figure 5.4, through ‘structured enablement’, ‘leadership communication’, and ‘operational improvements’. The next chapter, ‘Conclusion’, deals with the practical implications of the study’s findings and reflects on the significance and contribution.

CHAPTER SIX: CONCLUSION

6.1. Introduction

This chapter concludes the research by summarising the key findings, interpreting their implications, and discussing the practical applications of these insights for integrating AI into a software development company in the Western Cape, South Africa. As illustrated in Figure 6.1, the chapter also explores the theoretical and practical contributions to the field of AI integration in software development. By providing an overview of this research, including its limitations, this chapter aims to emphasise the significance of the findings and propose recommendations for future research and practical actions.

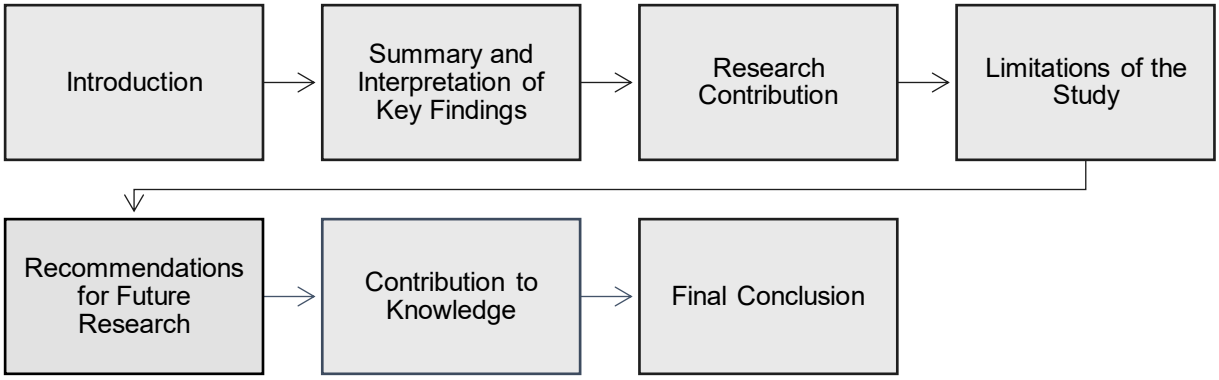

Figure 6.1: Chapter Six outline

6.2. Summary and interpretation of key findings

Figure 6.2 presents the key findings of the study based on the three research questions posed in Chapter One:

RSQ1: What are the material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?

RSQ2: What are the non-material cultures that influence the integration of AI in a software development company in the Western Cape, South Africa?

RSQ3: What are the strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa?

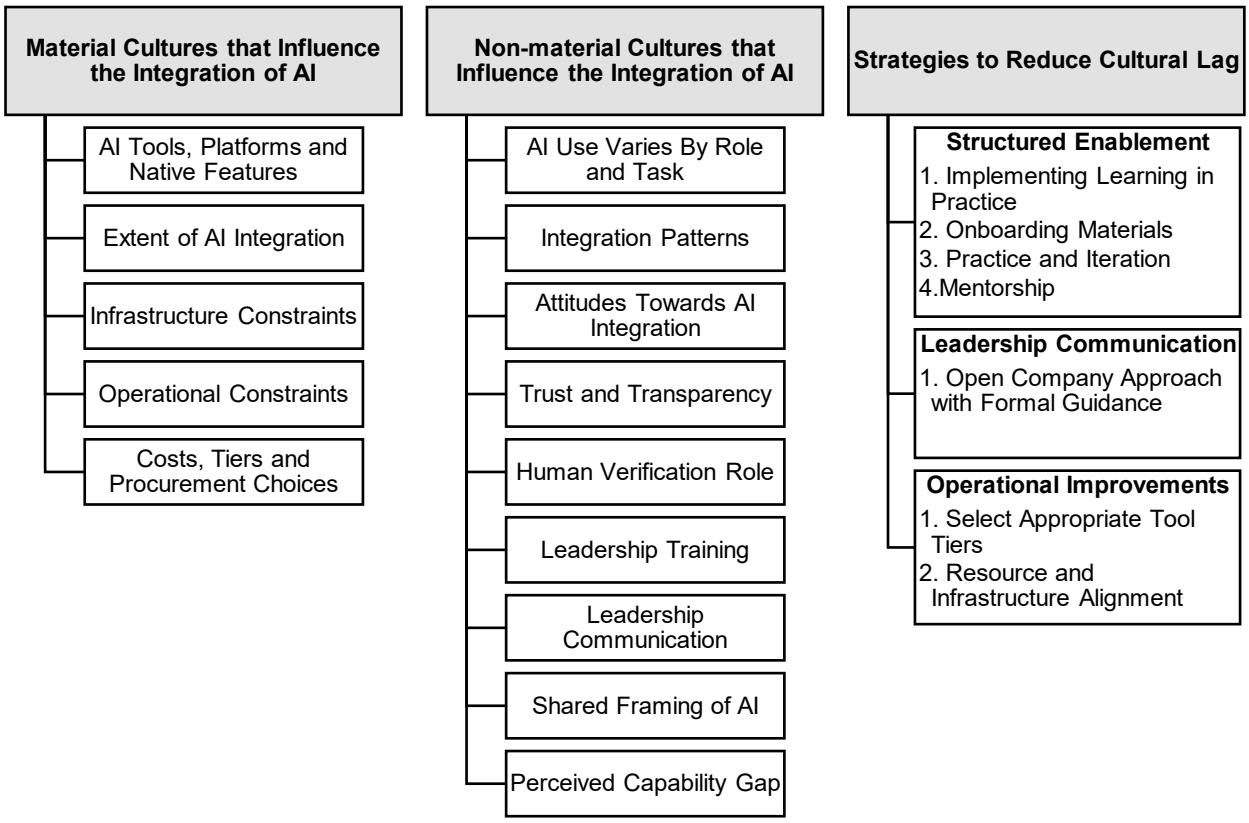

Figure 6.2: The key findings of the study

As shown in Figure 6.2, the study identified both the material and non-material cultures influencing the integration of AI in the software development company, and it proposes strategies to reduce the resultant cultural lag. The distinct material cultures existing in the company are characterised by a multi-tool AI environment that integrates AI into various workflows. Additionally, the company offers both basic and advanced API-level AI integration; however, infrastructure constraints, operational constraints, costs, tiers, and procurement choices hinder the effective and full utilisation of these AI tools. In terms of the distinct non-material cultures, it became evident that while the company adopts a bottom-up, role-sensitive approach to AI integration within a supportive culture, its infrastructure readiness and lack of clear policies, training, formal communication, and leadership guidance present constraints. It was also found that as familiarity and skills improved, participants became less sceptical, leading to greater acceptance of AI integration; however, the capability gap remains the main challenge to integration across the company.

The cultural lag that exists within the company can be attributed to misalignment between these two cultures. The study, therefore, proposes strategies to reduce this lag during the integration of AI. These strategies include leadership communication, structured enablement, and operational improvements. Leadership communication comprises clearly communicating goals, expectations, and policies related to AI from leadership, while maintaining the

company's supportive and non-coercive approach. This could involve leadership introducing clear policies and communication channels that provide structured guidance on approved tools, ethical use, data protection, and other AI-related best practices. A second strategy is structured enablement, which includes learning through practice, providing onboarding materials, encouraging practice and iteration with AI tools, and appointing mentors to raise confidence and awareness. The final strategy is operational improvement by upgrading its tools through selecting tool tiers that address limitations in access, privacy, and functionality, and prioritising the alignment of resources and infrastructure. Together, these strategies can reduce cultural lag and support smoother and more effective AI integration across the company.

6.3. Research contribution

According to Ogburn (1992), modern culture develops in two aspects: material culture (technology, tools, inventions, etc.) and non-material culture (values, beliefs, ethics, social norms, etc.). The author observed that these two aspects do not evolve at the same pace, with material culture typically advancing more quickly than non-material culture. As shown in Figure 6.3, this disparity, termed cultural lag, highlights the temporary misalignment between these cultural aspects and the challenge societies face in aligning their behaviours with innovation (Ogburn, 1922:199).

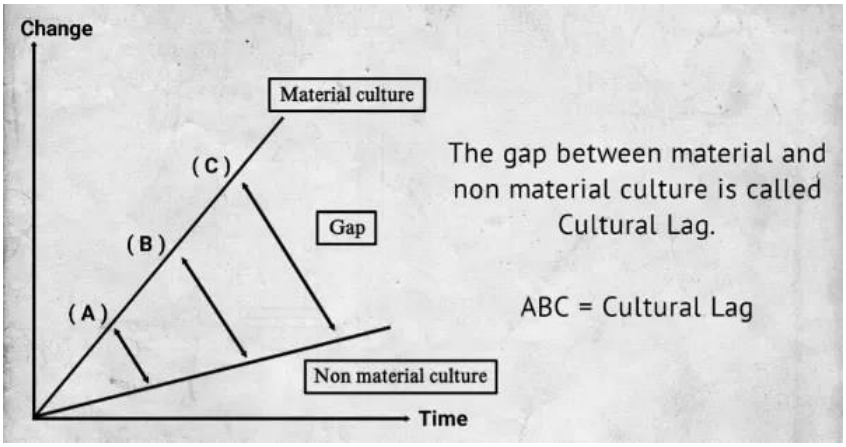

Figure 6.3: Cultural Lag (Ogburn, 1922)

The findings of this study led to the development of a modified version of Ogburn's depiction of Cultural Lag theory, as illustrated in Figure 6.4. This modified version, 'A Strategy Model to Reduce Cultural Lag for AI Integration', is specifically designed for the integration of AI in the selected software development company in the Western Cape, South Africa. Unlike the original depiction of Ogburn's Cultural Lag theory, this model introduces the three strategies to reduce the cultural lag, which is particularly relevant in this context. This modified model contributes to expanding the study's theoretical framework and serves as a practical tool to aid in reducing

cultural lag. The model could potentially be applied beyond this single software development company to the software development industry and other industries experiencing similar misalignments.

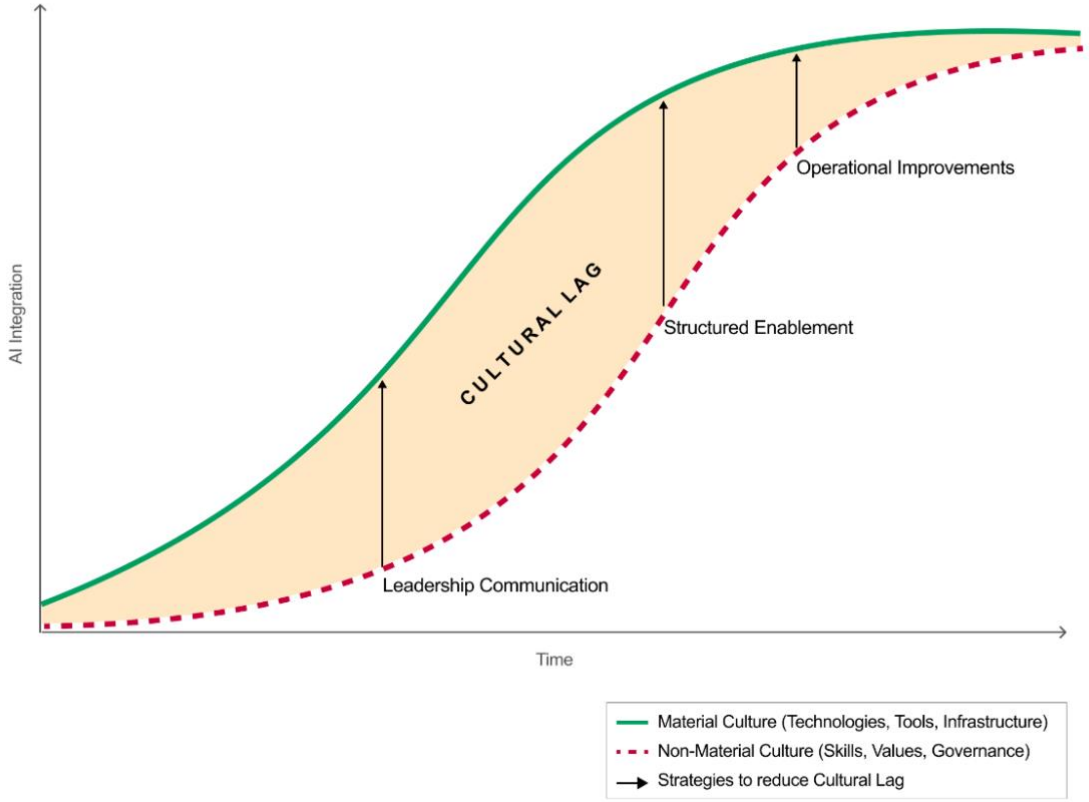

Figure 6.4: A Strategy Model to Reduce Cultural Lag for AI Integration

Figure 6.4 indicates that as time progresses, material culture advances rapidly, supporting Ogburn's (1992) argument that material culture typically evolves faster than non-material aspects of society. The material culture, as discussed in section 5.3.1, is represented by the green solid curve, which rises sharply during the initial phases of AI integration due to the company's readiness to use AI tools.

The non-material culture, including employees' attitudes, leadership training and communication processes, is represented by the dashed red curve. As discussed in section 5.3.2, non-material culture initially lags behind material culture as employees deal with distrust, skill gaps and the lack of formal policies.

Over time, however, the dashed red curve is likely to accelerate upward as the company implements strategies such as leadership communication, structured enablement, and operational improvements. The three strategies are presented in chronological order, where each one builds on the previous: first, leadership communication aligns the company;

structured enablement then empowers employees; and finally, operational improvements formalise the AI integration process. All of these strategies are discussed in detail in section 5.3.3.3.

The distance between the two lines represents the cultural lag, which Ogburn (1922:199) describes as a temporary misalignment between these cultural aspects and the challenge societies face in aligning their behaviours with innovation. Over time, the two curves can converge, symbolising the closing of the cultural lag where technological innovation and company culture evolve harmoniously. This alignment improves AI integration, supporting Ogburn's theory by suggesting that alignment is both possible and important through deliberate adaptation of non-material culture to match technological advancement.

6.4. Limitations of the study

The study's limitations include a relatively small sample size of eight participants from a single software development company located in a specific geographic region, the Western Cape, South Africa. The sample size limits the generalisability of the findings to a broader population of software development companies. A larger sample, consisting of more software development companies, may have provided a broader understanding of the varied experiences and perspectives within the industry. Additionally, since this study focuses on the Western Cape region, it may not fully represent the experiences of all software development companies in other parts of South Africa, especially those with different technical and cultural contexts.

This study's single case study research strategy limits the ability to generalise the findings to other software development companies. The replication of this single case may prove challenging if the organisational context, technology landscape, or culture changes significantly over time. By recognising these limitations, the study's findings should be interpreted with caution, and further research is necessary to validate and extend these findings.

6.5. Recommendations for future research

Future research could explore conducting longitudinal studies to track changes in AI integration over time. In addition, future research could focus on comparative studies to compare the experiences of software development companies in different technical and cultural contexts. Furthermore, quantitative studies and mixed-method studies could be undertaken to gain a more comprehensive understanding of AI integration. Finally, further research could focus on the ethical issues arising from the influence and integration of AI in the software development industry. Future studies could also expand this research by including multiple software

development companies across different regions of South Africa to compare cultural readiness, governance practices, and AI integration strategies in a wider industry context.

6.6. Contribution to knowledge

6.6.1. Practical contribution

This study presents *A Strategy Model to Reduce Cultural Lag for AI Integration*. This practical contribution applies the model, as shown in Figure 6.4, to illustrate the phenomenon of cultural lag within the selected software development company. The model demonstrates how material culture evolves significantly faster than non-material culture, creating a cultural lag. It introduces strategies to reduce this lag and serves as a practical tool to assist in reducing cultural lag. The model can be applied beyond this single software development company to the wider software industry and other industries experiencing similar disparities.

The practical contribution of this study is the real-world application of the research findings. It focuses on how *A Strategy Model to Reduce Cultural Lag for AI Integration* can be utilised to address problems, enhance processes, or inform decision-making within the selected software development company. This model links Ogburn's Cultural Lag theory with software development practice by recommending strategies to reduce cultural lag, including leadership communication, structured enablement, and operational improvements.

6.6.2. Theoretical contribution

This study's theoretical contribution lies in applying Ogburn's century-old Cultural Lag theory to the contemporary context of AI integration in a software development company. By applying the theory to current phenomena, this study validates that Ogburn's theory remains relevant and expands it as indicated in section 5.5. In doing so, it provides a deeper understanding of how material cultures and non-material cultures influence AI integration.

This theoretical contribution advances existing knowledge of Ogburn's Cultural Lag theory by explaining the relationship between material and non-material cultures in a contemporary organisational setting. It strengthens the theoretical foundation of cultural lag by introducing a new perspective on the integration of AI within a software development company in the Western Cape, South Africa. Ultimately, the theoretical contribution of this study offers a more nuanced understanding of Ogburn's century-old Cultural Lag theory in the contemporary context.

6.7. Conclusion

At its core, this study explored the integration of AI within the software development industry. The researcher employed a single case study conducted at a software development company in the Western Cape, South Africa. The study adopted Ogburn's Cultural Lag theory as its

theoretical lens, which explains that material culture (technology, tools, etc.) often evolves more rapidly than non-material culture (values, beliefs, social norms). The findings echo Ogburn's concept that the company's material and non-material cultures advance at different speeds, creating a lag that hinders technological integration.

The research resulted in the development of *A Strategy Model to Reduce Cultural Lag for AI Integration*. This model identifies the material and non-material cultures influencing AI integration and proposes strategies to reduce the potential cultural lag. Sustainable and effective integration relies on aligning material innovations with non-material values, beliefs, and practices. The findings aim to benefit stakeholders, including software developers, IT professionals, business leaders, investors, academics, researchers, policymakers, and educational institutions, by facilitating smoother technological transitions and improving the overall effectiveness of AI implementation in the industry.

By applying this theory, the study confirms that Ogburn's Cultural Lag remains a relevant theory for understanding digital transformation in the modern context of AI, contributing to the expanding body of knowledge in this field. In doing so, the identified model can be applied beyond this single software development company to the wider software industry and other industries experiencing similar misalignments. This allows companies to identify their material and non-material cultures and develop strategies to reduce cultural lags, enabling smoother and more effective technological integration.

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APPENDICES

APPENDIX A: Interview Guide

INTERVIEW GUIDE

Title: Exploring the Influence of Cultural Lag on AI Integration in a Software Development Company in the Western Cape, South Africa

Name of researcher: Roxi Francke
Contact email: 217194540@mycput.ac.za
Contact details: 0824626360
Name of supervisor: Dr K. Ohei
Contact email: oheik@cput.ac.za

Dear participant,

We are conducting a research project within the Master of Information Technology in the Faculty of Informatics and Design at the Cape Peninsula University of Technology. This study aims to explore the influence of the potential cultural lag on the integration of Artificial Intelligence (AI) within a software development company in the Western Cape, South Africa. To achieve this, there are three research objectives: first, to identify the material culture that influences the integration of AI in a software development company in the Western Cape, South Africa; second, to identify the non-material culture that influences the integration of AI in a software development company in the Western Cape, South Africa; and third, to identify strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa.

I would greatly appreciate your assistance by participating in this interview. With your permission, it will be recorded. Your participation is completely voluntary, and you can withdraw at any time. The interview guide is user-friendly and should take approximately 30-45 minutes. All information will be kept confidential, with no personal questions linking you to the responses. Anonymity is guaranteed, and identifiers from INT1 to INTn will be used. The study has received ethical approval and complies with CPUT requirements. The data collected will be used solely for this study.

Section A

Demographic Questions

A1. What is your current job title at the company?
A2. Which department or team do you work in?
A3. Could you provide a brief description of your current role and responsibilities within the company?
A4. How long have you been working at this company?
A5. How many years of experience do you have in the software development industry?
A6. Can you describe your general comfort level with AI technologies?
A7. Do you work directly with AI technologies in your role?

Section B

Material Culture and AI Integration

B1. What AI technologies do you currently use to complete company tasks?
B2. How have these AI technologies changed your daily workflow, decision-making, or productivity?
B3. What challenges have you faced in accessing or fully using AI tools (e.g. software limitations, infrastructure, data availability, support)?
B4. Are the company's current operations and workflows suitable for integrating new AI technologies? Why or why not? Can you provide some examples?
B5. Was any formal technical support, onboarding, or training provided? If so, how effective was it in enabling your use of AI?

Section C

Non-Material Culture and AI Integration

C1. How would you describe your personal attitude towards AI integration in your work environment? C1.1. Has it changed over time?
C2. Did you at some point experience any form of resistance either personally or from colleagues, and what were the reasons?
C3. How does the company's culture, values, informal norms, or unwritten rules influence your use or avoidance of AI tools?
C4. How clearly has leadership communicated the purpose, goals, or expectations around AI integration?
C5. What concerns or misconceptions about AI have you heard from colleagues or experienced yourself? C6. How have these influenced AI integration efforts in the company?

Section D

Bridging the Cultural Lag

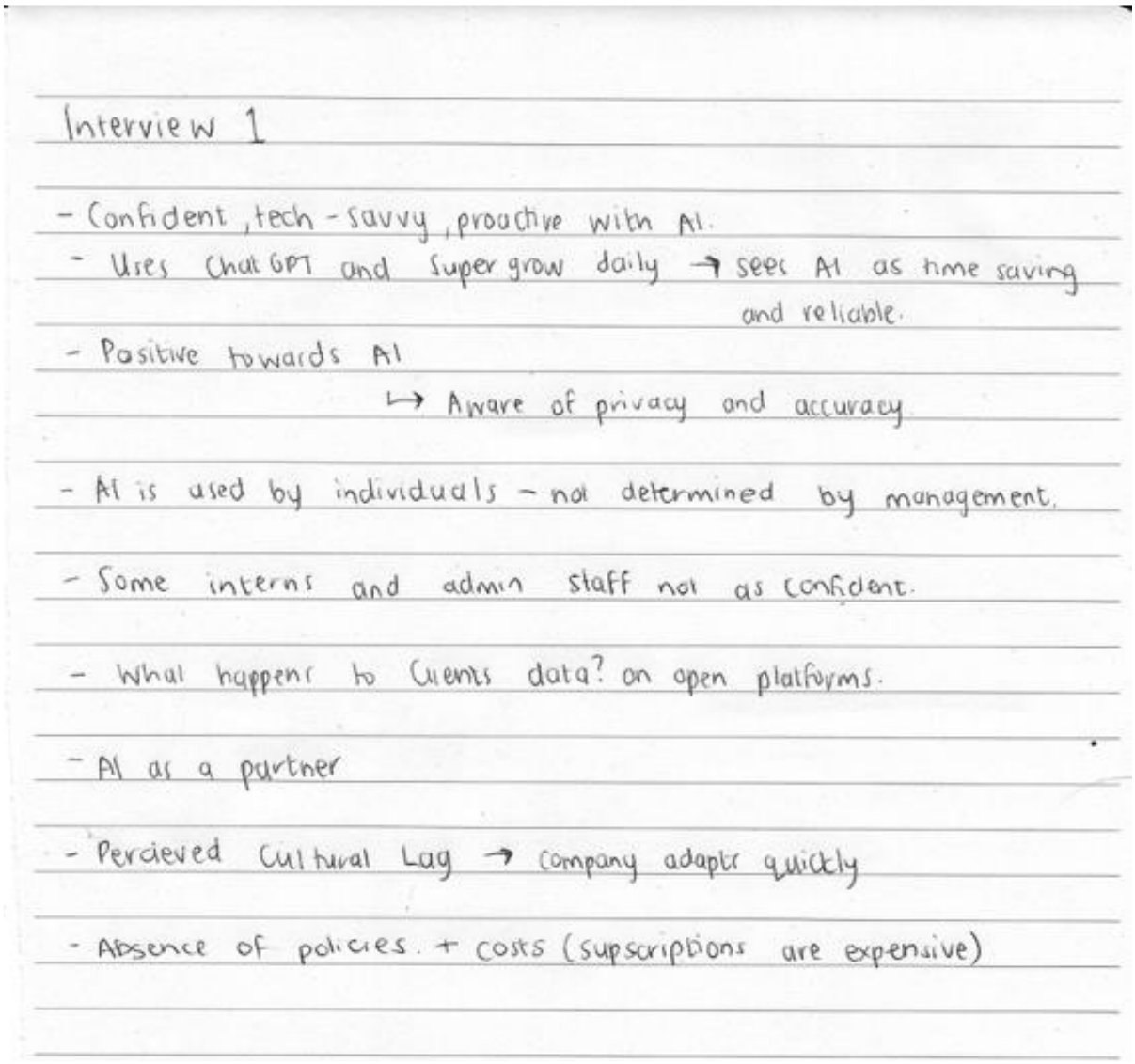
D1. In your view, is there a noticeable gap between how fast AI technologies are evolving and how the company culture is adapting? Can you share an example?
D2. Have there been any company-led initiatives aimed at improving AI understanding, usage, or acceptance? If any existed, how were they received?
D3. What kind of support would you recommend to make it easier for you and your colleagues to integrate AI technologies effectively?
D4. What policies or cultural changes would you recommend to better align people and processes with AI integration?

Section E

Broader Reflections

E1. Reflecting on your journey with AI in this company, do you see AI as a threat, a tool, or a partner? Why?
E2. Can you share any success stories, failures, or experiences you have witnessed or been part of, related to AI use?
E3. Is there anything else you would like to add regarding the interaction of AI and the company culture?

APPENDIX B: Sample of Reflexive Notes



Interview 1

- Confident, tech-savvy, proactive with AI.
- Uses ChatGPT and Supergrow daily → sees AI as time saving and reliable.
- Positive towards AI
  ↳ Aware of privacy and accuracy
- AI is used by individuals – not determined by management.
- Some interns and admin staff not as confident.
- What happens to clients data? on open platforms.
- AI as a partner
- Percieved Cultural Lag → company adapts quickly
- Absence of policies + costs (supscriptions are expensive)

APPENDIX C: Sample Email Sent to Interviewees

Sent: Wednesday, August 6, 2025 5:38 PM
To: [redacted]
Subject: Summary of Findings - Member Checking Request

Dear [redacted]

Thank you again for your valuable participation in this study. Below is a brief summary of the main points derived from my interview with you, as part of my analysis for the research project titled "The Influence of Cultural Lag on Integration of Artificial Intelligence in a Software Development Company in the Western Cape, South Africa."

The main points I have captured from your interview include:

- Head of Business Development at HashTopic, responsible for crafting growth strategies, writing proposals, attending client meetings.
- Comfortable using basic AI technologies across functions like LinkedIn marketing and proposal drafting.
- Employs ChatGPT and Supergrow for drafting emails, proposals and LinkedIn posts.
- AI handles grammar, tone, and structure, removing tedious tasks and boosting decision-making and overall workflow efficiency.
- Faces high subscription costs and foresees network limitations; lack of tool integration forces repetitive instructions to AI.
- Concerned about NDA breaches when sharing client data; the team upgraded to ChatGPT Premium and is building an internal AI solution to safeguard privacy.
- No formal AI training - self-taught
- The culture of the company strongly encourages innovation and AI use, but lacks structured guidance; AI tool adoption often happens in silos, with limited sharing among colleagues.
- Views AI as a tool, partner, and eventual threat - human oversight remains essential; has experienced AI-driven successes in winning deals and conducting market research.

Please advise if you agree with the above.

Warm regards,
Roxi Francke

Thursday, August 7, 2025 at 21:54:32 South Africa Standard Time

Subject: Re: Summary of Findings - Member Checking Request
Date: Thursday, 07 August 2025 at 21:54:31 South Africa Standard Time
From: Roxi Francke
To: [redacted]

From: Roxi Francke <[redacted]>
Date: Thursday, 07 August 2025 at 21:49
To: [redacted]
Subject: Re: Summary of Findings - Member Checking Request

Hi [redacted]

Thank you for bringing that to my attention. I will make that amendment.

Thank you,
Roxi

From: [redacted]
Date: Thursday, 07 August 2025 at 09:12
To: Roxi Francke <[redacted]>
Subject: Re: Summary of Findings - Member Checking Request

Hi Roxi,

Thanks for the awesome interview, I really enjoyed it.

I agree with the below, I have one amendment. Please see it in red.

Kind regards

[redacted]

From: Roxi Francke <[redacted]>

APPENDIX D: Audit Trail

1. Interview Process

- **Sample:** 8 employees (software developers, project manager, and managers) from a software development company in the Western Cape, South Africa.
- **Interview Format:** Semi-structured interviews.
- **Interview Guide Outline:**

    - Section A: Demographic Questions
    - Section B: Material Culture and AI Integration
    - Section C: Non-Material Culture and AI Integration
    - Section D: Bridging the Cultural Lag
    - Section E: Broader Reflections

2. Audio Recordings

- **Tool Used:** Microsoft Teams
- **Storage:** All recordings were stored securely in encrypted folders on OneDrive.
- **Retention Period:** Will be stored securely for 5 years post-publication, in compliance with institutional ethics requirements.

3. Transcription Notes

- **Method:** Verbatim transcription by Microsoft Teams' built-in transcription tool.
- **Format:** Microsoft Word documents with timestamped sections.
- **Editing Process:**
    - Initial draft by transcription tool
    - Cleaning of data

4. Data Analysis

- **Approach:** Thematic coding using Braun and Clarke's (2006) method.
- **Software:** ATLAS.ti™
- **Stages:**
    1. Raw data transcription
    2. Familiarisation
    3. Import interview transcripts into ATLAS.ti™
    4. Generate initial codes
    5. Search for themes
    6. Review themes
    7. Define and name themes
    8. Produce the analytical narrative for Chapter Four

- **Examples of Codes:**
    - Cost and procurement barriers
    - Technical readiness and infrastructure
    - Security, privacy, and governance measures
    - Training and enablement programmes
    - Employee attitudes and Integration readiness toward AI

APPENDIX E: Ethics Approval

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University of Technology
creating futures

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Secretary: Mziyanda Ndede

15 May 2025

Ms Roxi Francke
c/o Department of Information Technology
CPUT

Reference no: 217194540/2025/2

Project title: The Influence of Cultural Lag on Integration of Artificial Intelligence in a Software Development Company in the Western Cape, South Africa

Approval period: 15 May 2025 – 31 December 2026

This is to certify that the Faculty of Informatics and Design Research Ethics Committee of the Cape Peninsula University of Technology approved the methodology and ethics of Ms Roxi Francke (217194540) for Master of Information Technology.

Any amendments, extension or other modifications to the protocol must be submitted to the Research Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Prof L.J. Theo
Chair: Research Ethics Committee
Faculty of Informatics and Design
Cape Peninsula University of Technology

APPENDIX F: Sample of Participant Consent

FID/REC/ICv0.1

FACULTY OF INFORMATICS AND DESIGN

Individual Consent for Research Participation

Title of the study: The Influence of Cultural Lag on Integration of Artificial Intelligence in a Software Development Company in the Western Cape, South Africa.

Name of researcher: Roxi Francke
Contact details: email: 217194540@mycput.ac.za phone: 0824626360

Name of supervisor: Dr Kenneth Ohei
Contact details: email: oheik@cput.ac.za
phone: +27 (73) 063 3904

Purpose of the Study:

Introduction
This study aims to explore the influence of cultural lag - a delay in societal adaptation to technological change - on the integration of Artificial Intelligence (AI) within a software development company in the Western Cape, South Africa. The research will specifically investigate how material culture (e.g. technology, tools) and non-material culture (e.g. values, norms) influence AI integration. It seeks to identify strategies to mitigate cultural lag and improve the integration and implementation of AI systems in the company.

Aim
To explore the influence of the potential cultural lag on the integration of AI within a software development company in the Western Cape, South Africa.

Research Objectives

1. To identify the material culture that influences the integration of AI in a software development company in the Western Cape, South Africa.
2. To identify the non-material culture that influences the integration of AI in a software development company in the Western Cape, South Africa.
3. To identify strategies to reduce the potential cultural lag in the integration of AI in a software development company in the Western Cape, South Africa.

Participation: Participants will include staff from the selected software development company across various roles such as Business Developers, Junior Developers, UX/UI Designers, VR

Developers, Project Managers, Senior Developers, Marketing professionals, Senior Management, and the Managing Director - anyone involved in AI either directly or indirectly

Confidentiality:

- All participant information will remain confidential.
- Pseudonyms (e.g., "P1", "P2") will be used to maintain anonymity.
- Company names and identifying information will not appear in the final research output.

Anonymity:
Anonymity is ensured by removing personal identifiers from transcripts and storing data in a password-protected environment. Audio recordings will be stored securely and identification will be removed

Conservation of data: The collected data will be encrypted and securely stored on the university's data management platform and retained for five years before deletion.

Voluntary Participation: Participation is entirely voluntary. Participants can withdraw at any time without any consequences.

Additional consent: I make the following stipulations (please tick as appropriate):

	In thesis	In research publications	Both	Neither
My name may be used:				☑
My exact words may be used:	☑	☑	☑	
Any other (stipulate):	None			

	Yes	No
Permission to be recorded during interview session:	☑	

Acceptance: I, Jordan Springveldt

agree to participate in the above research study conducted by Roxi Francke of the Faculty of Informatics and Design, Department of Information Technology at the Cape Peninsula University of Technology.

If I have any questions about the study, I may contact the researchers. If I have any questions regarding the ethical conduct of this study, I may contact the secretary of the Faculty Research Ethics Committee at 021 469 1012, or email naidoove@cput.ac.za.

Participant's signature: _____ Date: Aug 12, 2025

Researcher's signature: _____ Date: 12 August 2025

APPENDIX G: Sample Interviewees' Responses

Interviewer 1:

A1. What is your current job title at the company?

I'm the head of business development at [the company].

A2. Could you provide a brief description of your current role and responsibilities within the company?

Yeah. So, I'll work with a strategy for how to grow the business. So, I develop the strategies, and I write proposals and then I attend any client meetings and or new client meetings. Then I'm helping with two new products that the company is busy creating - an AI Legal agent and we're busy creating and an e-commerce website.

A3. How long have you been working at this company?

It's 3 years in total I've been working at the company.

A4. How many years of experience do you have in the software development industry?

3 years ever since I've worked for this company.

A5. Can you describe your general comfort level with AI?

I use the basic AI technologies, but I'm very comfortable working with software and different AI platforms.

A6. Do you work directly with AI in your role?

Yes, I use a lot of AI from LinkedIn marketing to ChatGPT for our proposal drafting.

B1. What AI technologies do you currently use to complete company tasks?

So, I know the developers might use different tools, but I'm not really worried about that. I utilise ChatGPT and a tool called Supergrow. Supergrow is an AI LinkedIn branding platform, and I use ChatGPT to write proposals and emails for drafting and so forth.

B2. How have these AI technologies changed your daily workflow, decision-making, or productivity?

It's increased everything in particular that you don't have to worry about, sentence structure or thinking a lot. You can just put your basic thoughts onto the page and ChatGPT will create the email. For example, for proposal drafting, it's the same thing where it can carry the same tone, formality, and correct grammar. Throughout the proposal, just by populating the personality of the AI, so it improves decision making, productivity and our workflow. The respondent agreed that AI helps them focus on other work rather than tedious tasks - removing the boring processes that don't require a lot of thinking.

B3. What challenges have you faced in accessing or fully using AI tools (e.g. tool limitations such as bugs or rate limits, or company-side challenges like network or hardware restrictions)?

Yeah, I think we were quite lucky or I'm quite lucky with the AI tools I use. And the only problem is potentially the financing of it, because they've become quite expensive. Other than that, the network's normally always good, but I can foresee that being a challenge if your network's bad, and then also when the AI tools aren't integrated into your databases or into your systems, it doesn't actually know who you are as a company, so you actually land up having to repeat yourself with instructions as to what you require out of the proposal information. So that's a bit tedious. Other than that, there are no problems.

B4. Are the company's current operations suitable for integrating new AI technologies? Why or why not? Can you provide some examples?

So, I think we're always open to new AI integrations. The challenge is obviously the finance side and whether this is an actual use case for the AI integration. So our operations are very agile to it and because we're a tech company and we like futuristic technology, we always are looking for new ways. I introduced ChatGPT for proposal development myself, it wasn't a top-down approach, I implemented it because I saw I needed it. The interviewer agreed that this wasn't implemented from the management, they took the initiative to integrate it into their task of drafting proposals.

C1. How would you describe your personal attitude towards AI integration in your work environment?

My personal attitude towards it, I love it. I think it speeds up all processes, and I wish in my earlier career I could have had AI because it's so useful.

C1.1. Has it changed over time?

Yes, I've always liked AI, but I think that's my personality type. I like new technology.

C2. Did you at some point experience any form of resistance either personally or from colleagues, and what were the reasons?

So, not in this job because we're very forward-thinking. It's a tech company, but obviously, there's a general fear that AI is going to replace everyone's jobs.

The interviewer, did you not have any fears that the inaccuracy of the AI in proposals or when writing emails to clients could embarrass them in front of the clients because it was saying inaccurate information. The interviewer said that AI's role is to assist us and not to be the actual answer. So, I think the accountability still lies with the person. So what we do is put in our proposals, I would draft it and ask for a technical response, but then we will put it in front of our development team to tailor the response and to ensure that it's the correct response. We would still view the work it gave so we would check it. Using human intervention to proofread the work.

C3. How does the company's culture, values, or unwritten rules influence your use or avoidance of AI tools?

I think yes, it is in the sense that your leadership set your values and your culture and that comes down to everyone. We drive innovation. We want to innovate more. We are at the forefront of technology innovation. So, there's no avoiding the use of AI. The interview agreed that because the company is driving innovation, it encourages them to try new technology such as AI.

C4. Have leadership communicated the purpose, goals, or expectations around the use of AI?

We actually haven't been communicated to about how to utilise it. Yeah, or I haven't been. So no, there hasn't been any communication. The interview did not agree that they would benefit from more structured guidance stating that I will work out what AI is the best use case and then we because we focus on innovation, we will utilise it. So I don't need any guidance on it.

C5. What concerns or misconceptions about AI have you heard from colleagues or experienced yourself?

A concern was putting private Information on the ChatGPT platform. Recently, there was an integration with Google where information and a lot of private searches by the tool were leaked. So my concern is always about the privacy of the information.

The interviewee agreed that a misconception is that AI can completely replace them in the process of writing these proposals. Yes, 100%. I think AI can replace everyone eventually, but not at the current stage. But we also need to be involved, especially when you're putting a proposal together, you are held accountable for the terms that you put into your proposal. So if AI incorrectly does something, we could be held liable as a company for it. There needs to be human intervention to check that the work written by AI is correct.

C6. How have concerns or misconceptions influenced AI integration efforts in the company?

We were forced to purchase the premium version of ChatGPT because we wanted our information to remain private. Other than that, from my side, there's been no other influence really. I don't know from the developer's point of view.

Interviewee agreed that because of fears that there could be inaccuracy in what AI produces, that some people would want to do things manually. I know a colleague who operates very manually, so that doesn't. She doesn't trust AI in its full capacity, you know.

D1. In your view, is there a noticeable gap between how fast AI technologies are advancing and how the company culture is adapting? Can you share an example?

So, I can say this, I don't think there is such a noticeable gap and I think it's because we're in a software company so generally, all people are more prone to be working with AI technologies or they utilise it and are technology-driven. But our culture has changed, and the speed of our processing has changed. So as the technologies improve like ChatGPT going to version 4, it's more intelligent and it gives you better answers. We then send that Information on to our developers for our proposals and the culture is also one of adapting to learn from this change. So there isn't in my role such a big gap between how fast AI technologies are coming and our company culture. I think it's quite closely aligned that we adapt as the gap as technology improves.

Interviewee agreed that there's a gap, but there's not a massive gap. Stating - Yeah, I think it's because of the type of work that we do, and I'll use an example, if we find an AI solution that is better fitted to the project that we are developing like a chatbot, we just adapt to it and we utilise it. So and we will just understand the technology that's required for it. So, we will see that the gap doesn't really exist because we continuously move as the technology improves.

Interviewee agreed that they are never ahead of technology but the gap between knowing how to utilise it and what it is, isn't there.

D2. Have there been any company-led initiatives (technical support, onboarding, or training) aimed at improving AI understanding, usage, or acceptance? If any existed, how were they received?

No, we haven't needed that for AI specifically. We've had software solutions that we internally utilise, like a Project Management software that we actually got extra training for, but it wasn't for the AI use case.

Yes, I think we do need to do a bit more onboarding but there hasn't been any company-led initiatives.

D3. What kind of support (training, mentorship, workshops, etc.) would you recommend to make it easier for you and your colleagues to integrate AI technologies effectively?

We don't. I strongly believe we haven't needed it because we're a technology company. So, all of our employees take quite easily to AI or technology. So, I would argue we don't even need the support to be honest with you.

Interviewee agreed that talking from a perspective of someone who is very comfortable with AI and we do have people in the company who maybe aren't as comfortable like those in admin roles who might not be as comfortable or maybe our junior developers might not be as comfortable.

D4. What new policies or guidelines would you recommend to better align employees with AI integration?

So, I once again think just about having the correct policies that we need to put in place to stop employees from utilising client Information on open platforms or freely accessible platforms. And I think it's a cultural thing of people being disciplined and respecting privacy and intellectual property that needs to be placed in a policy in order for people to learn not to do that.

Interviewee agreed that employees should start to share the AI tools that they are using because everyone's kind of doing their own individual thing. Stating - We don't actually disclose what AI tools we use. And I think it's become almost like people use AI in secret, and people might feel like they are going to be looked down upon if they use AI, because they might feel people think they aren't intellectually sound.

E1. Reflecting on your journey with AI in this company, do you see AI as a threat, a tool, or a partner? Why?

All three of them, because I think one day AI will replace us. I don't know when, but it will be more efficient and more intelligent than us, and I utilise it as a tool and as a partner to ask questions, and I use it to speed up my internal processes.

The interviewee agreed that they think of AI in the sense of it being a partner to them, almost like an intern that they have with them at all times, helping them draft their proposals.

E2. Can you share any success stories, failures, or experiences you have witnessed or been part of, related to AI use?

Yeah, so. So, I haven't had many failures, but I've been a part of a few success stories of winning business deals. But it also has assisted me with doing market research and analysis with its deep

thinking or deep searching functions. So, it gives me a starting point to look for where problems exist in a market.

E3. Is there anything else you would like to add regarding the interaction of AI and the company culture?

Not really. No, there’s nothing else.

APPENDIX H: All Quotations and Codes from Interviewees

Quotations	INT
I utilise ChatGPT and a tool called Supergrow. Supergrow is an AI LinkedIn branding platform, and I use ChatGPT to write proposals and emails for drafting and so forth.	INT1
the only problem is potentially the financing of it, because they've become quite expensive.	INT1
also when the AI tools aren't integrated into your databases or into your systems, it doesn't actually know who you are as a company, so you actually land up having to repeat yourself	INT1
our operations are very agile	INT1
I introduced ChatGPT for proposal development myself, it wasn't a top-down approach	INT1
A concern was putting private Information on the ChatGPT	INT1
information and a lot of private searches by the tool were leaked.	INT1
admin roles who might not be as comfortable or maybe our junior developers might not be as comfortable.	INT1
My personal attitude towards it, I love it. I think it speeds up all processes,	INT1
there's a general fear that AI is going to replace everyone's jobs.	INT1
a misconception is that AI can completely replace them	INT1
We drive innovation. We want to innovate more. We are at the forefront of technology innovation. So, there's no avoiding the use of AI.	INT1
We actually haven't been communicated to about how to utilise it. Yeah, or I haven't been. So no, there hasn't been any communication.	INT1
I don't think there is such a noticeable gap and I think it's because we're in a software company so generally, all people are more prone to be working with AI technologies, or they utilise it and are technology-driven. But our culture has changed, and the speed of our processing has changed. So, as the technologies improve like ChatGPT going to version 4, it's more intelligent and it gives you better answers. We then send that Information on to our developers for our proposals and the culture is also one of adapting to learn from this change.	INT1
All three of them, because I think one day AI will replace us. I don't know when, but it will be more efficient and more intelligent than us, and I utilise it as a tool and as a partner to ask questions, and I use it to speed up my internal processes.	INT1
We would still view the work it gave	INT1
put it in front of our development team to tailor the response and to ensure that it's the correct response.	INT1
having the correct policies that we need to put in place to stop employees from utilising client Information on open platforms	INT1
I strongly believe we haven't needed it because we're a technology company.	INT1
admin roles who might not be as comfortable or maybe our junior developers might not be as comfortable	INT1
we use ChatGPT as the main source for AI. However, I am aware that we do have many other tools like ClickUp, like QuillBot, and many of them, I mean even Microsoft and many of them have AI features.	INT2
we then moved over to a paid subscription, which is quite pricey for the company,	INT2
We are integrating AI into our websites using chatbots.	INT2
the free version [of ChatGPT], and I think that was a challenge simply because with ChatGPT, our information is not secure. So that was a big challenge, hence the reason we then moved over to a paid subscription,	INT2
we could have workshops definitely, especially since we do have interns.	INT2

Quotations	INT
paid subscription, which is quite pricey for the company, but I think it's important that we do utilise a paid version.	INT2
ClickUp AI will give you an executive summary or case study of the current project	INT2
if you don't have a paid version then all your information you are feeding can be used by your competitors	INT2
I've even found that when I do a quick calculation that the calculation was incorrect.	INT2
I've used [ChatGPT] for finance. I don't think it's a great tool for finance.	INT2
I latched on to it very quickly, simply because we're [the company] always looking for innovative methods. We tend to want to work smarter, not necessarily harder.	INT2
people in [my] social circles would have a negative attitude towards AI	INT2
high unemployment rate in South Africa	INT2
the fear of jobs	INT2
we embrace innovation	INT2
embrace AI	INT2
there is a gap	INT2
we are still slow adopters	INT2
We're not automating fast enough	INT2
I definitely don't see it as a threat	INT2
I see it as a tool, but I also see it as a partner	INT2
like a tutor	INT2
short learning curve, I think it was easy to integrate AI into the business	INT2
we only utilise ChatGPT more on a strategic level	INT2
developers and designers, they basically use their own accord	INT2
[my] social circles would have a negative attitude towards AI	INT2
tools that can do things simpler and faster and cheaper	INT2
if they are utilising it and their code is not working the way they want to be, then as developers, it's on them.	INT2
we should have workshops [with] open conversations around AI	INT2
especially since we do have interns	INT2
don't have policies in place	INT2
I do think we could put policies in place	INT2
To just make sure that everyone is using it ethically	INT2
we have not communicated any form of policies to our colleagues.	INT2
ClickUp AI will give you an executive summary or case study of the current project of each project that we can use when writing our proposals.	INT2
moved over to a paid subscription	INT2
important that we do utilise a paid version	INT2
could have workshops definitely, especially since we do have interns	INT2
take the AI summaries, such as the executive summaries or the case studies, and we can potentially put that into the next proposal we write	INT2
We're not automating fast enough. We're not adapting fast enough.	INT2

Quotations	INT
we should have been slightly further ahead than only using ChatGPT	INT2
I work with generative AI in particular … I use ChatGPT 4.0 a lot … the enterprise version … I also use it for graphic generation … and to a lesser extent … Copilot in the Microsoft suite … Canva … [and] Napkin AI.	INT3
The company systems do not prohibit, so it is set up to encourage	INT3
I would say yes, the company's systems is geared up for it.	INT3
And then of course the privacy aspect … who's accessing what I am feeding [it].	INT3
In the initial stages when we were using the free versions, one was limited to so many … prompts … per day … With us acquiring the enterprise version, it … opened up the ability to just use it	INT3
We are working on a project now of the AI agent that we are developing.	INT3
using the free versions, one was limited to so many … prompts … per day …	INT3
Open to AI … We embrace AI … [we see] AI as an opportunity rather than a threat	INT3
We rather see it as a capable tool that will assist us to do our job better, more efficiently and deliver a better quality product to the client.	INT3
people were concerned … how's this going to impact my role?	INT3
Is it threatening my job?	INT3
The company's values definitely set up for us to adopt and embrace AI.	INT3
the culture does foster that.	INT3
Formally, no … perhaps leadership … can do more to promote the effective use of AI … getting consultants to come and talk to us, going to seminars to hear how the industry is really using AI … going on training.	INT3
Yes … this technology has developed much faster than what we in the company could keep up with … I think we're not necessarily understanding exactly what its true potential could be for us… we tend to use the basic stuff of generative AI	INT3
I don't see it as a threat. It is a tool that … must be used … to become a partner of the company	INT3
It has grown on me … Initially I was … circumspect … I also thought, oh, this is just one of those trendy … things that's just gonna fade … [now] I understand the inherent value of AI.	INT3
I will actually probe the AI even further. To test whether I am getting a factual response	INT3
our company systems are very good when we do our quality controls	INT3
We need to invest in the potential of AI … getting people to come and speak to us, going to seminars, going on training … we … send our staff on training to improve their skills … and perhaps we should be doing exactly the same for AI.	INT3
It must be like a standing item … on our weekly meetings where people report … what have I learned of the potential of AI in the role that I perform … incentivise people … and almost become intrapreneurial	INT3
With us acquiring the enterprise version, it … opened up the ability to just use it … And then of course the privacy aspect … who's accessing what I am feeding [it].	INT3
we're not necessarily understanding exactly what its true potential could be for us… we tend to use the basic stuff of generative AI … getting consultants in … might open up another level	INT3
To create scenarios and I'll ask what is the best response from that scenario... So scenarios, I would say scenario planning, strategic forecasting.	INT3
I will tell the prompt to act as an accountant for instance, and then and require expert responses from the prompt.	INT3

Quotations	INT
It must be like a standing item … on our weekly meetings where people report … what have I learned of the potential of AI	INT3
I don't think we've ever gone to the point where we're actually probing our own developers and saying, hey, how much of AI are you actually using	INT3
I would think twice before I ask it … around … financial advice … I've gained confidence … but I'm maybe not so sure in terms of the financial advice [and] legal advice … at the executive management level.	INT3
we did a training manual for a client and we used ChatGPT	INT4
use Gemini for backup	INT4
"I'm using the free version… I would upload PDFs, but then I would get this error saying oh ChatGPT cannot complete the request. Like so many PDFs and then ChatGPT's like, hold up, let me take a break".	INT4
having worked on WordPress… there are definitely AI tools that can be integrated with.	INT4
I remember [one of our colleagues] was making that AI agent. And also I know there's AI tools for [one of our clients].	INT4
company spirit where AI is encouraged.	INT4
we did a training manual for a client and we used ChatGPT for that.	INT4
a tool called Sora… that creates images. So I found that very cool and we actually created a lot of good images for a client.	INT4
I do use it often. However, in the beginning when I first learned about AI, I was a bit scared to use it. I was opposed to it. I wouldn't say I'm 100% comfortable. I would say maybe percentage-wise like 60% comfortable.	INT4
Yeah, I would say I was very sceptical and had like a negative outlook on it… it definitely has changed over time with me using it more.	INT4
I don't think that anybody is hindering AI. It's very much encouraged.	INT4
I don't think there was ever like a formal talk about AI with like goals or expectations before	INT4
we are moving towards it… I don't think we completely aligned with it.	INT4
AI is definitely a tool that can help you in many ways with work, speeding up work efficiently.	INT4
I can think of… [in] my family talks… there was mention of that AI is going to take away jobs.	INT4
when it comes to ChatGPT and you make sure you word your question correctly, then this decision is instant.	INT4
I would ask, for example, ChatGPT a question… maybe I need a second opinion. So I go to Gemini sometimes and compare those answers. And yeah, sometimes I go to YouTube, Google.	INT4
if there was like an AI training session similar to that for us. I think that would be cool.	INT4
No.	INT4
You can't let AI do everything… I wouldn't say just say, if you're given a task, drop it into ChatGPT and let it do everything	INT4
Use it wisely. Don't let that take away your own thinking.	INT4
on a call about [a client] about the testing for the site and then because we didn't know what a certain word was, we looked it up on ChatGPT and [a colleague] shared it with us.	INT4
I would say AI is advancing	INT4
I use actually like a mix… ChatGPT, there's Gemini, there's… the DuckDuckGo AI… I've used Copilot.	INT5
If I was on Power Automate, Copilot was there. Even when I was on Teams, it would be there.	INT5

Quotations	INT
There is obviously like the rate limits	INT5
It can take so much from my machine like so much resources… I do sometimes have network issues with it	INT5
I'm not a big fan of subscriptions…I'm not that invested in an AI to actually pay for it. I haven't found that much of a benefit for me to spend money on it	INT5
I use it for like to create skeleton code… if I need certain code that I know is going to be repetitive.	INT5
Because we are with Microsoft, we could easily get… Copilot… and I know ClickUp also allows for AI… The company's tools and that AI, they are set up already… the tools themselves already just bring in the AI without you even asking.	INT5
"Paranoia, definitely, just [from] the whole data information thing. I wouldn't say I'm hyped or overly excited about AI".	INT5
I'm still apprehensive, still just like watching it from the sidelines while using it in ways that it benefits me.	INT5
I'm generally, most of the time paranoid when it comes to this technology stuff like my information and putting my information out there	INT5
I'm not comfortable with that.	INT5
The company culture was definitely a reason for me to even get more involved with AI	INT5
[AI] is something that is encouraged at the company and it's something that we were all working on.	INT5
Not to my knowledge, no… I didn't remember anything like that.	INT5
Some much older people would. But I would think with someone like my mom and my dad, especially, they would definitely have massive unfamiliar territory with AI and also trust issues.	INT5
A tool like everything else in web development.	INT5
you shouldn't be using it to create, for example, an entire site from scratch	INT5
I wouldn't use AI to generate an entire blog's content because that's just not good practice.	INT5
but I could ask it simply if I give it a certain section of the blog post to formulate a short meta description for me using certain keywords that I give it	INT5
I know some companies definitely don't want AI like at my partner's company. They don't even want you using AI for work purposes.	INT5
asked AI, instead of it writing code, for it to explain code to me. I think it does that better than writing code	INT5
if it's wrong, then I will know that it's wrong, or then still look up what it's saying is correct because I can't just trust it.	INT5
it explains every single line properly and I can ask, what does this line do? And sometimes that saves me a lot of time.	INT5
I just kind of take information from the one and plop it in there and see what the other one says.	INT5
Even YouTube video training… would be helpful… maybe… set up rules… how we can go about using AI so that we use it effectively	INT5
maybe… set up rules… how we can go about using AI so that we use it effectively… we do handle sensitive information at times… so that would be training.	INT5
from the onboarding process, if anyone is joining the company, that they are told about AI, we can have [something] similar to how we have the training manual. You can maybe have like an AI use guidebook, maybe some infographics	INT5

Quotations	INT
yes, there is a gap… every week or so I'm hearing about something new about AI, but… we aren't moving at the same speed… we still take manual meeting notes down, whereas we can be using the transcription	INT5
we still take manual meeting notes down, whereas we can be using the transcription and then they can make summaries for us [and] the agenda.	INT5
sometimes I'll ask it to write up like an e-mail for me in a much professional way.	INT5
If I ask it for more complex stuff… I actually waste time… I spend more time trying to get the AI to work right than just… spending time debugging.	INT5
ChatGPT… AI features of Canva… I use Grammarly	INT6
With Wix… you can see it is integrated with AI	INT6
[In Teams] you don't need… to make notes because you can link it to AI and AI can summarise that meeting and send it to us via e-mail	INT6
Fireflies.ai Notetaker… I felt that it was beneficial. It didn't miss any information.	INT6
the brand kit that needs to be given to AI to be able to help.	INT6
The persona, the identity of the brand or the… brand kit… needs to be given to AI… otherwise… the result… might not match your brand.	INT6
on Canva… it gives me a completely different poster than I wanted. Then I stopped doing that and I just do my own thing.	INT6
I'm comfortable working with AI but at the same time not knowing much about AI… can be a bit of a challenge for me… I think I lack some knowledge on AI.	INT6
it was scary because it was unknown to me.	INT6
AI… might… make… people lose their jobs… replacing a human.	INT6
open to use AI	INT6
I found… more than one person… was also using ChatGPT.	INT6
we didn't discuss much about AI… we wanted to do more research about AI, but I didn't get the chance.	INT6
yes, there is this gap… maybe [a] skill [gap]… the skill of dealing with AI… I wasn't trained how to deal with AI.	INT6
You just have to learn by yourself.	INT6
It can be the three of them… It can be a threat… It's a tool… A partner… I don't see it… no, sorry, I don't see it as a partner.	INT6
But I think later, the more I was practising on different platforms. It made it easier for me.	INT6
[but] I feel like the elder generation [are] not open to use AI. While so it's like two groups, some are happy to learn and explore about it, some they don't trust AI.	INT6
tried not to say I am using AI to help me because I feel I am incompetent.	INT6
but depending fully on AI, it makes our brain lazy [with] no initiative.	INT6
doing my own research… then I will gather this information and put it on ChatGPT.	INT6
Workshops… pre-planned every 2-3 months… short courses plus practising… [to] keep up with what is trending	INT6
you need to give it a good prompt	INT6
I am using Unity	INT7
Blender	INT7
We have also been using AI tools recently for animation.	INT7

Quotations	INT
I used CASCADER	INT7
ChatGPT is great for templates and boilerplate	INT7
Claude	INT7
MESHY was the one that I found the most success with…	INT7
We also used the Cursor for project management, and that went well.	INT7
before I started using AI tools… it would take hours to do something that can be done in 10 minutes	INT7
…hardware hasn't caught up yet	INT7
I do find it a little buggy	INT7
the bugs waste a little time, but it's not enough…	INT7
with maths. I found that it struggles a bit…	INT7
We're currently using ChatGPT to use its NLP capabilities	INT7
it's not like a plug-in or a module, it is just an API…	INT7
…developing tools to integrate it seamlessly in the editor…	INT7
I would definitely say positive	INT7
add it to your skill set so it's helping you make your job better	INT7
I can reliably get it to a result that is close to what I'm hoping for	INT7
It's much easier to communicate an idea exactly as it's in your head to another human…	INT7
I did appreciate being given the free rein to use any tools…	INT7
people have a negative attitude towards AI because it may replace their job	INT7
AI tools have helped bring these resources to smaller developers	INT7
I see it more as a tool.	INT7
there is a gap, and it's very real.	INT7
See how exactly it can replace you, and use it instead of letting someone else learn how to use it…	INT7
those initiatives help with the adoption and acceptance of it.	INT7
It's still not going to do anything that you do not ask	INT7
it is heavy on the hardware right now, but… in the future… that is gonna change.	INT7
It's just the browser copilot.	INT8
AI is constantly being shown to me in the different tools that we use…	INT8
I'm going to say no; our current systems are not well set up for AI.	INT8
ClickUp has the ability to integrate with an AI tool, but we are not on that specific package,	INT8
if you ask it to give you more details, it asks you to upgrade your package…	INT8
So if I say, please take this table and explain to me, it doesn't necessarily read the table the way it should…	INT8
I use AI for … writing an e-mail and I'd like it to sound a little bit more polite or a little more professional	INT8
what [the owner of the company] did was take the requirements, put them into ChatGPT, and it spat out an entire inception report. I then took that report and tweaked it where relevant.	INT8
I definitely have a love-hate relationship with AI	INT8

Quotations	INT
my general comfort level around AI is, I would say medium	INT8
I was very against it until this year.	INT8
since the beginning of April this year… Before that, I was very against it.	INT8
I'm a conspiracy theorist… I struggled with removing the fear that it's being used as indoctrination…	INT8
I'm 100% encouraged by the company; I wouldn't have started using AI if it weren't for [the owner of the company].	INT8
the culture of AI is very strong	INT8
No, I don't think there's any expectation.	INT8
But I definitely think that there's this openness about AI, which [the company] 100% welcomes. But there's no sort of expectation that you have to use AI for everything.	INT8
I do find that the younger they are, the more they use AI. I even have a 22-year-old, he literally speaks to AI every night before he goes to bed to sort of brainstorm ideas for the next day.	INT8
it's definitely just a tool that you use when you need it,	INT8
I would say a tool	INT8
I then took that report and tweaked it where relevant.	INT8
I definitely see a gap between how fast everyone else is adapting and how fast our company is embracing AI	INT8
it should start with training, and once that's done, move into knowledge-sharing workshops with the rest of the team.	INT8
We don't have a strong AI mentor who can grab us and pull us into the AI space.	INT8
There's a want for the company to be AI-led in many different ways, but I just don't think that we're jumping on, and we're not diving in.	INT8
I'm always cognisant when somebody sends me a strategy or when somebody sends me something, a piece of code, I question, 'Where did you generate it from?'	INT8
the practicality of a development plan is based on environment-specific nuances that perhaps AI has no idea about. So, is it accurate? And if we follow it, will things go the way they should go?	INT8
It gives great insight into what a testing scenario should look like, but it doesn't dive into what that client's expectation is.	INT8
there are 1000 different types of AI courses, from ways to use AI to even things like how to build an AI System. So, I definitely think that it should start with training, and once that's done, move into knowledge-sharing workshops	INT8

APPENDIX I: Editing Certificate

6 December 2025

ROXI FRANCKE
Faculty of Informatics and Design
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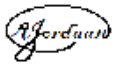
CERTIFICATE – EDITING OF MASTER'S THESIS

I, the undersigned, herewith confirm that the Master's thesis of ROXI FRANCKE titled, *"THE INFLUENCE OF CULTURAL LAG ON INTEGRATION OF ARTIFICIAL INTELLIGENCE IN A SOFTWARE DEVELOPMENT COMPANY IN THE WESTERN CAPE, SOUTH AFRICA"*, has been completed.

The final thesis and editing certificate have been submitted to Me. Francke on 6 December 2025.

Sincerely



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