

Understanding the post-implementation challenges of cloud ERP: An SAP S/4 HANA case

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List of acronyms

CIO	Chief Information Officer
ERP	Enterprise Resource Planning
CSP	Cloud Service Provider
BPCM	Business Process Change Model
IT	Information Technology
IaaS	Infrastructure as a Service
SaaS	Software as a Service
PaaS	Platform as a Service
SAP	Systems Applications and Products
ECC	ERP Central Component
S/4 HANA	Simple 4 – High Performance Analytic Appliance
BTP	Business Technology Platform
UAT	User Acceptance Testing
EAM	Enterprise Asset Management
GL	General Ledger
API	Application Programming Interface
SAC	SAP Analytics Cloud
SLA	Service Level Agreement

Abstract

Enterprise Resource Planning (ERP) systems are critical in streamlining operations, improving data accuracy, and enhancing decision-making through centralised information. Globally, 50–60% of organisations utilise ERP systems, with large enterprises investing up to USD 10 million per implementation. Cloud computing has transformed the ERP landscape, offering greater flexibility, efficiency, and agility. However, despite these advantages, many organisations face significant post-implementation challenges, such as integration issues, user resistance, and data security concerns. These challenges hinder the realisation of expected benefits. Understanding these challenges is essential to ensuring the long-term success of cloud ERP initiatives.

This study examined two large organisations that completed SAP S/4HANA Cloud implementations using different deployment models. This approach allowed a comparative analysis to answer the research question on post-implementation challenges of cloud ERP. Data was collected through a qualitative approach using semi-structured interviews. Furthermore, a six-step thematic analysis was used to analyse the data to explore patterns and themes. In addition, a coding matrix was used to explore relationships between those themes. Insights from the pre-implementation and implementation phases provided context for analysing post-implementation challenges. Furthermore, the study identified four key post-implementation challenges of cloud ERP: operational, management, organisational, and IT. The results revealed configuration limitations, integration complexity, and reporting constraints, particularly within SAP S/4HANA public cloud environments. Limited customisation and user resistance hindered adoption, while data control and authorisation concerns persisted. Despite these challenges, both organisations viewed the implementation as successful, supported by ongoing change management and training initiatives.

Keywords: Post-implementation, Operational, Organisational, Management, IT, Cloud, ERP, SAP, S/4 HANA, Benefits, Challenges

Chapter 1. Introduction

This chapter outlines the research background, problem statement, research questions, empirical context and the dissertation structure.

1.1 Background

Enterprise Resource Planning (ERP) refers to integrated software that assists organisations in managing their core processes, including finance, supply chain, inventory, and human resources (Vaka, 2024; Vaka & Azmeera, 2024). ERP systems are crucial as they streamline operations, enhance data accuracy, improve decision-making, and increase efficiency by centralising information resources (Vaka, 2024; Vaka & Azmeera, 2024). Panorama consulting group conducts independent global research on ERP implementations and digital transformation initiatives. Their annual ERP reports reveal that approximately 50–60% of organisations worldwide utilise ERP systems, with large enterprises being the predominant adopters (Panorama, 2020, 2021, 2022, 2023b, 2024b). Depending on project scope and complexity, large organisations typically invest up to 10 million USD in ERP implementations and approximately 200,000 USD annually in maintenance costs (Panorama, 2020, 2021, 2022, 2023b, 2024b). According to the National Definition of Small Enterprise in South Africa, organisations employing more than 250 employees and generating an annual turnover surpassing 10 million USD are classified as large organisations (Gazette, 2019).

Cloud computing provides a range of services, including storage, processing, and software, all delivered via the Internet (Davinder Pal, 2024; Sapkal et al., 2024). This model enables organisations to access resources on demand without the need to maintain physical infrastructure (Davinder Pal, 2024; Sapkal et al., 2024). Approximately 90% of companies use cloud computing in some form, with global investments expected to exceed 300 billion USD by 2027 (Davinder Pal, 2024; Sapkal et al., 2024).

The rise of cloud computing has significantly transformed the landscape of ERP with the introduction of cloud ERP systems (Nguyen et al., 2024; Vukman et al., 2024). Cloud ERP provides organisations with innovative and dynamic tools to improve operational efficiency and agility (Travis, 2023; Vukman et al., 2024). Many organisations are now facing pressure from ERP vendors to transition from their legacy ERP systems to cloud ERP, as support for legacy systems is gradually being phased out (Nguyen et al., 2024; Vukman et al., 2024).

Gartner and SAP Insider have noted conflicting viewpoints on why organisations migrate to cloud ERP (Holland, 2023a; Penny & Sieber, 2023). Some organisations view cloud migration as a critical component of their digital transformation initiatives (Boillat & Legner, 2014; Panorama, 2023b; Penny & Sieber, 2023). Conversely, others are reluctant to make the switch due to their long-term investments in legacy systems and the complexity and costs associated with the transition to cloud ERP (Christiansen et al., 2022; Penny & Sieber, 2023). Despite these concerns, SAP Insider reports that over 60% of organisations are implementing or migrating to cloud ERP systems (Holland, 2024a).

Despite the initial excitement surrounding the deployment of cloud ERP systems, many organisations encounter significant challenges that can impede their ability to leverage the platform's capabilities (Nguyen et al., 2024; Vukman et al., 2024). These concerns are supported by multiple online sources explaining cloud ERP challenges, such as integration, user resistance, and security (Masharov, 2020; Technologies, 2023; Vukman et al., 2024). In addition, Panorama Consulting outlines multiple strategies to overcome the post-implementation challenges of cloud ERP, accentuating the importance of change management, training, and system monitoring (Panorama, 2020, 2021). While existing literature primarily examines cloud ERP adoption rather than post-implementation, this study expands the discussion by leveraging prior ERP research to enhance understanding of post-implementation challenges, thus laying a groundwork for further exploration.

The pre-implementation and implementation phases of an ERP lifecycle have garnered significant attention in existing literature and ERP reports (Viorel-Costin, 2019). Bento and Costa (2013) noted that approximately 70% of newly implemented ERP projects fail to meet their intended performance objectives as organisations often perceive their ERP projects are completed once the system has been implemented (Bento & Costa, 2013; Gable et al., 2001). However, research indicates that failures typically stem from insufficient focus on the post-implementation phase (Bento & Costa, 2013; Gable et al., 2001). Shang and Seddon (2000) observed that organisations often experience a decline in performance during the post-implementation phase of the ERP lifecycle. Subsequent research suggests that organisations typically realise significant performance improvement in two to three years (Bento & Costa, 2013). Due to the lack of cohesive understanding of these intangibles, many organisations experienced failure and ultimately endured bankruptcy following the implementation of ERP systems (Menon et al., 2019).

The post-implementation phase involves the system's usage, maintenance, and optimisation, representing the stage at which the true value of the ERP system is realised (Bento & Costa, 2013; Mohammad Saif et al., 2021). Subsequently, the challenges include user resistance, system integration, data inconsistencies, and ongoing support (Bento & Costa, 2013; Mohammad Saif et al., 2021). Experts explain that organisations should implement strategies to effectively manage the post-implementation phase to mitigate risks and to overcome these challenges (Kiriwandeniya et al., 2013; Shang & Seddon, 2000).

Notably, the existing literature focuses on legacy ERP systems, with a predominant emphasis on the pre-implementation and implementation phases. This highlights a significant gap in research concerning the post-implementation phase of ERP systems, and an even more noticeable lack of literature regarding cloud ERP systems. Accordingly, this study aimed to develop a comprehensive understanding of the factors contributing to post-implementation challenges of cloud ERP. Using a detailed case study approach, this study examined real-world examples of organisations implementing cloud ERP systems and their current challenges. This study considered multiple factors: operational, organisational, management, and IT. This provides a holistic perspective on the issues encountered during the post-implementation phase.

1.2 Problem statement

Panorama Consulting reported that many of the post-implementation challenges of cloud ERP are caused by underestimating business-related activities and overestimating IT-related activities (Panorama, 2020, 2021, 2022). Furthermore, research suggests that the long-term success of a cloud ERP system depends on the post-implementation phase of an ERP lifecycle (Ghani et al., 2019; Osnes et al., 2018).

A significant concern is that current ERP literature focuses on legacy, on-premise systems, providing limited empirical evidence regarding cloud ERP environments (Ganly et al., 2016; Technologies, 2023). Unlike traditional ERP systems, cloud ERP operates within vendor-controlled infrastructures that restrict customisation and system control (Ganly et al., 2016; Technologies, 2023; Vukman et al., 2024). Therefore, creating unique challenges in integration, data governance, and change management (Ganly et al., 2016; Technologies, 2023; Vukman et al., 2024). Organisations migrating from highly customised legacy systems, often struggle to align standardised cloud configurations with complex business requirements, resulting in process misalignment and reduced (Ganly et al., 2016; Technologies, 2023; Vukman et al., 2024). Furthermore, user resistance, limited technical expertise, and the evolving nature of subscription-based service models intensify post-implementation challenges (Ganly et al., 2016; Technologies, 2023; Vukman et al., 2024). These issues can undermine the anticipated benefits of cloud ERP, leading to cost overruns, productivity losses, and reduced organisational agility (Panorama, 2020, 2021, 2022). Given the increasing global adoption of cloud ERP systems, it is imperative to investigate these post-implementation challenges to understand their root causes and implications for long-term system success (Abu Ghazaleh et al., 2019).

Furthermore, the cloud ERP landscape is constantly changing, influenced by technological innovation, changing business needs, and increasing competition (Ganly et al., 2014; Vukman et al., 2024). This dynamic environment complicates the post-implementation phase, as organisations must constantly adapt to ongoing updates, evolving functionalities, and the necessity for continuous improvement (Ganly et al., 2016; Ganly et al., 2014). A comprehensive understanding of these post-implementation challenges can lead to effective strategies, improved resource usage, and optimal system performance (Boillat & Legner, 2014). Therefore, this research aimed to explain the complexity of cloud ERP's post-implementation challenges and provide valuable insights and practical recommendations. Thus, with this gap in the literature, this study aimed to understand the post-implementation challenges of cloud ERP.

1.3 Research questions

The research aimed to understand the post-implementation challenges of cloud ERP. The primary and secondary questions were founded on frameworks from the literature on ERP systems. Although the literature primarily focused on legacy ERPs, this guideline provided a starting point to answer the research questions.

Primary question

1. How are the post-implementation challenges of cloud ERP experienced by an organisation?

Secondary questions

1. What are the post-implementation challenges of cloud ERP experienced by an organisation?
2. How do these post-implementation challenges relate to each other?

1.4 Empirical context

This research aimed to answer the research questions using SAP S/4HANA as the empirical context for the study. Two large organisations operating in different geographical areas and industries were chosen. One organisation implemented S/4 HANA public cloud, and the other S/4 HANA private cloud. The multi-case study allowed comparative analysis of how the phenomenon is experienced across organisations, providing a more generalisable understanding of the topic.

SAP S/4 HANA is among the most dependable and universal ERP systems worldwide (Juturi, 2024a, 2024b). Notably, around 20-25% of large organisations globally rely on SAP as their ERP system, particularly in the manufacturing, retail, and finance sectors, where its extensive functionalities can effectively manage complex business processes (Panorama, 2023b; Vaka, 2024). Gartner reports that approximately 50% of large organisations have already transitioned to SAP S/4HANA from SAP ECC, a figure expected to rise as more companies embark on digital transformation journeys (Holland, 2024c). SAP insider reports that 60% of organisations are implementing S/4 HANA private cloud, 27% are implementing S/4 HANA public cloud, and 13% are implementing S/4 HANA on-premise (Holland, 2024a). Considering these facts, the choice of ERP vendor provided a practical understanding of the broader context of cloud ERP.

Even though this research focused on cases from a single ERP vendor, the significance of this research extends beyond one ERP software, offering implications for the broader field of cloud ERP research. As organisations continue to embrace digital transformation, understanding the nuances of post-implementation challenges will be essential for ensuring that the potential of cloud ERP systems is fully realised. The findings of this research will have practical implications for organisations considering or using cloud ERP, providing them with the knowledge to navigate the post-implementation phase effectively.

1.5 Dissertation structure

Chapter 1: This chapter outlines the research background, problem statement, questions, and empirical context and the dissertation structure.

Chapter 2: This chapter interrogates the current literature on the phenomenon and discusses several key topics, such as cloud computing and its impact on ERP, migration options for cloud ERP, ERP lifecycle, the benefits and challenges of ERP systems, and the theoretical foundations used for the research.

Chapter 3: This chapter interrogates the current literature on SAP and S/4 HANA. Then, it explains the best practice approaches and support from SAP and the current adoption of SAP S/4 HANA.

Chapter 4: This chapter explains the research approach used to conduct the empirical report, using the following methods: a research philosophy, purpose, approach, strategy, and time horizon. Furthermore, the sampling methods were explained, including the data collection strategy, data analysis, and data quality assessment. In addition, this chapter explains the ethics procedure and the research limitations.

Chapter 5: This chapter explains the background of the two case studies. Furthermore, the study delved into the ERP lifecycle phases. This method allowed for a thorough understanding of the current knowledge of cloud ERP adoption.

Chapter 6: This chapter answered the research question: What are the post-implementation challenges of cloud ERP experienced by an organisation?

Chapter 7: This chapter answered the research question: How do these post-implementation challenges relate to each other?

Chapter 8: This chapter concluded this study by summarising all the critical points from the research.

Chapter 9: This chapter explained this study's limitations and potential future research for the phenomenon.

Chapter 10: This chapter lists all the references and sources used for the study.

Chapter 11: This chapter contains the appendices for the research method, including the research instrument (Appendix A), consent letters (Appendix B and Appendix C), research timeline (Appendix D), audit trail (Appendix E), codebook (Appendix F) and ethics approval (Appendix G).

Chapter 2. Literature review: ERP

This chapter interrogates the current literature on the phenomenon and discusses several key topics. First, the literature review outlines the concepts of cloud computing and the impact on ERP. Additionally, the literature explains the various migration options for cloud ERP. Furthermore, the review explains the ERP lifecycle to accentuate the nuances of the different phases. Similarly, the review discusses the benefits of ERP systems and the theoretical foundations underpinning ERP. Finally, the review cross-examines the existing literature for post-implementation challenges related to both ERP and cloud ERP before summarising the findings.

2.1 ERP's and cloud computing

During the 1990s, ERP systems were traditionally deployed on a database server located at the physical location of an organisation, referred to as on-premise (Elragal & El Kommos, 2012). During this period, ERP systems continued to evolve, and since the emergence of cloud computing, the partnership between ERP vendors and cloud service providers (CSPs) saw a significant improvement in technology performance (Malallah et al., 2023). With this relationship, ERP vendors could provide organisations with more dynamic and innovative solutions, as organisations could access their computing resources over the Internet (Domagała et al., 2021). CSPs are cloud vendors that provide organisations with options for renting infrastructure services (Bögelsack et al., 2022; Malallah et al., 2023). Further, this enabled organisations from different industries and sizes to implement ERP systems by leveraging the infrastructure of CSPs (Bögelsack et al., 2022; Malallah et al., 2023). Additionally, benefiting from flexibility, automation, and scalability as they no longer have costly infrastructure and liabilities (Malallah et al., 2023; Peng & Gala, 2014).

Embracing cloud computing is a strategic decision that requires a thorough understanding of its various offerings (Malallah et al., 2023; Song & Sohn, 2022). Cloud computing consists of two key components: service models and deployment models (Nadeem, 2022; Song & Sohn, 2022). Service models allow organisations to outsource their IT infrastructure at a subscription fee, which includes Infrastructure as a service (IaaS), Platform-as-a-service (PaaS), and Software-as-a-service (SaaS) (Elragal & El Kommos, 2012; Jiang & Wang, 2022; Nadeem, 2022; Song & Sohn, 2022). The two most prevalent deployment models are public and private clouds, and these environments are differentiated by how resources are owned (Jiang & Wang, 2022; Song & Sohn, 2022). Explanations of these models of ERP systems will be discussed in the following section.

A private cloud is an IaaS offering where applications run on a single-tenant server with an infrastructure dedicated to one organisation (Elragal & El Kommos, 2012; Jiang & Wang, 2022; Nadeem, 2022; Song & Sohn, 2022). All private clouds are IaaS, where an ERP vendor provides the software, and the customer chooses a CSP (Bögelsack et al., 2022; Jiang & Wang, 2022; Peng & Gala, 2014). The CSP is responsible for the physical infrastructure, such as the servers and networks hosted externally (Bögelsack et al., 2022; Nadeem, 2022). However, the organisation still manages the configuration of the resources accessed over the Internet (Bögelsack et al., 2022; Nadeem, 2022). Large organisations

traditionally select the private cloud offering as the benefits align with data privacy and security regulations. In addition, there is an option to migrate legacy systems (Bögelsack et al., 2022; Jiang & Wang, 2022; Peng & Gala, 2014). Furthermore, the private cloud offering has limitations such as minimal innovation, vendor lock-in and less scalability. When choosing a deployment model, these factors should be considered, as organisations need to maximise the benefits while addressing these challenges (Zafar et al., 2023).

A public cloud is a SaaS offering where applications run on a multi-tenant shared infrastructure, all the IT resources and software are provided by the CSP and ERP vendor (Elragal & El Kommos, 2012; Lewandowski et al., 2013). Furthermore, the ERP vendor manages all upgrades and maintenance, and the organisation pays a subscription fee (Christiansen et al., 2022; Jiang & Wang, 2022). Since the CSP manages the data, there are potential security concerns, as the business runs in a public cloud, and if the CSP has an outage, it affects the business operations (Boillat & Legner, 2014; Peng & Gala, 2014).

Since PaaS is designed for integrating and developing applications, most major ERP vendors offer middleware solutions that enable organisations to create custom apps, integration workflows outside of their core ERP systems. Consequently, ERP vendors typically do not provide a PaaS ERP system (Bögelsack et al., 2022).

2.2 Migrating to cloud ERP

Table 1 outlines the migration options available for cloud ERP (Bögelsack et al., 2022). Once organisations determine the deployment model, they select an implementation approach (Bögelsack et al., 2022; Domagala et al., 2021). Typically, organisations that choose greenfield implementations have highly customised legacy ERP systems, custom bespoke systems or third-party systems that require standardised processes (Nguyen, 2020; Viorel-Costin, 2019; Zafar et al., 2023). On the other hand, organisations that select system conversions aim to upgrade their legacy systems to cloud systems without experiencing business interruption (Nguyen, 2020; Panorama, 2023a; Zafar et al., 2023).

Table 1. Cloud ERP - Migration options

Implementation approach	Organisation situation	Purpose	Source
New implementation - Greenfield approach	Legacy ERP, Third Party ERP, Custom solutions	- Re-engineer business processes. - Align to ERP vendor best practices.	(Bögelsack et al., 2022; Zafar et al., 2023)
System conversions - Brownfield approach	Legacy ERP – Using the cloud ERP of the same vendor	- Organisation re-uses their legacy business processes. - The organisation wants to avoid the time and cost of an ERP project.	(Bögelsack et al., 2022; Zafar et al., 2023)
Hybrid approach – Bluefield	Legacy ERP – Using the cloud ERP of the same vendor	Migrate certain data or objects of the legacy systems.	(Bögelsack et al., 2022; Zafar et al., 2023)

Panorama Consulting reported that organisations improved their business processes by 90% after cloud migration (Panorama, 2020, 2021, 2022, 2023b, 2024b). In addition, they indicated that 92% of organisations had a significant focus on organisational change management to ensure the success of cloud ERP implementation (Panorama, 2020, 2021, 2022, 2023b, 2024b). They further claimed that organisations achieved 70% of their expected benefits (Panorama, 2024b). Gartner further explains that leadership within an organisation should focus on organisational change management by engaging users, process owners, and super users. Managing these fundamental strategies will further support a successful ERP journey (Nguyen & Capua, 2020; Torii, 2022).

2.3 ERP Lifecycle

Bento and Costa (2013) and Gable et al. (2001) explain that ERP projects can be divided into three phases pre-implementation, implementation, and post-implementation. There has been considerable literature published on the pre-implementation, and implementation phases of ERP, such as critical success factors, failures, barriers and risks (Ağaoğlu et al., 2015; Christiansen et al., 2022; Hamad et al., 2022; Mahmood et al., 2019; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Tongsuksai et al., 2021; Vukman et al., 2024; Vukovic et al., 2024; Zhong & Rohde, 2014). However, Ghani et al. (2019) and Osnes et al. (2018) argued the need for more research in the post-implementation phases of an ERP lifecycle and the challenges experienced during this phase. Markus and Tanis (2000) advise that different measurements of success should be utilised for the different phases of an ERP lifecycle.

Botta Genoulaz and Millet (2005) and Abu Ghazaleh et al. (2019) explained that a successful implementation of ERP systems does not guarantee long-term success. Furthermore, organisations should continuously support their ERP systems to ensure the business derives value from the technology investment (Hillman Willis & Hillary Willis-Brown, 2002). Typically, the value of ERP systems is realised during the post-implementation phase of an ERP lifecycle when the business is

mature and improvements to existing processes can be pursued (Davenport et al., 2004; Hillman Willis & Hillary Willis-Brown, 2002).

Furthermore, a study by Huang and Yasuda (2016) redefined the ERP Lifecycle model based on the process model by Shanks et al. (2000) and various ERP studies. Huang and Yasuda (2016) argued that the post-implementation phase of an ERP lifecycle should be separated into four phases, as depicted in Figure 1. The conceptual model provides valuable insights of an ERP lifecycle but adds little value to the purpose of this study, as this study will only focus on the post-implementation challenges of cloud ERP.

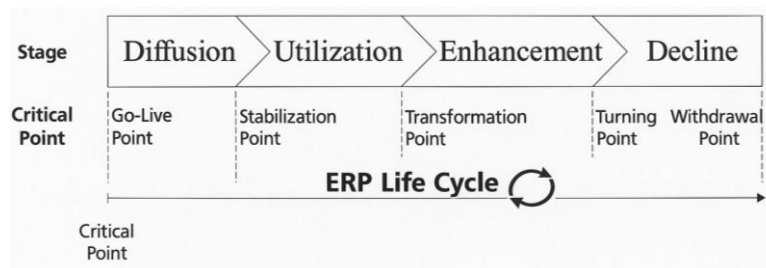


Figure 1. Conceptual Model of ERP Life Cycle (Huang & Yasuda, 2016)

2.4 ERP Benefits

Oseni et al. (2017), Hietala and Päiväranta (2021) and Madathala et al. (2016) explain that a successful post-implementation phase of an ERP lifecycle depends on effectively realising benefits while managing intrinsic challenges. Numerous studies claim that every benefit has a set of challenges, and organisations commonly discuss the benefits of their ERP system and then distinguish the current challenges they are experiencing (Hietala & Päiväranta, 2021; Madathala et al., 2016; Oseni et al., 2017).

Benefits management entails identifying, planning, and ultimately realising the benefits of a project or initiative (Shang & Seddon, 2000). In the context of ERP, benefit realisation ensures that an organisation meets its business objectives through the system (Butale & Seymour, 2024). Butale and Seymour (2024) recommended that organisations ideally manage and monitor their ERP benefits throughout the entire ERP lifecycle.

This research critically analysed the two frameworks from Kiriwandeniya et al. (2013) and Shang and Seddon (2000) as the theoretical foundation of the study. These frameworks are considered appropriate for research explaining the post-implementation phase of an ERP Lifecycle. Figure 2 depicts a framework from Kiriwandeniya et al. (2013) which analysed various different organisations in the manufacturing industry. The framework was founded by analysing the ERP benefits framework developed by Shang and Seddon (2000). Hence, many of the factors are related to the study by Shang and Seddon (2000).

However, this study delved deeper into the post-implementation phase and extended the ERP benefits framework with further research factors.

Table 2 depicts the framework from Shang and Seddon (2000), which was developed to assess business benefits during the post-implementation phase of the ERP lifecycle. The study was conducted

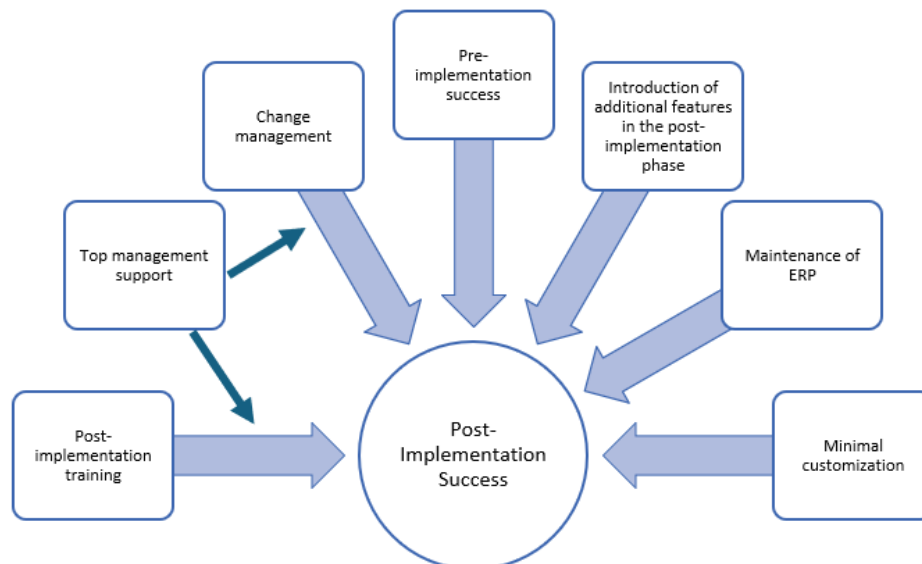


Figure 2. Theoretical framework for ERP post implementation success (Kiriwadeniya et al., 2013)

from the point of view of senior management within an organisation, and the framework can be used to identify the business benefits of ERP systems (Shang & Seddon, 2000). Furthermore, it can be reviewed to assess whether a project's outcomes, performance goals and business objectives were achieved (Hietala & Päivärinta, 2021; Seymour et al., 2016).

Factors	Sub-factors
Operational	• Cost reduction • Cycle time reduction • Productivity improvement • Quality improvement • Customer services improvement
Managerial	• Better resource management • Improved decision making and planning • Performance improvement
Strategic	• Support business growth • Support business alliance • Build business innovations • Build cost leadership • Generate product differentiation (including customization) • Build external linkages (customers and suppliers)
IT Infrastructure	• Build business flexibility for current and future changes • IT cost reduction • Increased IT infrastructure capability
Organizational	• Support organizational changes • Facilitate business learning • Empowerment • Build common visions

Table 2. ERP benefits framework (Shang & Seddon, 2000)

The literature review methodically integrated the various factors from the Shang and Seddon (2000) and Kiriwandeniya et al. (2013) frameworks, providing a comprehensive and insightful theoretical foundation for the research. The benefits framework considered five factors for organisations to assess the benefits of ERP systems: operational, managerial, strategic, IT infrastructure, and organisational (Shang & Seddon, 2000).

The operational factors particularly review the automation of business processes, cost reduction, and reviewing the improvement of quality due to fewer manual activities (Shang & Seddon, 2000). This coverage of operational factors provides a strong reassurance of ERP's effectiveness. Moreover, Kiriwandeniya et al. (2013) explained the importance of post-implementation benchmarking. Benchmarking involves comparing expected outcomes with actual results, ensuring that users meet business requirements as anticipated. Particularly from a business processes point of view, whether the standardisation of processes improved the business.

The managerial factors indicates that managers should consider a consolidated and holistic view of whether ERP systems optimised resource management, improved decision-making across the business, and improved performance (Shang & Seddon, 2000). In addition, Kiriwandeniya et al. (2013) indicated top management support as a critical determinant for ERP success. The study further advised that the importance of support correlates to the willingness to provision change management and training within the organisation.

The strategic factors included internal and external integration capabilities, innovation possibilities, and more focus on customer needs (Shang & Seddon, 2000). Kiriwandeniya et al. (2013) also considered innovation a critical determinant, such as ERP vendors providing additional features to support an organisation in optimising business processes with system upgrades. Further, Kiriwandeniya et al. (2013) advised that customisation is essential for any organisation, as all organisations operate differently and have specific requirements for enabling their unique business processes to be configured. Occasionally, the standard configuration in ERP systems does not cater for the requirement, and system enhancements are needed. As the study from Singh et al. (2022) indicates, even with a high level of enhancements, this should not have a negligible impact during the post-implementation phase.

The IT infrastructure factors reviews whether ERP systems support flexibility and reduce business costs (Shang & Seddon, 2000). In addition, Kiriwandeniya et al. (2013) indicated that ERP systems must be maintained to ensure that they can continuously add value to the business.

The organisational factors assesses whether the organisations supported change management, and whether change has built a better understanding across business units by empowering employees to work independently (Shang & Seddon, 2000; Staehr, 2007). As discussed, Kiriwandeniya et al. (2013) includes these factors with top management support.

In addition, Kiriwandeniya et al. (2013) provided two factors not found in other sources of literature: the success of pre-implementation activities and post-implementation benchmarking. Kiriwandeniya et al. (2013) indicated that the planning and implementation phases contribute to a successful post-

implementation phase. Examples include correctly implemented business requirements, testing conducted end to end, and change management and training prioritised (Madathala et al., 2016; Vaka & Azmeera, 2024). Furthermore, benchmarking compares expectations versus what was delivered by ensuring the business requirements were delivered as expected by users at all levels (Kiriwandeniya et al., 2013).

Even though these frameworks provided the theoretical foundation for the research, they have limitations. Kiriwandeniya et al. (2013) was derived by studying manufacturing companies in Sri Lanka. Consequently, the research author indicated a lack of depth and considered the framework limited if used globally (Kiriwandeniya et al., 2013). Furthermore, the framework by Shang and Seddon (2000) is generic, and focused on benefits rather than challenges of an ERP system. Therefore, the framework is limited in the broader aspects of this research. However, Hietala and Päiväranta (2021) argued, while organisations assess their benefits from ERP systems, organisations are likely to understand their current post-implementation challenges (Hasheela, 2015; Hietala & Päiväranta, 2021).

The study integrated various factors from the frameworks of Shang and Seddon (2000) and Kiriwandeniya et al. (2013). Figure 3 depicts a conceptual model of the different factors that can be used to develop an ERP post-implementation success framework.

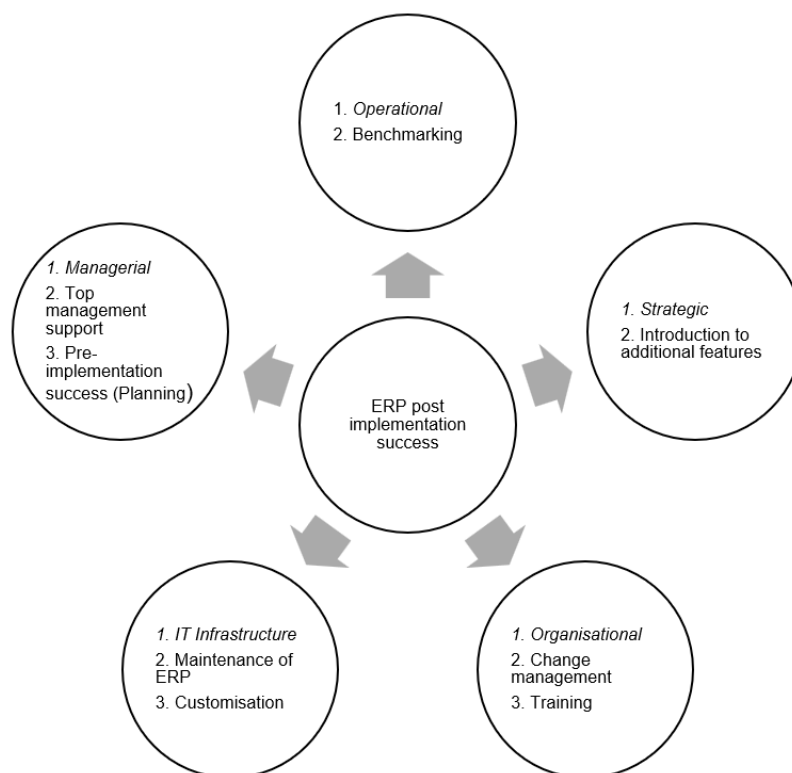


Figure 3: ERP Post implementation success

2.5 ERP Challenges

The post-implementation phase of the ERP lifecycle focuses on the ongoing support, maintenance, and optimisation of the ERP system after deployment (Vaka, 2024; Vaka & Azmeera, 2024; Zafar et al., 2023). The phase further involves monitoring system performance, managing challenges, and completing necessary updates or enhancements to improve functionality (Peng & Nunes, 2009a; Shang & Seddon, 2000; Shanks et al., 2000; Staehr et al., 2012). A successful post-implementation phase ensures that the ERP system remains aligned with the organisation's goals, delivers long-term value, and supports continuous improvement (Hietala & Päivärinta, 2021).

Table 3 outlines the primary literature used to explain the post-implementation challenges of ERP systems. Mohammad Saif et al. (2021) and Singh et al. (2022) studied the post-implementation challenges of ERP in a large organisation in the apparel and pharmaceutical industries, respectively. The study by Singh et al. (2022) was established on the foundation and background of research done by Peng and Nunes (2009a) and Peng and Nunes (2009b). These studies were limited to an Indian pharmaceutical company, and the latter was conducted in a developing country. These authors claimed their research was limited and that future research should be done in broader geographical areas and different industries.

Chou et al. (2014) reviewed 40 research papers on the ERP post-implementation risk. The review's objective was to understand challenges in various areas within the business. Chou et al. (2014) mainly focused on the leadership team's responsibility to manage and mitigate these risks and challenges. The author argued that the literature review was limited to the leadership team's responsibility to manage and mitigate these risks and challenges. The author advised that future research should conduct empirical research on the broader aspects of the post-implementation phase of an ERP Lifecycle (Chou et al., 2014).

In addition, Goyette et al. (2022) explained user resistance occurred because of knowledge transfer issues. In addition, a study by Salih et al. (2013) identified the lack of communications and training as key factors for user resistance. These studies reached similar conclusions, emphasising the need for training and change management. However, they exhibited extensive differences during their empirical research, so the conclusions were inconclusive.

Lewandowski et al. (2013) explains the post-implementation challenges of SaaS ERP in SMEs. The study was primarily limited to SaaS ERP and SMEs. In addition, the study mainly focused on the technical and user aspects of the organisations rather than explaining the broader impact of cloud ERP systems.

Presently, minimal literature has been published on the post-implementation challenges of ERP, as indicated by Osnes et al. (2018), Hietala and Päivärinta (2021), Lewandowski et al. (2013), and Singh et al. (2022). However, comparable themes were derived across the existing literature. Therefore, this literature review categorised the findings into four themes outlined in Table 3: operational, management, organisational, and IT.

Table 3: Post-Implementation challenges of ERP

Theme	Sub-theme	Source
Operational	Process performance, system issues, standardisation	(Chou et al., 2014; Goyette et al., 2022; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Singh et al., 2022; Vaka & Azmeera, 2024)
Management	Vendor support, lack of leadership, costs, analytical	(Chou et al., 2014; Goyette et al., 2022; Mahmood et al., 2019; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Singh et al., 2022)
Organisational	Lack of training, human challenges, knowledge transfer, work culture, cultural diversity, change management	(Chou et al., 2014; Goyette et al., 2022; Mahmood et al., 2019; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Singh et al., 2022)
Information Technology	Technical, data management, configuration, security, performance, functionality, usability	(Chou et al., 2014; Goyette et al., 2022; Lewandowski et al., 2013; Mahmood et al., 2019; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Singh et al., 2022)

The following section reviews the four themes in the existing literature on post-implementation challenges related to ERP systems.

Operational challenges occur when users cannot perform their daily tasks due to performance issues, incorrect usage, or poor system design, as it causes reluctance to utilise the system, which can disrupt business operations (Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Singh et al., 2022). In addition, Lewandowski et al. (2013) explain that standard ERP processes limit organisations from implementing their own business processes in standard functionality, which creates business resistance to the application. These operational challenges often occur from a fear of change, inadequate training, and lack of motivation, which can reduce operational efficiency (Chou et al., 2014; Mohammad Saif et al., 2021).

Management challenges occur when top management support is lacking during the post-implementation phase, resulting in conflicts, inadequate system development, and resource allocation issues (Chou et al., 2014; Osnes et al., 2018). Top management support ensures clear communication, suitable resource allocation, and a thorough understanding of the associated costs and benefits (Chou et al., 2014; Osnes et al., 2018). ERP systems can only become effective if the IT strategy is aligned with the business strategy and the organisation has a clear direction (Chou et al., 2014; Osnes et al., 2018).

Organisational challenges fundamentally revolve around user resistance (Chou et al., 2014; Osnes et al., 2018). Employees may refrain from using new software or adapting to new processes, which can lead to inefficiencies and frustration (Chou et al., 2014; Osnes et al., 2018). This resistance can derive from a lack of familiarity with the system, fear of the unknown, or concerns about how the changes affect their daily tasks (Chou et al., 2014; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b). In addition to this, insufficient training is another frequent complaint. However, with comprehensive training, these concerns can be managed, and employees can feel comforted and prepared to understand the features

and functionalities of the new system (Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Singh et al., 2022). Moreover, minimal change management strategies can exacerbate these challenges in productivity (Chou et al., 2014; Osnes et al., 2018). Change management is essential to guiding employees through the transition, ensuring they understand how to use the new system and feel supported throughout the process (Chou et al., 2014; Osnes et al., 2018).

Literature argued that challenges occurred when knowledge transfer between the project team and support teams was not prioritised, and there were misunderstandings between the two groups (Goyette et al., 2022; Salih et al., 2013). Furthermore, user resistance was caused by the lack of communications, training initiatives, and change management programs (Goyette et al., 2022; Salih et al., 2013). Additionally, challenges include managers making IT decisions without consulting experts or users, leading to poor maintenance and enhancement choices.

IT challenges relate to technical issues related to configuration, reporting, and data management (Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Singh et al., 2022). In addition, reporting challenges occur when management creates reports and forecasts, and the ERP does not generate the required output (Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Singh et al., 2022). Configuration limitations proved ineffective, as the ERP system could not adequately be modified to meet changing business needs due to flexibility issues or a lack of resources (Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Singh et al., 2022).

ERP systems often face integration issues, primarily when modules from different vendors are used, leading to system fragmentation and communication problems (Lewandowski et al., 2013). Lack of compatibility with legacy systems caused data inconsistencies and integration challenges (Lewandowski et al., 2013). Additionally, outdated and duplicated data can reduce accuracy and decision-making quality if not adequately managed (Lewandowski et al., 2013). The literature on SaaS ERP argued that when service providers upgraded the ERP, users felt they had to continuously re-acquaint themselves with the system (Lewandowski et al., 2013).

The literature emphasised that a successful implementation is not the end of an ERP initiative (Chou et al., 2014). Organisations will continue to find challenges, and they should continue to resolve them to gain the benefits of ERP systems (Chou et al., 2014). Further challenges could be a derivative of another challenge, and various challenges are interrelated (Chou et al., 2014). The literature argued that the implications of not managing these challenges could create instability in the ERP system, preventing the business from achieving the intended benefits (Chou et al., 2014; Goyette et al., 2022; Lewandowski et al., 2013; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Singh et al., 2022).

2.6 BPCM relevance for ERP

Kettinger et al. (1997) proposed a business process change model (BPCM), as depicted in Figure 3 (Seymour & Koopman, 2021). This model is designed as a system change model aiming to improve system performance (Grover & Kettinger, 1998). It applies to business processes while emphasising IT, organisational structure, and management. This model is applied when an organisation redesigns their processes to enhance performance, adapt to changing conditions, and remain competitive in a dynamic business environment (Kettinger et al., 1997). This model was found suitable for the post-implementation phase of an ERP lifecycle, as these factors described in the model coincide with the factors with the ERP benefits framework by Shang and Seddon (2000). In addition, this study applied the BPCM to explain the relationships between the various factors affecting cloud ERP during the post-implementation phase.

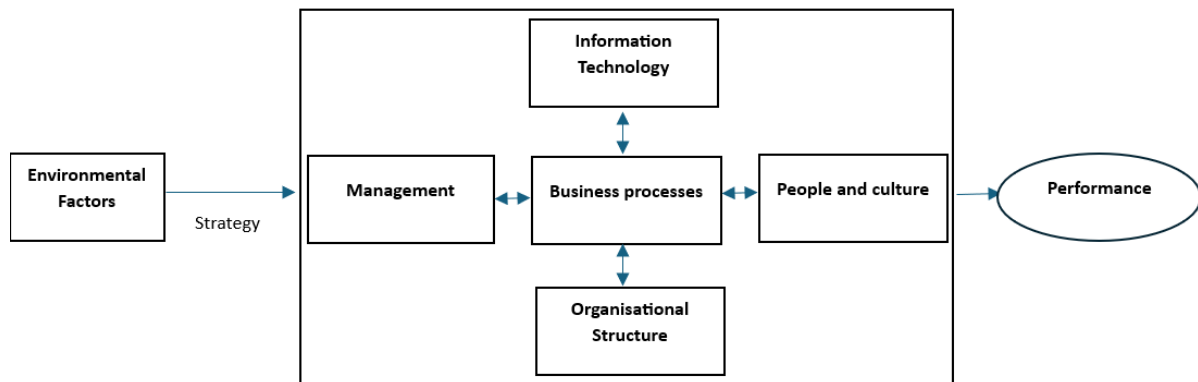


Figure 4. Business process change model (Seymour & Koopman, 2021)

In the context of an ERP Lifecycle, the BPCM can be used to explain the success of an implementation is dependent on managing multiple factors. These factors include business strategy, business processes, management, people, and organisational structure (Grover & Kettinger, 1998; Guha et al., 2015; Kettinger et al., 1997). Kettinger et al. (1997) further claim these factors are not standalone entities but are deeply interconnected, each influencing the other.

An organisation's strategy ensures that business processes align with organisational goals, improving competitiveness and achieving long-term objectives (Grover & Kettinger, 1998; Guha et al., 2015; Kettinger et al., 1997). In the context of this study, the organisation's strategy was influenced by the need to migrate from their legacy ERP system to cloud ERP. Therefore, the environmental factors that influenced the strategy were technological innovation and vendor pressure.

Streamlining business processes improves operational efficiency, reduces costs, and enhances customer satisfaction (Juturi, 2024a, 2024b; Puspitasari et al., 2019). It enables automation, supports real-time decision-making, and ensures scalability, thus optimising operational activities (Zafar et al., 2023). The organisational structure explains the human side of the implementation, ensuring employee engagement, reducing resistance, and encouraging collaboration (Vaka & Azmeera, 2024). However, the leadership commitment drives the system change, ensures resource management, and creates a culture of support, making implementation successful (Vaka, 2024; Vaka & Azmeera, 2024; Zafar et al.,

2023). Each of these factors is interconnected and contributes to the overall effectiveness of the system change (Kettinger & Grover, 1995; Kettinger et al., 1997).

The BPCM model provided a strong theoretical foundation for this research. Kettinger et al. (1997) claim that each factors is interconnected, and to ensure system performance success, these factors must all be examined and successfully applied.

2.7 Summary of literature

Table 3 summarises the current body of literature explaining the ERP and cloud ERP background. It further categorises the available literature into themes and sub-themes.

Table 4. Summary of literature: ERP

Category	Themes	Sources
Enterprise resources planning (ERP)	Definition	(Alaskari et al., 2021; Domagala et al., 2021; Peng & Gala, 2014)
	Skills	(Menon et al., 2019)
	Lifecycle	(Markus & Tanis, 2000; Ross & Vitale, 2000; Shanks et al., 2000; Staehr et al., 2012)
Cloud computing	Deployment	(Elragal & El Kommos, 2012; Jiang & Wang, 2022; Nadeem, 2022; Song & Sohn, 2022)
	Services	(Elragal & El Kommos, 2012; Jiang & Wang, 2022; Nadeem, 2022; Song & Sohn, 2022)
Cloud ERP	Performance	(Jiang & Wang, 2022; Malallah et al., 2023; Song & Sohn, 2022; Vukman et al., 2024)
	Ownership	(Bögelsack et al., 2022; Boillat & Legner, 2014; Malallah et al., 2023; Vukman et al., 2024)
	Innovation	(Ağaoğlu et al., 2015; Botta Genoulaz & Millet, 2005; Domagala et al., 2021; Vukman et al., 2024)
	Migration	(Bögelsack et al., 2022; Vukman et al., 2024)
Post-implementation benefits and challenges	Operational	(Kiriwandeniya et al., 2013; Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Seymour et al., 2016; Shang & Seddon, 2000; Singh et al., 2022)
	Managerial	(Hietala & Päiväranta, 2021; Kiriwandeniya et al., 2013; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Seymour et al., 2016; Shang & Seddon, 2000; Singh et al., 2022)
	Organisational	(Hietala & Päiväranta, 2021; Kiriwandeniya et al., 2013; Mohammad Saif et al., 2021; Osnes et al., 2018; Peng & Nunes, 2009a, 2009b; Salih et al., 2013; Seymour et al., 2016; Shang & Seddon, 2000; Singh et al., 2022)
	Information Technology	(Kiriwandeniya et al., 2013; Mohammad Saif et al., 2021; Peng & Nunes, 2009a, 2009b; Seymour et al., 2016; Shang & Seddon, 2000; Singh et al., 2022)

Chapter 3. Literature review: SAP

This chapter interrogates the current literature of SAP, since SAP S/4 HANA is the empirical focus of the research. First, the literature review outlines the concepts of SAP and S/4 HANA. Then, it explains the various best practice approaches and support from SAP. Furthermore, before summarising the findings, the review explains the current adoption of SAP S/4 HANA, including the benefits and challenges experienced by organisations.

3.1 SAP Software

Systems Applications and Products (SAP) is an ERP system used globally and is considered among the best software solutions (Madathala et al., 2016; Puspitasari et al., 2019). Gartner reports that SAP has over 400,000 customers and 190 countries with a market cap of over 40 billion USD, and many Fortune 500 companies have implemented SAP (Hansen et al., 2023). The software company has industry-specific solutions for agribusiness, automotive, banking, chemicals, manufacturing, retail, and many more (Panorama, 2023a, 2025). In the 1970s, SAP released the application SAP ERP Central Component (SAP ECC), which is used interchangeably with the term SAP ERP. Originally, SAP ERP predominately focused on the financial aspects of a business (Juturi, 2024a, 2024b). Over the next few decades, the software was enhanced and developed to manage all business functions (Juturi, 2024a, 2024b). SAP ECC is an application deployed on-premise and is considered the backbone of operations for many large organisations globally (Madathala et al., 2016).

SAP ECC is a legacy system with maintenance support until 2027 and this has propelled all SAP customers to migrate to SAP S/4 HANA (Juturi, 2024a). SAP S/4HANA is a revolutionary development in ERP systems, and it was designed to meet the demands of modern businesses with versatile cloud-based deployment options (Oliwatosin et al., 2024). SAP S/4HANA was launched in 2015 and was developed to leverage the capabilities of the SAP HANA database, allowing for instantaneous query responses (Juturi, 2024a; Zhang et al., 2019). It delivers real-time data processing and analytics and features the SAP Fiori user interface, which ensures a consistent and intuitive experience for users (Juturi, 2024a; Madathala et al., 2016; Oliwatosin et al., 2024).

Due to the decision to end maintenance of SAP ECC, there has been a significant increase in S/4 HANA cloud projects (Panorama, 2024a). Recent reports claim that more than 50% of large organisations have already transitioned to SAP S/4HANA, a figure expected to rise as more companies embark on digital transformation journeys (Panorama, 2024a). In addition, SAP insider reports the average timeline for transitioning to SAP S/4HANA is usually between 12 and 18 months. Though, further reports argued it could take up to 2 years (Holland, 2024a).

Many organisations have reluctantly agreed to migrate their systems as they have built their legacy ERP systems over many years, and migrating to a cloud ERP system is time-consuming and requires significant investment (Christiansen et al., 2022). During 2024, Gartner estimated that around 70% of SAP ECC clients still need to license SAP S/4HANA (Hansen et al., 2023; Penny & Sieber, 2023; Torii, 2024). The findings indicate migrations to SAP S/4HANA are not occurring at an appropriate frequency

to meet SAP's goal of ending mainstream maintenance support for ECC in 2027 (Barua, 2025; Hansen et al., 2023; Penny & Sieber, 2023). However, since SAP has committed to the end of maintenance, there is an inevitability to understand how organisations that decline to migrate will be managed after 2027 (Barua, 2025; Hansen et al., 2023; Penny & Sieber, 2023).

3.2 SAP S/4 HANA Cloud

Rise with SAP, also termed Rise, is an offering from SAP that supports organisations migrating from their legacy ERP systems to SAP S/4 HANA cloud (Barua, 2025; Holland, 2023b; Zafar et al., 2023). In addition, some customers are using SAP S/4 HANA on-premise, which SAP has committed to support until 2040 (Nguyen, 2020). Even though this is long-term support, SAP will focus on SAP S/4 HANA cloud for innovations (Nguyen, 2020). Thus, SAP has encouraged organisations to migrate to S/4 HANA cloud (Barua, 2025).

Rise with SAP is tailored to support large organisations moving from their existing SAP ECC, legacy ERP systems or S/4 HANA on-premise to SAP S/4HANA public or private cloud (Barua, 2025; Zafar et al., 2023). In addition, SAP has a Grow with SAP offering, which supports small-medium enterprises (SMEs) adopting S/4 HANA public cloud (Hansen et al., 2023; Penny & Sieber, 2023). The offering is an option for new potential customers seeking to adopt S/4 HANA public cloud (Hansen et al., 2023; Penny & Sieber, 2023). However, this literature review will not focus on Grow with SAP.

Migrating from SAP ECC to S/4HANA cloud is a complex process and organisations should meticulously plan and assess all relevant factors before determining their implementation approach (Holland, 2024c; Vaka, 2024; Viorel-Costin, 2019). Additionally, Table 4 outlines the two deployment models available in the Rise offering: S/4HANA private cloud and the S/4HANA public cloud (Hudson et al., 2023; Vaka, 2024; Vaka & Azmeera, 2024). The table further defines the benefits and challenges for each deployment model, including the migration approaches available.

Table 5: Deployment models for S/4 HANA

	S/4 HANA - Private Cloud	S/4 HANA - Public cloud	Source
Implementation approach	- Greenfield approach - Brownfield approach	Greenfield approach	(Ahmed & Suneson, 2024; Holland, 2024a; Nguyen, 2020; Vaka & Azmeera, 2024; Zafar et al., 2023)
Cloud service provider (CSP)	- Microsoft Azure - AWS - Google Cloud - Alibaba Cloud	- Microsoft Azure - AWS - Google Cloud - Alibaba Cloud	(Ahmed & Suneson, 2024; Barua, 2025; Figueiredo, 2022; Nguyen, 2020; Zafar et al., 2023)
Benefits	- Single contract - More control of hardware - More customisation options	- Single contract - Reduced maintenance - Scalability - Continuous innovation - Security	(Barua, 2025; Holland, 2023b; Vaka & Azmeera, 2024)
Challenges	- Still responsible for managing IT resources over the internet - Limited innovation updates - Less scalable	- Limited customisation - Internet dependent - Vendor lock-in - No control of updates - Integration challenges	(Barua, 2025; Vaka, 2024; Vaka & Azmeera, 2024)

3.3 BTP and Clean core

SAP Business Technology Platform (BTP) and a clean core approach are important in the SAP ecosystem, particularly when discussing SAP S/4HANA cloud strategies (Zafar et al., 2023). BTP is a PaaS application designed for organisations to enable seamless integration, application development, and intelligent technologies (Bhattacharjee et al., 2022). The clean core concept refers to maintaining a simplified, unmodified core of the SAP S/4HANA (Barua, 2025; Zafar et al., 2023). Furthermore, the objective is for organisations to standardise their business processes and comply with SAP standards, which means minimising custom code and modifications to the core ERP system (Bhattacharjee et al., 2022). This enables organisations to maintain the integrity and upgradability of their core system, which assists with innovation and flexibility (Barua, 2025; Zafar et al., 2023). BTP and clean core are utilised in concurrence, as BTP supports extending the core ERP system while adhering to the clean core method (Barua, 2025; Zafar et al., 2023).

S/4HANA cloud introduced a new concept called "Extensibility." The functionality is designed for key users and works on the principle of cloud services (Barua, 2025; Penny & Dawson, 2023). It is built specifically for S/4 HANA cloud but is also available in on-premise editions (Barua, 2025; Brandas et al., 2019). This functionality allows organisations to extend standard functionalities if the SAP standard does not have the functionality to accommodate an organisation's business requirements (Brandas et al., 2019; Penny & Dawson, 2023). Extensibility includes modifying standard business configurations,

extending data models, exposing data, creating new interfaces, or developing custom applications and reports (Brandas et al., 2019; Penny & Dawson, 2023).

Extensibility ensures software stability by using well-defined interfaces such as released objects and public APIs standards (Brandas et al., 2019; Penny & Dawson, 2023). SAP software updates remain unaffected by customer extensions standards (Brandas et al., 2019; Penny & Dawson, 2023). Extensions made to the core of SAP S/4HANA cloud are designed to be upgrade-proof, meaning they do not impact future updates standards (Brandas et al., 2019; Penny & Dawson, 2023). Any extensions that cannot be made directly in the core are handled side-by-side on SAP BTP standards (Brandas et al., 2019; Penny & Dawson, 2023).

3.4 SAP Activate framework

The SAP Activate framework was developed by SAP to enable organisations to migrate seamlessly from SAP ECC to S/4 HANA (Denecken & Musil, 2017; Denecken et al., 2022). The framework incorporates SAP Best practices, Guided configuration, and the SAP Activate methodology (Denecken & Musil, 2017; Denecken et al., 2022). Irrespective of the implementation approach or deployment model, the framework is a valuable project management tool to ensure organisations meet their project and business objectives (Denecken & Musil, 2017; Denecken et al., 2022).

SAP Best Practices are pre-configured solutions and templates designed to help organisations implement SAP software more effectively (Denecken & Musil, 2017; Denecken et al., 2022). They encompass industry-specific processes, configurations, and documentation that streamline the deployment of SAP applications (Denecken & Musil, 2017; Denecken et al., 2022; Panorama, 2024b). SAP Guided configuration involves a structured approach to setting up the system according to best practices and specific business requirements. As outlined in Table 5, the SAP Activate methodology is a six-step agile methodology that supports project managers in implementing SAP software using industry-defined methods (Denecken & Musil, 2017; Denecken et al., 2022).

Table 6: SAP Activate methodology

SAP Activate methodology	Description	Source
Discover	Decide on ERP software choices, implementation approaches, and strategy planning.	(Denecken & Musil, 2017; Denecken et al., 2022; Vaka & Azmeera, 2024)
Prepare	Define their roles and responsibilities, construct a project plan, and assign the resources to deliver the project.	(Denecken & Musil, 2017; Denecken et al., 2022; Vaka & Azmeera, 2024)
Explore	Alignment with industry standards by conducting fit-to-standard workshops using SAP best practices and assessing whether their business requirements correspond to these best practices.	(Denecken & Musil, 2017; Denecken et al., 2022; Vaka & Azmeera, 2024)
Realize	Adopt agile iterative process to build the business requirements. Tasks such as configuration, development and testing are conducted.	(Denecken & Musil, 2017; Denecken et al., 2022; Vaka & Azmeera, 2024)
Deploy	Deploy the SAP system to production, and while the system is live, the project team monitors the activities to ensure acceptable performance.	(Denecken & Musil, 2017; Denecken et al., 2022; Vaka & Azmeera, 2024)
Run	System is operational.	(Denecken & Musil, 2017; Denecken et al., 2022; Vaka & Azmeera, 2024)

3.5 S/4 HANA adoption

A considerable amount of research has been conducted on organisations implementing SAP S/4HANA, with many of these studies focusing primarily on the pre-implementation and implementation phases of the ERP lifecycle (Viorel-Costin, 2019). These statements align with the views of numerous researchers, who remarked that most ERP-related studies are focused on the early phases of an ERP lifecycle (Ghani et al., 2019; Hietala & Päiväranta, 2021; Oseni et al., 2017; Osnes et al., 2018). Despite this, examining these studies provides valuable insights into adopting SAP S/4HANA.

SAP S/4 HANA has been adopted by many organisations globally, and studies by Juturi (2024a) and Puspitasari et al. (2019) argue that the system provides businesses with efficiency, cost reduction, simplified processes, and real-time insights. Furthermore, Madathala et al. (2016) explains SAP S/4 HANA's system's performance with real-time application reporting allows organisations to make key business decisions in real-time. In addition, the study claimed that SAP S/4 HANA cloud security authorisations, such as user permissions, are uncompromising, and only users who are required to access an application are given access (Figueiredo, 2022; Makka, 2022). However, Makka (2022) argued that there are many security concerns, varying from data breaches to unauthorised access and data loss. The literature advised that organisations should implement security frameworks and security awareness programs to mitigate threats.

During the post-implementation phase, the challenges experienced include business process efficiency, management support, organisational change management, training, technical infrastructure, skilled resources, and security (Ahmed & Suneson, 2024; Jain & Bagga, 2021; Viorel-Costin, 2019). Further, Prasetyo and Soliman (2021) found that S/4 HANA needed to be more user-friendly and easier to use

than competitor ERP systems. Moreover, these challenges, Vaka (2024) argues that the benefits of SAP S/4 HANA outweigh the challenges. The literature advises that once the challenges are navigated, this business will experience ongoing business improvements and have a foundation for innovation for future innovative requirements (Juturi, 2024a; Vaka, 2024).

3.6 Summary of literature

Table 6 summarises the current body of literature explaining SAP's empirical context. It further categorises the available literature into themes and sub-themes.

Table 7. Summary of literature: SAP

Category	Themes	Sources
Systems Applications and Products (SAP)	Global footprint	(Hansen et al., 2023; Madathala et al., 2016; Puspitasari et al., 2019)
	Industry solutions	(Panorama, 2023a, 2025)
	Capabilities	(Juturi, 2024a, 2024b)
	Legacy systems support	(Christiansen et al., 2022; Juturi, 2024a, 2024b; Panorama, 2024a; Penny & Dawson, 2023; Penny & Sieber, 2023; Torii, 2024)
Rise with SAP	Support	(Barua, 2025; Hansen et al., 2023; Holland, 2023b; Sieber et al., 2024; Zafar et al., 2023)
	Implementation	(Ahmed & Suneson, 2024; Holland, 2024a; Nguyen, 2020; Vaka & Azmeera, 2024; Zafar et al., 2023)
	Deployment	(Barua, 2025; Holland, 2023b; Vaka & Azmeera, 2024)
	Innovation	(Bhattacharjee et al., 2022; Nguyen, 2020; Nguyen & Capua, 2020; Zafar et al., 2023)
	CSPs	(Ahmed & Suneson, 2024; Barua, 2025; Figueiredo, 2022; Nguyen, 2020; Zafar et al., 2023)
	Clean core	(Barua, 2025; Brandas et al., 2019; Penny & Dawson, 2023; Zafar et al., 2023)
	Frameworks	(Denecken & Musil, 2017; Denecken et al., 2022; Holland, 2024a)
Post-implementation benefits and challenges	Operational	(Oliwatosin et al., 2024; Puspitasari et al., 2019)
	Management	(Holland, 2023a, 2024c; Madathala et al., 2016; Zafar et al., 2023)
	Organisational	(Barua, 2025; Figueiredo, 2022; Holland, 2024b; Makka, 2022; Prasetyo & Soliman, 2021; Zafar et al., 2023)
	Information Technology	(Barua, 2025; Figueiredo, 2022; Holland, 2024b; Makka, 2022; Prasetyo & Soliman, 2021; Zafar et al., 2023)

Chapter 4. Research method

This chapter explains the research process used to conduct the empirical report, using the following methods to plan the research: a research philosophy, purpose, approach, strategy, and time horizon. Furthermore, the sampling methods, including the data collection strategy, preparation, analysis, and data quality assessment, are explained.

Furthermore, this chapter underlines the importance of the ethical procedure, stating the method used to acquire ethics approval. Finally, it explains the limitations encountered during the execution of the research method, and the chapter is then summarised.

In addition, this chapter references the appendices for the research method, including the research instrument (Appendix A), consent letters (Appendix B and Appendix C), research timeline (Appendix D), audit trail (Appendix E), codebook (Appendix F) and ethics approval (Appendix G).

4.1 Research philosophy

The key concepts of a research philosophy are ontology and epistemology. A research philosophy is a paradigm that explains how data should be collected and analysed (Saunders et al., 2019). Saunders et al. (2019) argue that a researcher's assumptions and principles are fundamental abstractions of how knowledge will be developed.

A subjectivism ontological position was chosen for this study as the researcher aimed to understand the post-implementation challenges of cloud ERP from an individual's perspective. Ontology is the view of how the researcher perceives reality, and the two critical stances are objectivism and subjectivism (Saunders et al., 2019). Patton (2014) and Saunders et al. (2019) explain objectivism portrays that social reality exists independent of an individual's reality. On the contrary, subjectivism portrays that the individual's perceptions create their social reality.

Interpretivism was chosen for the study as it provided insights into the phenomenon from the individual's viewpoint (Saunders et al., 2019; Walsham, 2006). Interpretivism assumes that an individual's reality is subjective, and their experiences shape reality (Saunders et al., 2019; Walsham, 2006). Epistemology is the relationship between knowledge and reality (Saunders et al., 2019). This position explains that the researcher's view of the world strongly influences the interpretation of the data collected (Walsham, 2006).

4.2 Research purpose

An explanatory purpose was chosen for this study. Ghani et al. (2019) and Osnes et al. (2018) explain the need for more literature on the post-implementation phases of an ERP lifecycle. The significance of this research is accentuated by the fact that large organisations worldwide are increasingly investing in transitioning from their legacy ERP systems to cloud ERP solutions (Panorama, 2024a). Furthermore, the researcher explains the phenomenon by investigating the two organisations and interviewing experts who support cloud ERP within the business.

Explanatory research aims to answer a phenomenon's "how" and "why" occurrences (Johannesson & Perjons, 2014; Saunders et al., 2019). The aim is to increase the knowledge in a particular area of study to better understand a phenomenon without necessarily deriving a conclusion (Johannesson & Perjons, 2014; Saunders et al., 2019). Generally, explanatory research is conducted when it has a known problem, and an explanation is required to understand a problem better using comparisons between various variables (Denscombe, 2019; Johannesson & Perjons, 2014; Saunders et al., 2019).

4.3 Research approach

Inductive reasoning was chosen for this study. Cloud ERP represents a relatively new phenomenon, and many organisations are transitioning from legacy ERP systems to Cloud ERP. Despite its growing adoption, Cloud ERP has minimal research available, specifically regarding the challenges encountered during the post-implementation phase. By employing inductive reasoning, this research aims to formulate a comprehensive theory by examining the unknown aspects of the literature.

Inductive reasoning was selected to investigate unknown areas, develop theories, and gain new insights while ensuring that conclusions are closely tied to the data (Armat et al., 2018; Hayes et al., 2010; Saunders et al., 2019; Yin, 2015b).

4.4 Research time horizon

Cross-sectional research was chosen for this study. The approach benefited this study, allowing the researcher to understand the phenomenon's current circumstances without the necessity to track changes over time. Furthermore, the researcher could study the post-implementation challenges of cloud ERP for two large organisations in a particular timeframe. Since the timeframe of the research was short, the approach was appropriate.

Cross-sectional research explains the selection of a case study by explaining a distinct phenomenon. This method requires a participant sample, a defined industry, a particular geographic area, and organisations (Saunders et al., 2019).

The research timeline (Appendix D) outlines the timeline for the master's dissertation course. In 2023, the researcher dedicated significant time and effort for the research proposal, literature review, and research design as an initial contribution to the dissertation. Additional assignments for the coursework were completed independently of the dissertation.

In 2024, after ethics was approved, the researcher started interviews. The interviews were an iterative process of transcribing and performing data analysis after each interview. Once completed, the researcher followed the prescribed data analysis techniques to ensure data quality. The researcher then worked with their supervisor on a draft submission before submitting the final dissertation in 2025.

4.5 Research strategy

A multiple-case design was chosen as the research strategy, ensuring a thorough examination of the phenomenon. A research strategy is a high-level plan that guides a researcher in planning and

conducting a study (Denscombe, 2014; Johannesson & Perjons, 2014). Yin (2018) defines a case study as a research strategy that intensively studies a person, group, organisation, or project. Case studies are chosen when in-depth knowledge is required for a specific phenomenon (Walsham, 1995, 2006; Yin, 2015a, 2018). Additionally, it is used to explain a phenomenon for better understanding. Yin (2018) and Walsham (2006) discuss how a case study aims to explain the real-life realities of a phenomenon.

Yin (2018) describes four types of case study designs, holistic single case study, holistic multiple case study, embedded single case study and embedded multiple case study. Furthermore, the design allows independent arguments from each case which provided depth to the research (Yin, 2015a, 2018).

Choice of cases

The researcher chose two large organisations that implemented S/4 HANA cloud. The comparative analysis between private and public cloud gave the study greater depth and insight into cloud ERP. Initially, the researcher aimed to choose an SAP S/4 HANA public cloud implementation in South Africa. However, during the research period, no South African organisations successfully implemented S/4 HANA public cloud. Ultimately, the selected organisation from Eswatini was the only successful adopter of SAP S/4 HANA public cloud in Africa. Furthermore, the organisation that implemented S/4 HANA private cloud was one of only a few South African companies that successfully implemented SAP S/4 HANA private cloud. Therefore, the case selection for SAP software was challenging due to the rarity of fully implemented cloud ERP systems in South Africa. However, it is essential to note that, at the time of the research, many organisations were in the implementation phase of SAP S/4 HANA.

This study chose a qualitative research method. A research method is a detailed plan of how data collection and data analysis will be executed for a study (Johannesson & Perjons, 2014; Saunders et al., 2019). A qualitative research method is a non-numeric data collection method used to understand the experiences of individuals in real-life settings (Patton, 2014; Yin, 2015b). Qualitative research allows the data to be collected in an open-ended communication technique, which allows the participants to express their experiences, views and opinions without interruptions and influence from the researcher (Johannesson & Perjons, 2014; Saunders et al., 2019). This setting commonly creates insightful responses, and opportunities emerge for new ideas (Patton, 2014; Saunders et al., 2019; Yin, 2015a).

Due to the minimal literature available in this context of the phenomenon, qualitative research allowed new themes to emerge during data analyses (Johannesson & Perjons, 2014; Patton, 2014; Saunders et al., 2019; Yin, 2015b). This aligned with the research strategy of a multiple case study, interpretivism, inductive reasoning and explanatory research.

4.6 Data collection

This study chose semi-structured interviews as the primary research instrument (Appendix A). To prepare the interview document, the researcher used a topic guide strategy to design the research instrument (Arthur et al., 2014). In addition, the researcher used formalized strategies discussed by Jiménez and Orozco (2021) to conduct the interviews.

Interview strategy

This study chose a topic guide strategy to prepare the research instrument (Arthur et al., 2014). The researcher prepared an introduction, subtopics, and conclusion to steer the interviewee to answer the research phenomenon. Additionally, the questions were constructed in short phrases with simple language and terminology (Arthur et al., 2014). A topic guide is a term used to describe the key topics and subjects that will construct the research instrument, and these topics emanate from the research questions (Arthur et al., 2014). Even though a topic guide is a guide, it allows the researcher to ensure consistency and flexibility in data collection (Arthur et al., 2014).

The introduction contained personal details to gain the participant's trust and make them feel comfortable. The subtopics contained questions about the organisation's operations, structure, management, and IT. The conclusion included questions that kept the interview positive, and the researcher summarised the key points to ensure the information was understood (Arthur et al., 2014). In addition, the researcher used the guided "Grand Tour" technique to elicit more detailed information on the experiences and perceptions of the participants during the interviews. This technique allowed the researcher to pivot the participant to more salient experiences (Jiménez & Orozco, 2021). Further, this technique allowed the interview to be conducted inductively by allowing the interviewee to express his views on the phenomenon, creating an environment that allows new themes to emanate.

Pilot testing

As a starting point, the researcher used a pilot testing method to ensure the questions were appropriate for the case participants. The research followed a three-step strategy for the pilot testing. The researcher tested the research instrument with a group of experts who had a similar background to the target group for the study. This allowed the researcher to analyse the validity of the questions and refined them where required (Saunders et al., 2019).

1. Three experts with extensive knowledge of SAP S/4HANA were interviewed using a provisional research instrument. The experts included a project manager, a technical consultant, and a developer, each of whom had participated in multiple SAP S/4HANA implementation projects.
2. After each interview, the researcher analysed the questions and responses to assess their feasibility. This process allowed the researcher to add new questions or eliminate irrelevant ones.
3. The interviews were timed and recorded.

Interviews

During the interviews, it became clear that some questions could have been more impactful. As a result, questions that did not yield valuable information were removed. Additionally, when participants brought up specific topics which led to new themes, the researcher adjusted the questions accordingly. This iterative process allowed for continuous improvement of the research instrument throughout the study.

Interviews were conducted individually through virtual calls using Microsoft Teams. The interviews were recorded with the embedded recording and transcription functionality.

4.7 Sampling method

Non-probability and heterogeneous purposive sampling were chosen for the study. This method allowed the researcher to select participants who understood the phenomenon, providing in-depth and valuable information (Mohd Ishak & Abu Bakar, 2014; Saunders et al., 2019). In addition, this method allowed participants from different positions to participate in the same study (Saunders et al., 2019). These participants had extensive knowledge about their cloud ERP system and were a combination of management, users, and technical experts.

Saunders et al. (2019) and Guest et al. (2016) emphasise that achieving data saturation is more important than the overall sample size in qualitative research. However, Saunders et al. (2019) suggest that a sample size of four to twelve participants per case study is sufficient for purposive sampling.

The interviews revealed repetitive information, indicating that data saturation was nearly achieved. A sample of four to twelve participants per case study was appropriate for effective data collection. Given the brief duration of the data collection period, the researcher fulfilled the minimal criteria required for data collection.

4.8 Participants

This study interviewed IT executives, managers, business /end-users, and technical experts. These participants had in-depth knowledge of the organisation's cloud ERP system. These employees currently support ongoing business activities and are experiencing business challenges. Table 7 outlines the participant's role, organisational rank, the case, and unique IDs used for the participants to ensure anonymity.

Table 8. Participants interviewed

Unique ID	Case ID	Participant ID	Role	Organisational rank
C1P1	C1	P1	CIO/ SAP Programme manager	Management
C1P2	C1	P2	SAP Manager	Management
C1P3	C1	P3	SAP Business analyst	Support team
C1P4	C1	P4	SAP Business analyst	Support team
C1P5	C1	P5	IT Security	Support team/ SAP User
C1P6	C1	P6	IT Infrastructure and networks	Support team/ SAP User
C2P1	C2	P1	CIO/ SAP Programme Manager	Management
C2P2	C2	P2	SAP Manager	Management
C2P3	C2	P3	SAP Enterprise Architect / Integration expert	Management/ Support team
C2P4	C2	P4	SAP Business analyst: Agriculture	Support team
C2P5	C2	P5	Production Manager	Super user/ SAP User
C2P6	C2	P6	Finance manager	Super user/ SAP User

4.9 Data preparation

During data preparation, unique codes were assigned to the organisation and participants. The video recordings were renamed using these unique codes to maintain anonymity before being uploaded to Otter AI. The Otter AI tool was then utilised to review and edit the transcripts.

In the first step, the researcher edited the transcribes and replaced the organisation and participant's names with unique codes. After that, editing began with keeping elisions, slang, and non-verbal sounds verbatim, but grammatical errors were corrected. In addition, non-linguistic observations were not documented. Since there were 12 participants, the researcher proofread each transcribe to ensure all the words were included.

Original copies of the transcripts, video recordings were stored in a password-protected folder. Otter AI is password-protected, and only the researcher had access. After the Otter AI data preparation, the transcribes was uploaded to NVivo for analysis.

4.10 Data analysis

As depicted in Figure 5, the researcher used Braun and Clarke (2006) six-step thematic analysis to prepare, analyse, and interpret the data. The approach allowed themes and patterns to derive valuable and meaningful information (Braun & Clarke, 2006). In addition, a coding matrix was used to organise codes into matrices to explore patterns and relationships between themes.

The following six-phase steps outline the process used to analyse the data, and a detailed audit trail is attached in Appendix E. Since manually conducting a thematic analysis was arduous, NVivo was used to analyse and interpret the data.

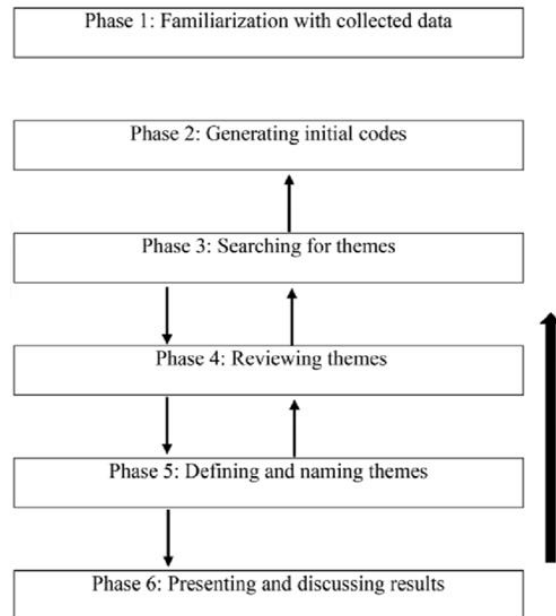


Figure 5. Six-step thematic analysis (Braun & Clarke, 2006)

Phase one involved transcribing and reading the data, familiarising the researcher with the collected data. Initially, all 12 interviews were recorded on Microsoft Teams, and the videos were uploaded to Otter AI. Otter AI was used to transcribe the data and correct grammatical errors. All the transcriptions, including business and organisation names, were modified with unique codes for ethical reasons. The data was then uploaded to NVivo for data analysis. In addition, the researcher then used the “Autocode” functionality to generate the initial codes. This process created a concise overview of the data and highlighted the main points. The data generated first-order codes based on the critical points and referenced them accordingly.

Phase two was collating data and grouping data into relevant codes. After reviewing the codes generated from the automated functionality, the researcher started grouping the codes into segments, which contained the main points of the findings.

Phase three involved reviewing the codes and grouping them into themes, which are more comprehensive than codes. During this phase, codes were utilised to identify patterns and develop themes. Codes that were too unclear or irrelevant to the study were discarded, while related codes were grouped to form cohesive themes.

Phase four involved reviewing the themes, removing any insignificant data, or adding new themes. During this phase, the collected themes were reviewed. Some themes were discarded, combined, refined, or separated. The research questions were also added to NVivo, and the themes were then sorted accordingly to structure the findings.

Phase five involved analysing the existing themes and giving them essential names and definitions. During this phase, the researcher further reviewed each theme, revisited the transcripts, and thoroughly reviewed each transcript to ensure the data aligned with the relevant themes.

Phase six involved producing a report summarising the findings and concluding with a conceptual model addressing the research question. The researcher created a report that discussed the identified themes in detail, with elaborations provided in chapters 5 and 6.

4.11 Data quality

Data quality is integral to ensure rigour in a qualitative study, and researchers advise that no ubiquitous method exists (Daniel, 2019). During the 1980's, Guba and Lincoln (1989) and Krefting (1991) developed frameworks to evaluate data quality for qualitative research. Even though these frameworks were developed many years ago, they are still prevalent and being used in the latest publications, such as Daniel (2019) and Mayan (2023). Some qualitative researchers, such as Altheid and Johnson (1988) and Tracy (2010), have argued that standardised criteria are unsuitable for qualitative research. Nonetheless, experts attest to the trustworthiness, credibility, transferability, dependability, and confirmability assessment criteria as a foundation for data quality (Guba & Lincoln, 1989; Korstjens & Moser, 2018; Krefting, 1991; Mayan, 2023; Morse, 2015).

Credibility ensures that the researcher interprets the findings accurately from the participant and that the information is credible and valid for the phenomenon (Mayan, 2023; Morse, 2015). Patton (1999) explains the process of data triangulation by comparing and cross-checking data consistency across multiple participants. Patton (1999) explains that even if the data is different, it should not be considered invalid as the purpose is to understand why there are differences. Transferability ensures a suitable selection of participants with adequate knowledge of the phenomenon (Korstjens & Moser, 2018). Dependability ensures that the findings can be replicated if a different researcher conducts the same study (Mayan, 2023; Morse, 2015). Confirmability ensures the researcher does not interpret the findings from their perspective but subjectively uses the data to construct conclusions (Mayan, 2023; Morse, 2015).

This study used data triangulation to ensure credibility. The researcher interviewed multiple participants from the same organisation and used the data to compare the responses. In addition, online reports (whitepapers) were used to confirm consistency. For Transferability, purposive sampling ensured that the right participants contributed to the study. Peer debriefing and an audit trail were used to ensure dependability and confirmability. The researcher conducted peer debriefing using participants from the pilot testing as it allowed the researcher to discuss the data with experts outside the case participants. It further allowed the researcher to engage with experts who challenged the analysis and allowed an iterative process during interviews and the final analysis. In addition, an audit trail was documented in NVivo and screenshotted in Appendix E. The audit trail was used to meticulously document each step of the thematic analysis from start to end. Additionally, version control was used in NVivo to maintain the detailed audit trail, providing reassurance of the thoroughness of the process.

4.12 Ethics

The researcher received ethics approval (COM/00518/2023) from the UCT Ethics Committee to conduct the research. UCT Ethics Committee provided ethics approval on 2023/11/09, thereafter the

researcher proceeded with data collection. The ethics request was completed through an online portal provided by the faculty. The UCT Ethics Committee reviewed the request before issuing a legal consent document outlining the purpose of the research. The researcher ensured that the document underwrites all the necessary ethical procedures.

Two organisations were chosen for data collection, and each organisation signed an organisational consent form from an executive who approved data collection (Appendix B). In addition, each participant (Appendix C) signed a consent form, which outlined the purpose of the research.

Before the interview started, the researcher advised the participants that the interviews would be recorded as specific questions related to the participants, working conditions, and responsibilities. The researcher ensured that all personal details were kept private and confidential. The data was discarded if a participant chose to withdraw before or during the interview.

Once data was collected, the researcher ensured that all the data was stored in a password-protected folder online. Only the researcher and their supervisor had access to the folder. Since Otter AI was used for transcribing, the researcher renamed the video or audio recordings to ensure that organisational names were not stored online. During the transcribing process on Otter AI, the researcher changed the names of the participants and organisations to unique codes to ensure anonymity and privacy. Once the transcribes were uploaded to NVivo, the data was cleaned from personal data, and anonymity and confidentiality were assured.

4.13 Limitations

The research method served as a guide for the researcher during the research process. However, there were limitations. Since the study followed an interpretivism philosophy, the participants provided information from their perspective, which might differ from the reality of the challenges experienced by the phenomenon. Explanatory research in alignment with interpretivism can be biased based on how the researcher interprets the study.

Semi-structured interviews were used as the primary data collection method. This method encouraged open-ended discussions, resulting in a substantial dataset. However, the large volume of data included considerable nonessential information related to the phenomenon, making the data analysis process quite strenuous. Thematic analysis was used for data analysis. Often, with thematic analysis, the researcher can use bias inclinations, which could be due to perceptions or how the researcher views the world.

The researcher could not obtain business documents, which would have been the secondary data collection instrument, but it presented challenges due to various ethical and security concerns. These factors profoundly impacted the study, leading to the decision to use only one research instrument.

4.14 Summary

This chapter detailed key components such as research philosophy, purpose, approach, strategy, and time horizon. It further emphasises the significance of ethical procedures and discusses challenges faced during research execution.

This study adopted a subjectivism ontological position and interpretivism epistemology, focusing on understanding the post-implementation challenges of cloud ERP from individual perspectives. Furthermore, the explanatory purpose was chosen to explain the lack of literature on ERP post-implementation phases, particularly given the migration from legacy ERP systems to cloud ERP. The aim was to investigate and understand these challenges through expert interviews. Additionally, inductive reasoning was utilised to explore the relatively new phenomenon of cloud ERP, aiming to develop comprehensive theories from unknown areas in the literature. Moreover, cross-sectional research design is utilised to comprehend current post-implementation challenges in two large organisations within a specific timeframe.

The researcher chose two large organisations that implemented S/4 HANA cloud. The comparative analysis gave the study greater depth and insight into cloud ERP systems. S/4 HANA proved optimal, as the researcher had the necessary resources to support the study. Due to the minimal literature available in this context of the phenomenon, qualitative research allowed new themes to emerge during data analyses.

The researcher prepared, analysed, and interpreted the data using thematic analysis. This approach allowed themes and patterns to derive valuable and meaningful information. In addition, a coding matrix was used to organise codes into matrices to explore patterns and relationships between themes. This study used data triangulation, audit trail, purposive sampling, and peer debriefing to ensure data quality.

An essential aspect of the interpretivist framework is ensuring that a researcher's interpretations are firmly grounded in the data, unrestricted from personal biases or preconceived notions. Peer debriefing established a rigorous method for external scrutiny, allowing independent reviewers to critically challenge and validate the connections between evidence and the conclusions drawn. Furthermore, the audit trail documented every data collection, coding, and interpretation, providing a clear and transparent understanding of the methodological decisions and analytical reasoning involved. Concurrently, these practices enabled other researchers to trace how findings derived directly from the empirical data, thus reinforcing the credibility of the research despite the inevitable subjectivity in qualitative research.

Chapter 5. Case descriptions

This chapter discusses the background of the two cases used for the study. Furthermore, the study delved into each of the ERP lifecycle phases. This approach allowed for a thorough understanding of the current knowledge of cloud ERP adoption.

5.1 Background

Case 1 has a global footprint of over 70 years of experience in manufacturing, distribution, and material handling. In addition, Case 1 is the leading mining and construction machinery supplier in South Africa and has strategically partnered with some of the industry's leading manufacturers. This partnership ensures that South African businesses have access to the best available equipment. The organisation migrated from SAP ECC to SAP S/4 HANA private cloud using a brownfield approach. The organisation preferred this approach, allowing business continuity with minimal user impact. In addition, they had an internal core SAP team and support from an implementation partner to implement SAP S/4 HANA private cloud.

“So, we did a Brownfield's conversion. So, we needed to execute a migration so that we had a platform on which to build the rest of our ERP roadmap, without severely disrupting our logistics businesses which are already on ECC [C1P1]”

Case 2 is one of the largest companies in Eswatini and has a global footprint. The organisation focuses on sugar cane farming and manufacturing refined sugar and ethanol. Furthermore, the organisation conducts business by exporting products to Europe and Africa, with a significant interest in the South African market. Using a greenfield approach, the organisation migrated from SAP ECC and various bespoke systems to a single SAP S/4 HANA public cloud instance. The organisation chose this approach because it pursued an opportunity to standardise their current business processes. The migration to SAP S/4 HANA public cloud was strategically planned and executed with the support of an internal SAP team, SAP, and an implementation partner.

“So, with the public cloud, you have to go Greenfield, we don't have any choices [C2P1]”

Case 2 adopted a phased approach involving going live with different SAP modules in separate work streams. During data collection, the company successfully implemented enterprise asset management (EAM) and procurement streams, with finance and sales streams going live within the coming months. Adopting a phased approach forced the organisation to integrate SAP ECC into S/4 HANA to ensure governance, as some streams run in parallel systems.

Panorama Consulting reported that phased approaches are less risky as they allow the business to phase in and learn the new system while using it (Panorama, 2023b, 2024b). The phased approach allows organisations to manage specific streams whose processes comply with industry standards to make it easier to go live before the more complex streams (Panorama, 2023b, 2024b).

“Okay, remember, we have taken a phased approach to the transition. And, in the phasing, yes, we identified which processes we could move into S/4HANA, first...from a business point of view, which we would seamlessly migrate. And, therefore, EAM (Enterprise Asset Management) was identified to be those processes which we could migrate, and, as well, we did not migrate the processes as they are now in ECC, in terms of customising the public cloud functions, which is also not permitted. So, we basically had our fit to standard workshops across the business and then challenged ourselves to review the way we work and then fit to the public cloud processes [C2P3]”

These two organisations chose the Rise with SAP journey to migrate from SAP ECC to S/4 HANA Cloud. The project approach to implement SAP S/4 HANA differed between the organisations. As outlined in Table 8, Case 1 implemented the S/4 HANA private cloud, and Case 2 implemented the S/4 HANA Public cloud. This study will delve deeper into the SAP journey to S/4 HANA, and the challenges organisations face post-implementation. Despite these challenges, the successful operation of the businesses on SAP S/4 HANA is a reassuring sign of the system's capabilities.

“And we also looked at the sort of, cost savings of RISE, and almost handing over all of our costs around SAP to SAP” [C2P1]

Table 9. Case deployment models

	Case 1	Case 2
ERP Software	S/4 HANA private cloud	S/4 HANA public cloud
Implementation approach	Brownfield (Conversion)	Greenfield (New implementation)
Project timeline	January 2022 - September 2023	October 2022 - June 2024
Project go-live	September 2023	June 2024- September 2024

5.2 Cloud ERP Lifecycle

As previously discussed, Bento and Costa (2013) and (Gable et al., 2001) explained that an ERP lifecycle is divided into three phases: pre-implementation, implementation, and post-implementation. Although this study primarily focused on the post-implementation phase, the findings suggest that each phase is connected. Therefore, providing a brief overview of the pre-implementation and implementation phases expanded the research and improved the understanding of the post-implementation phase.

During data collection, participants frequently discussed their methods for implementing their cloud ERP systems. The research emphasised the importance of understanding distinct aspects of the pre-implementation and implementation phases of an ERP lifecycle. Discussing these experiences from both organisations provided a strong foundation for the study.

Pre-implementation

The pre-implementation phase of an ERP lifecycle is the planning phase where organisations establish the foundation for a successful ERP system (Ağaoğlu et al., 2015). This phase includes assessing business needs, engaging stakeholders, selecting an appropriate ERP vendor, and choosing an implementation partner (Saade & Nijher, 2016).

A proactive stance was adopted from both organisations, who claim that project initiatives only began when senior management supported the ERP undertaking.

“So, you know, the way we addressed projects now is ensuring that we have support from the executive, and business, and executives in IT for the project [C1P1]”

Case 2 advised they currently have change management at an executive level to ensure all management members are comfortable with the project's initiative.

“But, in addition to that, the way the change management sessions that were held at the executive level, just for the validation of that public cloud, then the decision to go public was made at the executive level [C2P2]”

Since SAP confirmed the end maintenance for SAP ECC, both organisations had to consider the future roadmap for their ERP systems. The organisations had discussions and a discovery sessions with SAP to ensure they have the capability of moving to S/4 HANA cloud. In addition, both organisations had numerous negotiations with SAP, and after internal discussions, they found the SAP Rise environment a good option for standardising their business.

The CIO of Case 1 indicated they were offered a trial environment to test their processes.

“There was some trial software that we could add to our environment as well. And then the consideration that SAP, at that time, was developing the RISE environment more so than the on prem environment. So, for us, you know, the S/4HANA on RISE represented for us an opportunity to consolidate in the most cost-effective manner [C1P1]”

In addition, the CIO advised they assessed their current system and found that it was customised to the extent that it could not keep up with the maintenance requirements.

“We've learned that lesson in the past with our two more legacy ERPs, where they were customised to an extent that we weren't able to continue or keep up with the maintenance requirements [C1P1]”

Moreover, an internal assessment was performed to ensure the organisation was cloud fit.

“It was being cloud fit [C1P1]”

The management team from Case 2 reported that they considered many motivations to move to the public cloud. Nevertheless, a compelling argument was that this would be their last substantial investment in an ERP project.

“This will be our last SAP project, our last ERP project. Done. It's gone. We've moved. Don't have to [do a] conversion again. All we do...it's a change of thinking. So, we get new product every month and we get new upgrades every six months [C2P1]”

In addition, standardisation and clean core was a strong motivation for S/4 HANA public cloud.

“Yes, standardization and clean core was one of the compelling stories for CASE2 to choose public cloud [C2P1]”

Both organisations assured management support, which enabled the creation of a comprehensive project plan.

Yes. Well, that's all part of the project plan. So, you've got a project plan from start to finish and then readiness checks. You've got, as I mentioned, mock runs, you've got mock data loads, you've got Master data [C1P3]”

Additionally, an implementation partner was chosen to support the project's successful execution.

“And where it is process specific, then the consultants for each area, our implementation partner, in this case, then are responsible for logging those tickets with SAP [C2P3]”

Implementation

The implementation phase of the ERP lifecycle involves configuring, customising, and deploying the system (Ralhan et al., 2023). This phase includes installing the ERP, integrating it with existing systems, and migrating data from legacy systems to the new ERP platform (Alaskari et al., 2021; Ralhan et al., 2023). In addition, the project team collaborates closely with the ERP vendor and the implementation partner to ensure the system is set up and correctly implemented (Hillman Willis & Hillary Willis-Brown, 2002; Zafar et al., 2023). In addition, end-users receive training to use the new system effectively. Change management practices are essential to address resistance and facilitate a smooth transition (Goyette et al., 2022).

The SAP Activate methodology was used to plan the implementation for both organisations. While the implementation approach differed, both organisations adhered to the methodology's basic principles when planning their S/4 HANA implementation. The participants discussed the ERP lifecycle phases and the SAP Activate methodology interchangeably during the discussions. Therefore, the evidence suggests that the ERP lifecycle can effectively be categorised using the SAP Activate methodology, as outlined in Table 9. Additionally, Table 9 briefly explains the organisation's activities during each phase of the ERP Lifecycle.

Table 10. ERP Lifecycle vs SAP Activate methodology

ERP lifecycle phase	SAP Activate methodology	Organisation activities
Pre-implementation	Discover	Assessment of the Rise environment
Pre-implementation	Prepare	Selection of implementation approach and deployment models
Implementation	Explore	Conducted fit to standard workshops
Implementation	Realize	Configured the system, performed testing and training
Implementation	Deploy	Cutover activities, such as data migration
Post-implementation	Run	System was live

During the realise phase, Case 1 did not conduct fit-standard workshops. This approach differed in Case 2, as business process reviews of all processes were performed.

“So, part of the discovery was fit to standard workshops, where each department or business processes, led by business process owners, went through the processes to check where there are deviations [C2P2]”

In addition, specific configurations were mandatory for Case 1, such as master data design changes from SAP ECC to S/4 HANA.

“Not knowing a business process fully with config. It's a copy and paste. And because you can't copy and paste material vendor and customer master into BP, because it's completely different, there was a bit of misalignment [C1P3]”

Furthermore, Case 2 configured standard scope items, as their objective was to standardise their processes.

“They call them scope items, the standard processes. Then, from there, you can use, or you can configure them. The business allowed configuration, for example, you need to name your company, you need to...but there's a standard structure [C2P3]”

Both organisations conducted further activities in the realisation phase, including training and user acceptance testing (UAT) to ensure the business was ready for the new ERP system.

“So, before we go live, we perform user acceptance testing, and training of the end users to empower them as well [C2P4]”

Finally, in the deployment phase, the organisations tested mock data loads in their new system to ensure it could handle the performance requirements. Even though the data migration activities were completed, there were specific challenges related to data migration cockpits and manually correcting data. However, this was not investigated further as it was not the focus of the study.

“So, in terms of data migration, the challenge was around some settings related to the data or to the master data objects not being in place early enough, such that we know that when we migrate, we have the correct profit centers, the correct evaluation classes for materials in the system [C2P3]”

5.3 Summary

Cases 1 and 2 chose the Rise with SAP journey to migrate from legacy systems to cloud ERP. These organisations successfully implemented different versions of SAP S/4 HANA cloud. An essential factor in their success was the strong support from their senior management teams. During the pre-implementation, both organisations had iterative discussions with SAP to ensure the deployment model fit their business strategy. In addition, during the implementation phase, both organisations adhered to the SAP Activate framework for implementing their cloud ERP systems.

The discussions on the pre-implementation and implementation phases provided a strong foundation for the next chapter, which will provide an in-depth analysis of the post-implementation phase of the cloud ERP implementation.

Chapter 6. Post-implementation challenges of cloud ERP

Research explains that a successful post-implementation phase of an ERP lifecycle depends on effectively realising benefits while managing intrinsic challenges (Hietala & Päivärinta, 2021; Madathala et al., 2016; Oseni et al., 2017). Literature indicates that benefits and challenges are inherently related, and every benefit has a set of challenges. The benefits of ERP systems are often discussed before distinguishing challenges (Hietala & Päivärinta, 2021; Madathala et al., 2016; Oseni et al., 2017).

During data collection, participants focused on the benefits of cloud ERP before specifying the challenges, which aligns with the literature. The research inductively developed themes derived from the data collected from participant interviews. As outlined in Table 11, these were categorised into four themes: IT, operational, management, and organisational. These themes are discussed in the following sub-sections, supported by bar graphs in which the horizontal axis represents the 12 participants and the vertical axis reflects the frequency of references and contribution to each theme.

Table 11: Post- Implementation challenges of cloud ERP

		Sub themes	
		Benefits	Challenges
Themes			
	Information Technology: ERP application	Cloud functionalities	Configuration limitations
		Extensibility capabilities	Data inconsistencies
			Integration complexity
			Reporting obstacles
	Information Technology: Infrastructure	Enhanced scalability and flexibility	Authorisation concerns
		Enhanced security	Data protection concerns
		Maintenance reduction	Unspecified downtime
	Operational	Integrated business processes	Inefficiency of standardised processes
		System performance	Lack of alignment with standardised processes
	Management	Business growth	Cloud support inaccessibility
		Cost reduction	Skills shortage
		Improved decision-making	Rising costs
		Resource optimisation	
	Organisational	Change management framework	User resistance
		Training objectives	

6.1 Theme 1: Information Technology

Information Technology (IT) refers to an organisation's ability to effectively leverage IT resources to support its operational activities, strategic goals, and overall technology performance. IT capability enables businesses to innovate, improve efficiency, and remain competitive in an increasingly digital world.

During the data analysis, discussions regarding the technical factors of SAP S/4 HANA, and the IT theme emerged. The study categorised the IT theme into ERP applications and IT infrastructure, as depicted in Figure 6.

ERP application theme explains the capability and functionality of the cloud application and the IT infrastructure theme explains the technical components for hosting the ERP application. Both themes presented meaningful insights into the technical dimensions of cloud ERP. These findings are discussed in detail in the following sub-sections.

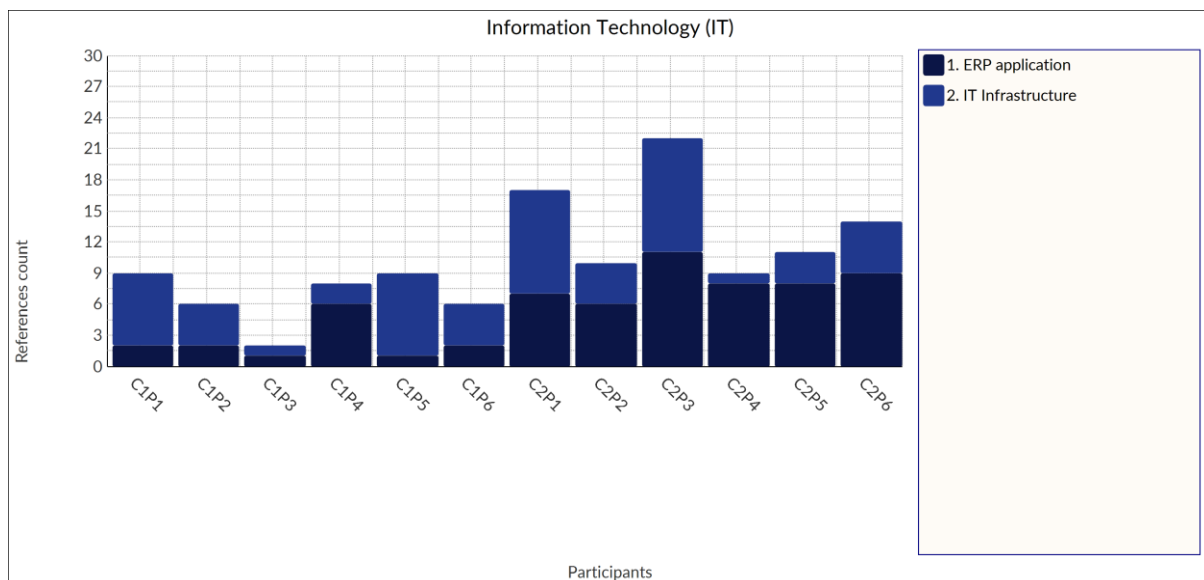


Figure 6. Information Technology (IT)

Theme 1.1: ERP Application

Cloud ERP has become essential for modern businesses to streamline operations, reduce IT costs, and enhance collaboration (Jain & Bagga, 2021). The software provides the flexibility, scalability, and cost-efficiency businesses need to stay competitive in a fast-evolving business environment (Jain & Bagga, 2021; Panorama, 2024b). During the analyses, the ERP application theme focused on the application capability and the benefits and challenges experienced by the organisations.

Benefits

Figure 7 depicts the benefits of the ERP application identified during the post-implementation phase. The theme of ERP application was divided into sub-themes: cloud functionalities and extensibility capabilities.

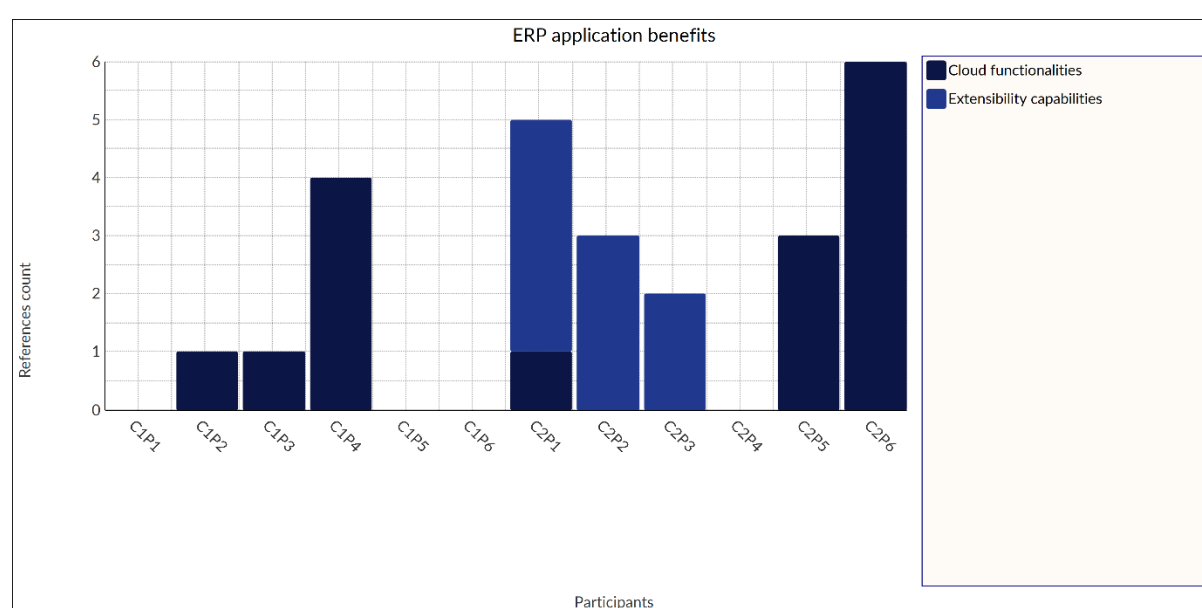


Figure 7. ERP application benefits

Cloud functionalities

Case 2 needed to explore new functionalities in S/4 HANA public cloud as certain functionality was deprecated from SAP ECC, and some changes were mandatory.

The universal general ledger is a mandatory change in S/4 HANA, as the system now has a single data table for financial transactions, which is considered a tremendous benefit as it removes data redundancies (Jain & Bagga, 2021; Madathala et al., 2016).

However, the participants are still uncertain of the complete functionality capability as their finance module has yet to move to S/4 HANA. Interestingly, the reported challenges of the universal general ledger were a mandatory change for Case 1, even though it was not reported. This oversight was likely because no SAP finance expert was interviewed.

“Mainly because we were moving to a new space where the emphasis is on the use of the universal GL [General Ledger], which is a new concept. It's a new functionality

that gives you the flexibility to analyse your cost in many various ways, as defined to that table. And, at the end, where we're coming from, we had classified our costs by type [C2P6]"

In addition to the universal general ledger, participants from Case 2 indicated that standardised workflows significantly benefited the business, as specific administrative tasks are automated.

"Because in S/4HANA, you create a record, you release it, you put it to ready to schedule, you dispatch it. So, all those steps, you must make sure that they happen, so that the work order can be in that maintainers trained to perform maintenance confirmations. So, yeah, that was one task that took a while for the team to understand, to carry out [C2P5]"

Extensibility capabilities

Case 2 explored in-app extensibility capabilities for enhancing the public cloud system. Participants advised in-app extensibility was used for custom fields and custom reports.

"Is this an in-app extensibility? There's plenty available there. One of the key ones within the public cloud is this ability to add custom fields. In a table, you can add a custom field, and any program that uses it, you can empower it to use that custom field [C2P1]"

Further, the integration expert from Case 2 advised that they explored SAP BTP to fulfil their requirements if in-app extensibility functionality was unavailable.

"If standard does not fulfil, so there isn't an option in public cloud, other than for us to explore the development of the business requirements using BTP [C2P1]"

The expert further claimed they have a backlog for the extensibility scope that must be addressed. However, Case 2 is adamant that extensibility capabilities cover their current needs.

"Where it is required, some items now are in the backlog for the extensibility scope, where we need to customise or build using BTP to accommodate some of the business requirements that cannot be fit or addressed by the standard processes [C2P1]"

The approach to in-app extensibility complies with various literature and reports (Brandas et al., 2019; Penny & Dawson, 2023). However, limited research has delved deep into the limitations of in-app extensibility capabilities, and this could be a noteworthy topic for future research.

Challenges

Figure 8 depicts the ERP application challenges identified during the post-implementation phase. The theme ERP application was divided into sub-themes: configuration limitations, data inconsistencies, integration complexity, and reporting obstacles. These findings are discussed in detail in the following sub-sections.

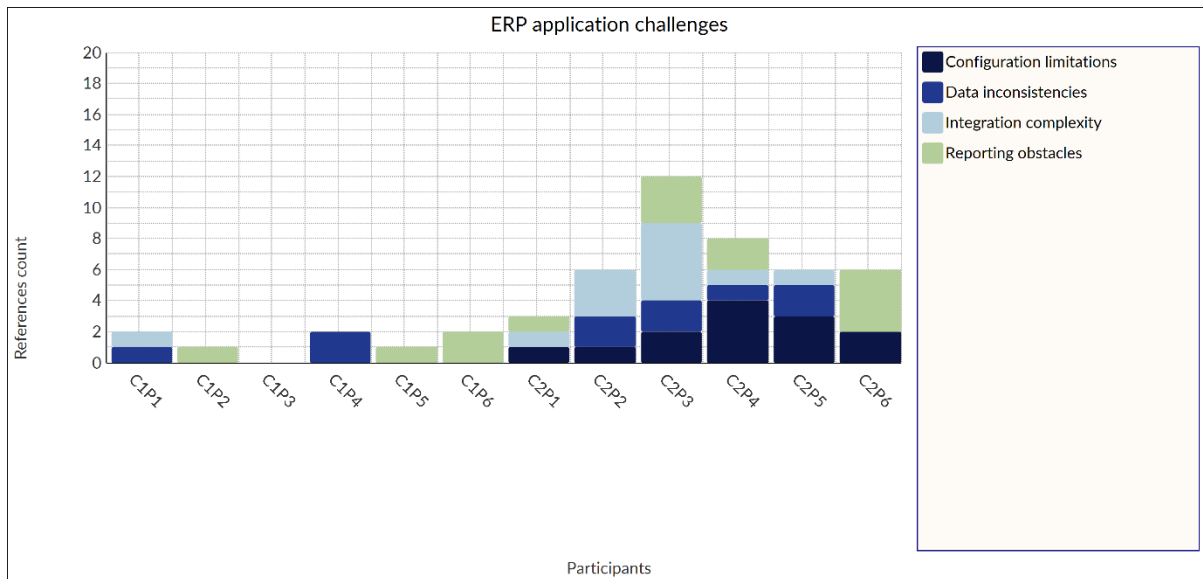


Figure 8. ERP application challenges

Configuration limitations

Configuration limitations was a great concern for Case 2. Participants indicated they were forced to explore new functionalities in the SAP S/4 HANA public cloud because certain functionality was deprecated from SAP ECC and certain changes were mandatory for public cloud.

The finance business user from Case 2 indicated that the universal journal had both benefits and unforeseen challenges for their business. The participant advised that the unforeseen changes to the universal journal might impact the business, as the previous general ledger accounts were customised to meet business requirements. However, the participant indicated that the business is unsure about the implications after finance migrates to S/4 HANA cloud and business needs upskilling.

“So now you need to try and use the extensive use of the subsystem and the universal GL to try and analyse. So, I think that was a new concept that we are still trying to learn and adjust to. It's still too early to make a conclusion on that because what is bringing in a lot of complexities is that our budgets are based on the old GLs [General Ledger] [C2P6]”

In addition, participants advised that specific configurations, such as enterprise structures, cannot be reversed in the public cloud. These limitations initially caused frustration within the organisation.

“So, the challenge is, with the public cloud, there are settings that, once done, you can't...we can't change. There are things that, once maintained, you can't even delete, for example, the org structure. So, you can't just play around with the org structure. So, yeah, there are a number of those on the public cloud. And they do tell you [C2P2]”

Furthermore, the participants advised that the public cloud has allowable configuration and specific configurations that are not permitted. Since most of the organisation's processes were customised in SAP ECC, and S/4 HANA requires standard configuration. These limitations caused huge disturbance within the organisation.

“Most of our solutions in ECC are customised, unlike in S/4HANA public cloud, where everything is just standard [C2P4]”

The participant further indicated that they had difficulty configuring their business requirements in the S/4 HANA public cloud due to its limitations.

“Customisation in public cloud is, hey, quite difficult [C2P4]”

In addition, another participant indicated that the organisation would suffer if new complex business requirements were needed. The participant further suggests that limiting modifications will restrain the organisation from meeting future requirements.

“I don't know how they responded. But, from what I've seen, the people in the business, they don't like this idea of public cloud because of the limitations, you know, when it comes to customisations. I think the main worry is around the capability of the public cloud in meeting the business requirements. Especially when it comes to accounting, or finance, our agriculture, our materials management [C2P5]”

Research explains that limited customisation poses challenges for organisations when configuring their business requirements. These challenges arise because cloud ERP designs are built on cloud fundamentals, limiting customisation (Abd Elmonem et al., 2016; Lewandowski et al., 2013; Mahmood et al., 2019; Razzaq et al., 2020).

Interestingly, despite the rigid nature of customising cloud ERP, literature has not determined this as a key challenge in cloud ERP adoption.

Data inconsistencies

Both organisations had minimal issues regarding data inconsistencies. Case 2 indicated they had data inconsistency issues, as some data objects were incorrect in production, and these errors needed to be corrected manually. In addition, Case 1 advised that they are only experiencing archiving issues with their data, as historical data is outside the S/4 HANA system.

“So, in terms of data migration, the challenge was around some settings related to the data or to the master data objects not being in place early enough, such that we know that when we migrate, we have the correct profit centers, the correct evaluation classes for materials in the system [C2P3]”

Zafar et al. (2023) claim that a lack of data governance frameworks caused data challenges. Furthermore, Madathala et al. (2016) supported the literature by claiming that 70% of organisations that did not invest in data cleansing and quality assurance programs had challenges with data inconsistencies.

Although both cases had minimal data issues, there were minimal discussions of their broader data migration strategies, as this is a component of the implementation phase. Therefore, the depth of data migration was not relevant for this study.

Integration complexity

In Case 2, the participants advised that all future modifications would use BTP and SAP S/4 HANA extensibility functionality. However, even with the S/4 HANA system live, the BTP solution has yet to be used. The participants further claimed limitations with BTP, such as standard application programming interfaces (APIs) and connections might not be available. In addition, the organisations claimed to need to acquire the skills to leverage BTP.

“Where it is required, some items now are in the backlog for the extensibility scope, where we need to customise or build using BTP to accommodate some of the business requirements that cannot be fit or addressed by the standard processes [C2P3]”

In addition to future integration and modification opportunities with BTP, participants further advised that the business has built a custom interface from S/4 HANA to SAP ECC. Even though the interface is not entirely operational, the business requires integration between the systems as finance and sales activities are conducted in SAP ECC and production and procurement activities are conducted in SAP S/4 HANA. This has caused manual activities to be done in the system, which caused duplications as the data was periodically replicated to the different systems, and this has caused incorrect financial reporting.

“Yeah, there are issues. Remember, we’re working on cloud, and some other external systems that we are using are not on cloud. So that integration part, bringing the data reading from cloud into an on-premise system...eish, there have been challenges and some of the interfaces are still being built. They haven’t been completed yet [C2P4]”

Research argues that almost 60% of organisations had integration challenges when implementing S/4 HANA, furthermore, the research indicates that 20% of the overall challenges were related to integration with legacy systems (Madathala et al., 2016). In addition, cloud-based applications integrating to on-premise systems have different integration requirements.

As indicated in numerous literature sources, integration is a common challenge experienced by organisations, and there is no immediate solution to ensure thorough success during the post-implementation phase.

Reporting obstacles

Despite its robust reporting capabilities, SAP S/4HANA faces several challenges. One major issue is the complexity of integrated reporting, as organisations often need to consolidate data from various sources, such as legacy systems, third-party applications, and external databases, which can complicate real-time reporting (Zafar et al., 2023).

Participants from Case 2 had several concerns with S/4 HANA reporting. One participant indicated that the standard reporting in S/4 HANA does not fulfil their requirements, as their legacy system had complex requirements from business users. Jain and Bagga (2021) indicated that organisations commonly endure these issues. Users prefer legacy reporting because the report is user-specific, and the users trust the data is accurate.

“Our management reporting is quite different and complex, yet S/4 is just standard [C2P4]”

Furthermore, the participant advised that the reporting challenges were problematic to the point where the organisation had to purchase an external reporting system to support the business.

Jain and Bagga (2021) and Singh et al. (2022) discuss that when users have these challenges, they tend to revert to legacy reporting as they lose faith in the new system.

“So, we will have challenges, being able to build those reports such that we had to buy an external system for report writing [C2P4]”

In addition, a participant from Case 1 advised that when the organisation consolidated all its reporting requirements in S/4 HANA, the system performance could not run the report.

These comments aligned with the Jain and Bagga (2021), which indicated that the consolidation of reporting systems collected in S/4 HANA could cause potential performance issues.

“So, as I said a couple of minutes ago about the reporting system, which when we moved it to S/4HANA, the reporting system ran for six hours [C1P6]”

Even though SAP S/4HANA includes embedded analytics, it is important to note that users may need training to navigate advanced tools like SAP Analytics Cloud (SAC), and without adequate training, users may struggle to utilise these tools (Chou et al., 2014; Peng & Nunes, 2009a). Custom reporting also requires extensive configuration, which demands expertise in both technical and business domains (Jain & Bagga, 2021). The literature aligns with the current experiences reported by participants in cast two.

In addition, a participant from Case 2 advised that they moved to the SAP SAC due to reporting limitations. However, the participant advised that they are unsure of the reporting tool and have not worked on it before.

“So, we may need to add some additional reports, even in ECC we ended up having to do some custom build reports, which I don't know whether that will be done within SAP, or we'll have to now try and do them in SAC [C2P6]”

Participants from Case 1 advised that building custom reports in SAP S/4 HANA and complying with the clean core standards are complex. Configuring a report to a user's requirements can be time-consuming, and the possibility of needing more skilled resources adds to these challenges.

“And then, if you want something and you say, “Hey, man, you know what, I’ve got a manager there, he wants to see a sales report, and he wants to add this, and he wants to add that, and you want something specific.” Then we will get involved, we will assist him, we are on a Z report, we write a Z report, or whatever the case may be. And then, you know, it’s totally different. That means it’s an allowable Z report that you can run, and he wanted to see something., so we meet that requirement. But, on changing SAP standard[s], we don’t ever do that. Look, with the cloud, now with S/4, you’ve got [C1P2]”

Additionally, ensuring data quality and consistency across different modules and real-time reporting environments can be challenging, especially for organisations transitioning from older systems to SAP S/4HANA (Viorel-Costin, 2019). These concerns were further reiterated by participants from Case 2 who explained that due to reporting not working in SAP S/4 HANA, users started reporting outside the system.

“Yes, we can run particular functions, particular processes, we can do the data, we can do the reporting, but I still think there was much too much stuff done outside the system, especially on the reporting side [C1P2]”

Theme 1.2: IT infrastructure

Traditionally, organisations have invested in physical infrastructure to support their IT operations (Malallah et al., 2023; Song & Sohn, 2022). However, since cloud computing has emerged, cloud platforms have become the foundation of this support (Malallah et al., 2023; Song & Sohn, 2022). Organisations increasingly leverage these platforms to host their infrastructure workloads and benefit from a robust, reliable, scalable, and secure IT environment (Malallah et al., 2023; Song & Sohn, 2022).

During the analysis of IT infrastructure, the focus was on the technical capabilities required to host ERP applications, as well as the associated benefits and challenges. The benefits included enhanced scalability, enhanced security, and maintenance reduction. In addition, the challenges included authorisation concerns, data protection concerns, and unspecified downtime. These findings are discussed in detail in the following sub-sections.

Benefits

Figure 9 depicts the benefits of the IT infrastructure identified during the post-implementation phase. The theme of IT infrastructure was divided into sub-themes: enhanced scalability, enhanced security, and maintenance reduction.

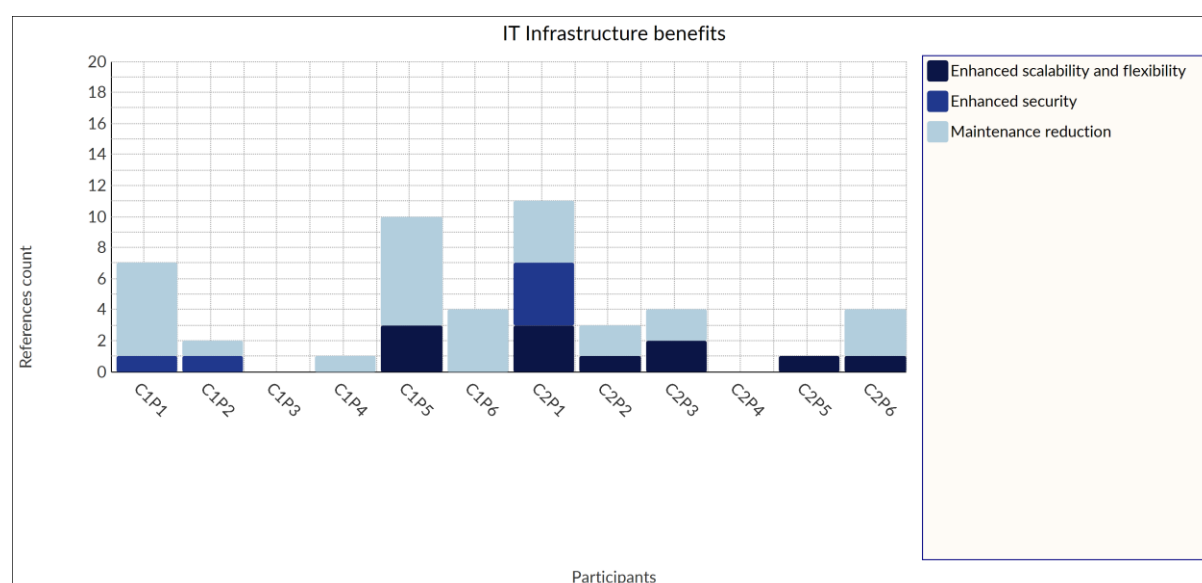


Figure 9. IT Infrastructure benefits

Enhanced scalability and flexibility

Malallah et al. (2023) explain enhanced scalability and flexibility are the primary reasons for migrating to cloud ERP.

Participants from both organisations noted that the implementation of innovative solutions is significantly easier, as they can now utilise the infrastructure provided by the CSP.

“Innovations are readily available for you to use. So, yeah. One of the reasons why we chose the public was that [C2P2]”

In addition, both organisations advised that with cloud technologies, remote working has been made easier. Devices can logon to organisation portals over the internet, where with on-premise, VPN and multiple different configurations are required for remote capabilities.

“But with S/4HANA, now the users that often work outside of the office or workshop, they have devices that they can connect with, from the field or from whichever side that they work from [C1P5]”

Furthermore, tasks can be done remotely, allowing organisations to run more efficiently.

“There is one advantage that we did not discuss. S/4 is a flexible system. You can use it on any digital device, I'd say. You can use it on a cell phone, on a laptop, on a tablet, your iPhone. So, yeah, I think that that's one positive. You can access the system anywhere. So having it on the internet is one advantage. Even if, when you are in Europe, you can perform your task there. So, I think that's one good thing about S/4HANA [C2P5]”

Enhanced security

The CIOs from both organisations were confident that the CSPs provided enhanced security capabilities. They advised that the CSPs can provide even better security than their on-premise systems as they have 24/7 support and ensure continuous upgrades on security frameworks.

“We can rely on the certifications of this SAP environment that are audited by third parties. So that does give a, you know, it does meet your security compliance requirements [C1P1]”

The CIO from Case 2 even further expressed that the probability of a data breach on the cloud is significantly lower than if they host their own infrastructure.

“I think the odds of a data breach there, with somebody into our system, is probably less there than if we had it on premise [C2P1]”

Even though enhanced security is considered a benefit, multiple studies indicate that to achieve these benefits organisations need to implement robust data security frameworks (Madathala et al., 2016; Makka, 2022; Vaka, 2024; Vaka & Azmeera, 2024).

Maintenance reduction

Participants from both organisations indicated the extensive benefits of CSPs managing and maintaining the IT infrastructure. They expressed a tremendous reassurance that CSPs perform rudimentary tasks such as patching and system updates. In addition, it allows resources to manage more critical tasks, such as operational activities and innovation.

“Perks, if you can put it like that, because a lot of the infrastructure patching and looking after the system move...the responsibilities shift. It used to be our responsibility to make sure the Linux or the OS updated, and all the configurations are in place, and all testing is done. That big responsibility has shifted from our

internal team to their team, where we [are] only configuring the interface, if you can put it like that, like stuff like that. So that is like, from [a] responsibility point of view [C1P5]"

Participants stated their hardware needed to be updated, as the business did not have the capability and time to manage the required consistent upgrades.

"Because it's not our hardware, it's actually now years old where I think they would like to get involved in it, but we can't even sign onto it [C1P6]"

In addition, the CSPs communicate periods of downtime while performing updates, which allows an organisation to prepare accordingly.

"They book out downtime and they patch the systems accordingly [C1P6]"

Further, Case 2 stated that they had significantly downsized their IT infrastructure to the point where almost all their workloads are hosted in the cloud.

"But infrastructural costs are eliminated, right, for the public. Like our current servers, and, because we've got millions worth of servers, so that would be [C2P2]"

Additionally, Case 2 indicated that the advantage of their public cloud is that it is updated instantly.

"Because if you're on public cloud, if they do an update, you'll just benefit immediately from the updates. There is no need for additional testing on [C2P6]"

Even though many benefits of cloud ERP were explained, one participant indicated that these benefits are only relative to an organisation's situation. The participant further advised that cloud technologies might only occasionally be a better option as some organisations have data centres, and surrendering that investment might not prove cost-effective. These discussions are unrelated to this research but provide a relevant argument.

"So, I think a lot of companies that have pre-infrastructure, they don't necessarily see cloud as a cheaper option, versus a company that has just started. So, a company that just started, it might be for them a lot cheaper to start the system in the cloud, because the cost of the hardware and the maintenance is all on them. Where[as] a person [who] already owns a data center, they already have the equipment and all the necessary staff in skill sets for that. So, in those cases, it sometimes...like a lot of people say, "Oh, cloud is cheaper than on premise." Depending on how you calculate the cost, it's not always the two factor on [C2P5]"

The advantages of reducing the maintenance of IT infrastructure align with existing literature and echo's this study's research findings (Madathala et al., 2016; Osnes et al., 2018; Razzaq et al., 2020; Zafar et al., 2023).

Challenges

Research indicates that migrating sensitive data to cloud environments introduces a range of security challenges. The shared nature of cloud infrastructure and the dynamic aspect of cloud services require a strong security approach to safeguard against numerous threats. Data breaches, unauthorized access, and data loss are the most common risks (Madathala et al., 2016; Makka, 2022; Vaka, 2024; Vaka & Azmeera, 2024). Furthermore, robust data security frameworks, which include data classification, access controls, encryption, archiving and disaster recovery should be implemented (Madathala et al., 2016; Makka, 2022; Vaka, 2024; Vaka & Azmeera, 2024).

As depicted in Figure 10, this study only reviewed three IT infrastructure challenges within the data security framework. These challenges are authorisation concerns, data protection concerns, and unspecified downtime. Participants gave minimal arguments and views about the in-depth technical aspects of data security.

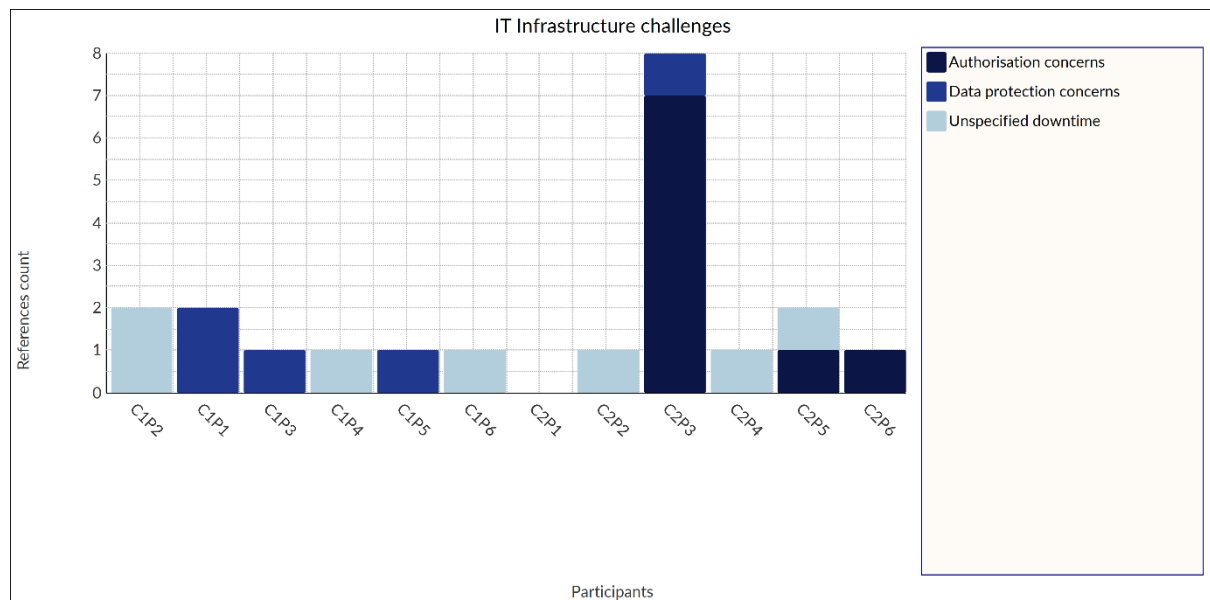


Figure 10. IT Infrastructure challenges

Authorisation concerns

SAP S/4HANA public cloud follows the same role-based access control as on-premise and private cloud. However, it differs from these versions due to its architecture, managed services, and security model. The cloud offering's specific tools, restrictions, and configurations are unique. As in SAP ECC, the roles were customised specifically to business needs. However, in SAP S/4HANA public cloud, organisations were required to use standard roles.

“Because in ECC we could define or structure the roles according to their business needs [C2P3]”

The participant further stated that the standard roles differed from their requirements, as some business users needed cross-functional access. Moreover, cross-functional roles do not comply with SAP compliance within SAP standard.

“But the roles that are in the catalog of roles in public cloud, the segregation that we had in ECC has not been provided with the roles that are available [C2P3]”

These challenges created extra workload in the EAM (Enterprise Asset Management) area for specific users, who had to perform system functions for other users as the access control issues persisted.

“But with us, that is not the case, because they are a few mechanics that still do not have access in S/4HANA, which then increases the workload on the planning team [C2P5]”

These challenges have created user frustration, as it took as long as three months to resolve. These challenges only occurred with Case 2, as Case 1 copied their existing authorisation roles from their legacy ERP.

“But we only had tipping issues, like people are unable to catch up because they do not have access and then users say, “ But how can you only report this after three months, because that is just an access issue is not a system issue? [C2P6]”

Data protection concerns

Cloud ERP enables data storage in the cloud, and organisation portals are accessible through the Internet. However, both organisations acknowledged that their concerns were more about lacking control over their own data security, than about the security policies of the CSP. In addition, the participants stated that they entirely trust the CSPs ability to secure their data.

“But it is somewhat unnerving to have this 'out of your own control.' Although I'm not sure that us, you know, as CASE1, few people could do it better than SAP [C1P1]”

Unspecified downtime

Both organisations shared similar opinions on unspecified downtimes. One participant expressed that intermittent interruptions with load shedding in South Africa could cause network latency issues. He further advised that proactive measures, such as regular network checks and maintenance, are crucial to mitigate the impact of uncontrollable issues, such as cable faults, which can broadly impact the organisation.

So, you know, there's risk in South Africa, with the current powers that be, with the connectivity, and the interruptions in electricity, you know, sometimes also based on risk mitigation, you know [C1P2]?

6.2 Theme 2: Operational

An organisation's business processes are central to their operations, and changes or disruptions will cause business difficulties (Madathala et al., 2016; Peng & Nunes, 2009a). Business process re-engineering is generally a key component to ERP implementations, and both organisations spent considerable time discussing the approach (Madathala et al., 2016). Operational activities and business process terms are used interchangeably in the study.

Since Case 1 adopted a brownfield conversion from their SAP ECC system to SAP S/4 HANA private cloud, there were very few issues during the post-implementation phase concerning their business processes, as the organisation's goal was to ensure business as usual. However, since Case 2 migrated to S/4 HANA public cloud instance, they incorporated SAP best practices. They attempted to standardise their current processes, which yielded considerable benefits and challenges.

The theme of operational emerged during the data analysis. The participants engaged in a continuous discussion about the benefits and challenges they are facing with their business processes, including integrated business processes and system performance. In addition to their benefits, Case 2 experienced challenges, predominantly around the inefficiency of standardised processes.

Benefits

Figure 11 depicts the benefits both organisations experienced with their operational theme during the post-implementation phase. The theme of operational was divided into sub-themes: system performance and integrated business processes.

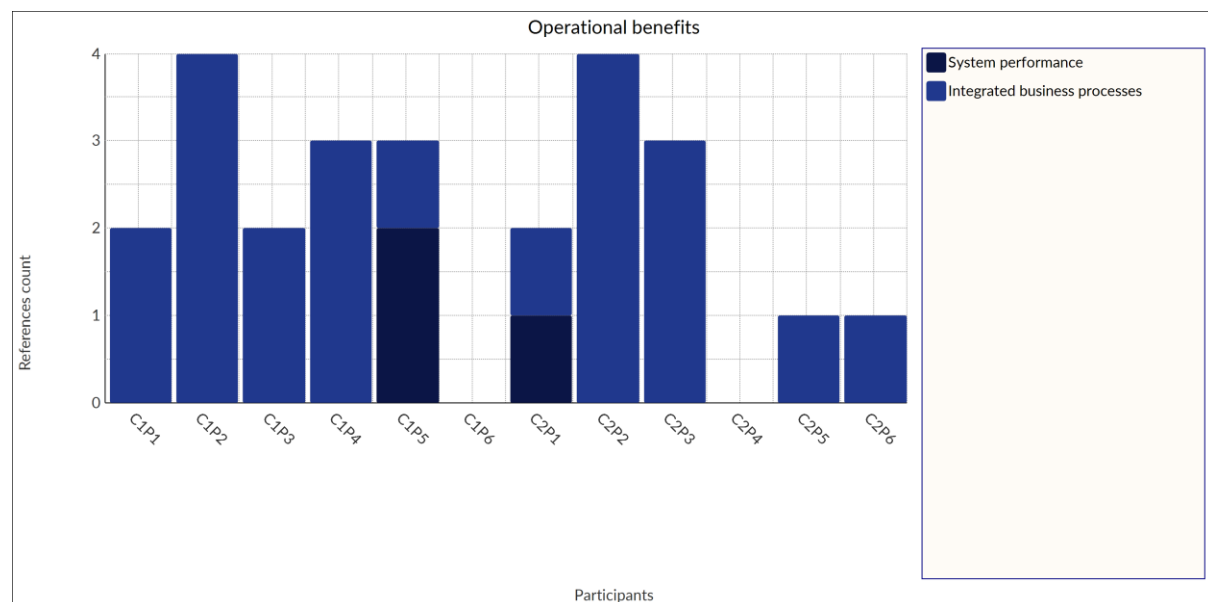


Figure 11. Operational benefits

System performance

The reporting functionality in SAP S/4HANA leverages real-time, in-memory computing to provide users with instant access to up-to-date data across various business functions (Juturi, 2024a; Madathala et

al., 2016). It integrates transactional and analytical data, enabling seamless and embedded reporting directly within the system (Jain & Bagga, 2021; Oliwatosin et al., 2024). These findings in the literature align with the comments from both cases, as users reported a significant increase in system performance and reporting speed.

Case 1 indicated the overall performance when using cloud ERP was significantly faster.

“The end user experience, the system did function quite a lot faster for them [C1P5]”

Further, a participant from Case 2 also mentioned that SAP S/4 HANA's analytics and real-time reporting were evident, and after testing, users reported a tremendous increase in response time.

“The biggest is probably when you're looking at your analytics. And the analytics now running in the cloud, we moved it to the same data center as our S/4, so that response time was quick [C2P1]”

Integrated business processes

Case 1 confirmed their business experienced no interruptions during the migration to S/4 HANA, as everything continued as "business as usual." This was possible because no changes were needed for their existing business processes. While the brownfield migration required considerable planning, this approach ensured that business continuity was managed effectively.

As discussed by Vaka and Azmeera (2024), SAP provides multiple technical steps to follow before performing the conversion. However, the overall benefit is that the business can continue as usual, and legacy business processes are copied to the new system. This research does not cover the technical steps of the conversion as this process is part of the pre-implementation phase.

“But in the system that we migrated, you know, it's pretty much business as usual [C1P1]”

In addition, Case 1 indicated that users could not identify a visible difference between the systems.

“So, you know, I would say that, for the end user, I don't think there's a visible difference [C1P1]”

Case 2 had contrasting experiences with their integrated business processes. The business reported improved efficiency with their processes when SAP best practices were implemented. These improvements are due to the integration of work streams, and minimal configuration was required.

Since minimal case studies have been conducted using SAP S/4 HANA public cloud, there is no evidence in the literature to dispute or verify these claims. However, ERP systems generally create efficiency, as reported by Hietala and Päiväranta (2021) and Seymour et al. (2016). In addition, Lewandowski et al. (2013) studied SaaS ERP, but there was no mention of business process improvement.

“The best practice processes that were already defined, sort of, aligned with all the processes on the ground [C2P2]”

When distinct business processes were standardised, the users indicated that the system was familiar to the business.

“They are pretty much close to what the business users are used to [C2P2]”

Zafar et al. (2023) indicates that standardisation improves end-to-end processes as it automates administration tasks.

Challenges

Case 2 conducted fit-to-standard workshops to review SAP's industry best practices. The organisation was propelled to adopt SAP best practices to maintain a clean core approach. As a result, they had to adjust their business processes to align with SAP's standard offerings.

“So, we need to try and standardize the business processes and align to the best practice or the standard business processes as defined in S/4 HANA [C2P6]”

The literature contained minimal arguments contradicting the operational challenges experienced with the S/4 HANA public cloud. However, a Gartner report by Penny and Dawson (2023) advised that there may be limitations in functionality and process gaps with SAP S/4HANA public cloud. Furthermore, research by Zhong and Rohde (2014) and Lewandowski et al. (2013) explained that cloud ERP systems are not easily customisable to fit customer requirements due to the rigid design.

Figure 12 depicts the challenges for Case 2, as no challenges were found in Case 1. In addition, the research further divided the operational theme into sub-themes: inefficiency of standardised processes and lack of alignment with standardised processes.

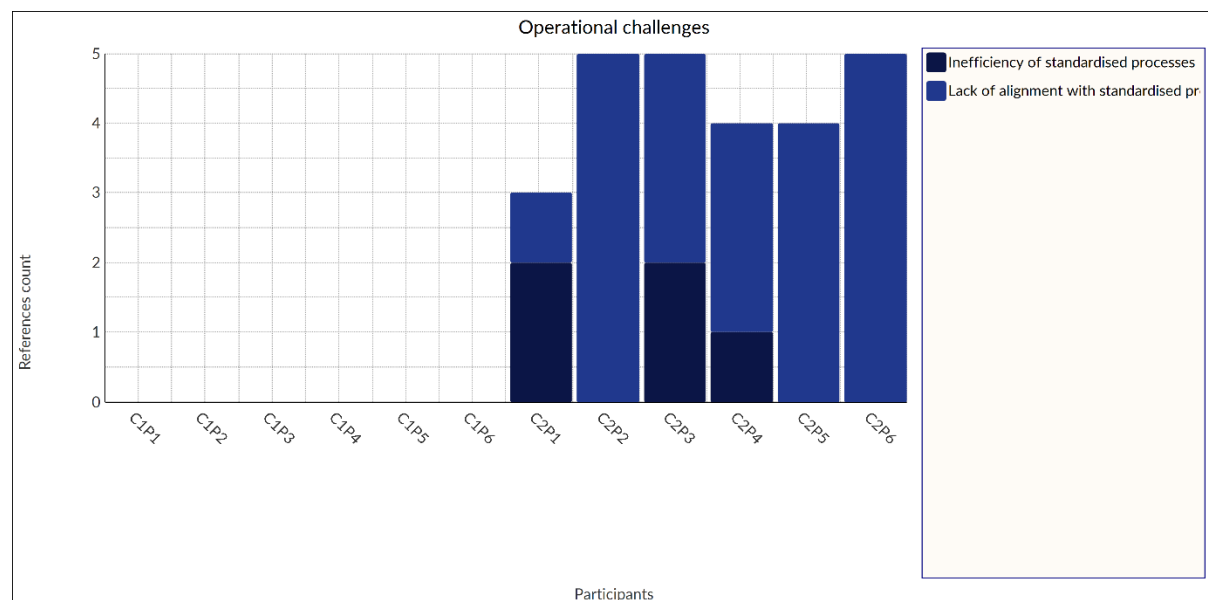


Figure 12. Operational challenges

Inefficiency of standardised processes

The participants advised that a third-party system was needed to meet some requirements due to the SAP public cloud's rigid customisation possibilities.

“Unless, for some other systems where we had a lot of customisation, we had to go and outsource or purchase a specific system [C2P4]”

Since Case 2 implemented SAP S/4 HANA in different phases, specific workstreams were still operational in SAP ECC, and workstreams such as procurement and EAM (Enterprise Asset Management) were in the S/4 HANA public cloud. Interfaces were designed and built to integrate the two solutions to create consistency. However, this approach created challenges in certain aspects, such as sales and finance in SAP ECC and EAM and procurement in SAP S/4 HANA,

“So, in terms of process understanding, it creates that gap in terms of the expectation that when you run an EAM (Enterprise Asset Management) process in S/4, the completion of that process has to happen in ECC [C2P3]”

Finance activities were still conducted in the SAP ECC system.

“All payments to suppliers, as well as the financial reports and auditing are still carried out through the ECC system. So that is an integration or interface that will cease to [exist once] SAP modules are live in S/4. So, I think that is an interim process or an interim complexity, if I may call it that [C2P3]”

Since Finance and Sales workstreams operate across two systems, reporting was questioned for the accuracy of the data. Therefore, reporting was conducted outside the system as a workaround for accurate data.

“We can do the data, we can do the reporting, but I still think there was much too much stuff done outside the system, especially on the reporting side [C2P3]”

One super user revealed that processes with complicated calculations were done outside of their SAP ECC system due to the complexity of their requirements. The participant advised that SAP S/4 HANA did not offer innovative solutions to accommodate this requirement, so they continued to perform the calculations outside of SAP.

“So, the only one that we do now, which is outside, the only core process is a pretty complicated set of calculations around the factory [C2P1]”

Lack of alignment with standardised processes

Even though Case 2 identified many benefits regarding their business processes, each participant indicated concerns. Business users advised that customised functionality was unavailable in SAP standard, and they indicated that SAP best practices could not meet their requirements. Furthermore, the impact affected their business as certain processes are unattainable to implement using SAP S/4 HANA public cloud, and the organisation needed to manage the limitations.

“And, therefore, EAM (Enterprise Asset Management) was identified to be those processes which we could migrate, and, as well, we did not migrate the processes as they are now in ECC, in terms of customising the public cloud functions, which is also not permitted [C2P3]”

In addition, super users indicated several concerns about process standardisation, such as agriculture capabilities, customisation opportunities and user resistance. They advised that it has led to a lack of user adoption and caused multiple processes to be done outside SAP S/4 HANA. One participant expressed multiple concerns about the choice of public cloud over private, which has caused lack of flexibility with their current processes.

“Yeah. So, yeah, it has been a pain point. And, at some stage, I almost felt that, probably, maybe going public cloud was not an option for us. But, yeah, some of the things we're able to fit within the standard business processes, but there are those that we will have to try and manage [C2P3]”

Furthermore, participants stated that their current agricultural process is unique, and that SAP does not have a solution to fulfil their requirements.

“So, I think we are going to have a problem, especially on the agriculture side of things for business. I think S/4 does not have an agriculture system or module, which you can use to manage your farms and stuff [C2P5]”

Numerous participants questioned the decision to move to S/4 HANA public cloud and felt that the limitations had caused multiple challenges for the business. One participant thought moving to the private cloud might have been more appropriate.

“Yeah, but as well, there is that bit of a feeling to say, “Why didn't we move to business side, especially to the private? [C2P2]”

Since the EAM (Enterprise Asset Management) module was standardised entirely, one participant claimed there are now challenges with the business as some unique processes cannot be moved to S/4 HANA public cloud.

“We built a lot of those, which now are presenting us with a challenge in terms of how we then fit those processes to public cloud [C2P3]”

Considering all these challenges expressed by the super users, the leadership team felt that the challenges were process-related rather than SAP-related. In addition, the leadership team felt the organisation's business processes needed optimisation.

“We said we would stick with it, it was working for us, any issues that we might have had were not necessarily SAP issues, I think it was more a bit of process issues, business issues [C1P2]”

6.3 Theme 3: Management

Management teams within an organisation play a critical role in ensuring the success of an ERP implementation (Ağaoğlu et al., 2015; Botta Genoulaz & Millet, 2005). Additionally, management teams can facilitate effective communication and promote a culture of continuous improvement during the post-implementation phase (Hietala & Päivärinta, 2021). Furthermore, their commitment creates a sense of prerogative and commitment throughout the organisation, enabling the adoption and long-term success of the cloud ERP system (Lewandowski et al., 2013).

The theme of management emerged during the data analysis. The management participants continuously discussed the benefits and challenges they are experiencing during the post-implementation phase. The benefits included business growth, cost reduction, improved internal processes, and resource optimisation. Furthermore, the challenges included cloud support inaccessibility, rising costs, and skills shortage. These findings are discussed in detail in the following sub-sections.

Benefits

Figure 13 depicts the benefits of cloud ERP from the management's perspective. The management theme was divided into sub-themes: business growth, cost reduction, improved decision-making, and resource optimisation.

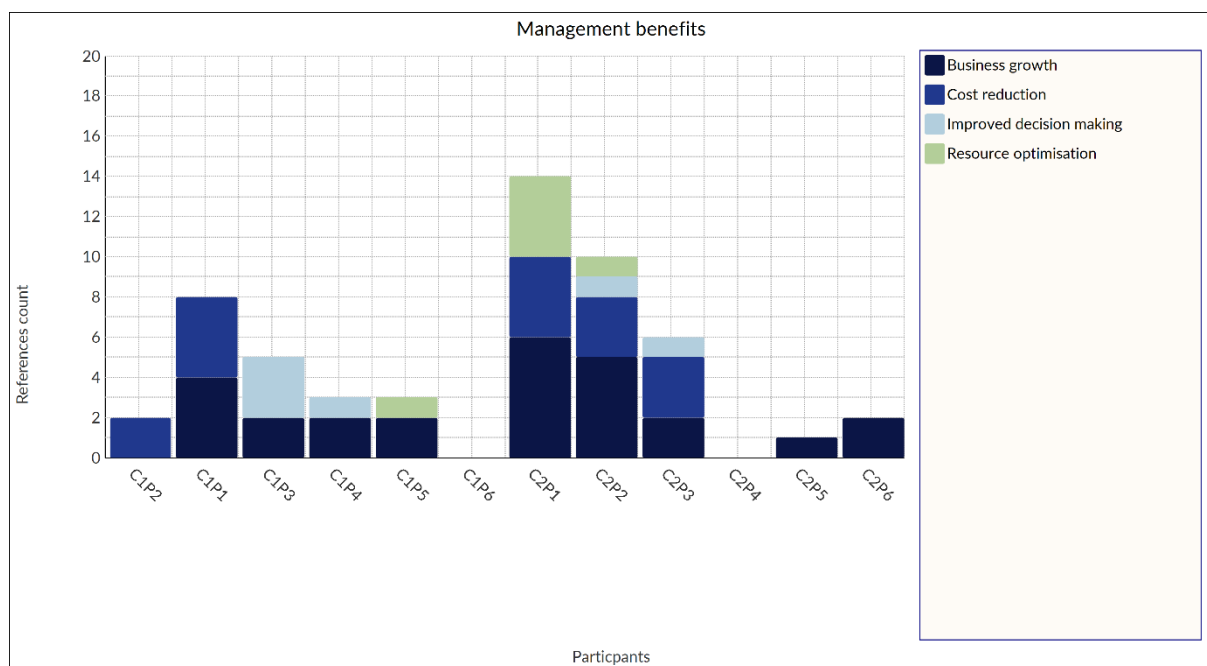


Figure 13. Management benefits

Business growth

Both organisations view SAP S/4 HANA as a proactive step in their future roadmap. Participants said standardising their ERP system would allow them to scale and transform the business anytime. The migration to a cloud ERP system futureproofs the business by allowing it to be flexible and innovative.

“So that was always our scope, is to make sure that we put our entire business worldwide onto the same platform at the end of our roadmap [C1P2]”

Cloud ERP is a considerable investment, and the software is an essential enabler for innovation and business growth to allow an organisation to gain a competitive edge amongst competitors (Peng & Gala, 2014). The findings support various studies indicating that innovative cloud technologies can give organisations a competitive advantage.

Cost reduction

Furthermore, the management team analysed various indicators to determine whether the implementation succeeded. The team also reviewed the cost reduction, and both cases advised that it was significant to saving towards the total cost of ownership towards the business.

Cost reduction during the post-implementation phases, aligns with numerous studies such as Davenport et al. (2004), Lewandowski et al. (2013) and Ağaoğlu et al. (2015). These studies advise that with a successful implementation of ERP, the organisation will reduce costs from all levels of the business. Further, Hamad et al. (2022) indicates management support has a massive impact on the overall financial support of an organisation.

“Yes, it did, based on our on-premise costs vs the private cloud edition, also some savings, percentage not shared on savings, and less reliance on Internal operations to manage the SAP system, as it will be in the cloud going forward [C1P2]”

In addition, reducing business costs allows the organisation to spend more on innovation to contribute to business growth.

“We haven't decreased our support, which we know will decrease, but I want to keep that back so we can do some interesting things, rather than give it back to the business saving [C2P1]”

The management team from Case 2 even stated their total cost of ownership was reduced by almost 20 percent.

“Our TCO costs will be around 14 to 18% lower than our current ECC costs [C2P1]”

Furthermore, participants from Case 2 claimed that by implementing the S/4 HANA public cloud, the business has significantly reduced infrastructure costs.

“Maybe it is part of the license cost, but infrastructural costs are completely eliminated, right, for the public [C2P2]”

Additionally, Case 2 participants expect considerable decline in infrastructure costs.

“I foresee a decline in costs from when we are paying for a service to when we are maintaining the service locally, from a resource perspective. Even though I don't have sight of the actual costs now, yes, what they are currently and what the prediction for

the future looks like. But I expect that there should be a significant decline in IT system maintenance costs going forward [C2P3]"

Improved decision-making

The fundamental motivator for the management team was improving decision-making. Business users reported a notable improvement in the approval of business requirements, attributed to the active involvement of management in the digital transformation process. These observations represent a significant benefit, as they can be considered a critical benchmark of a successful ERP system. Internal business decisions have been streamlined, requiring minimal manual interventions for key business decisions.

"We would then do the change in the system test, give back to business to test in our testing environment, approve, sign off before we move to end product production [C1P3]"

Improved decision-making is considered a key aspect of ERP implementations and a fundamental benefit of the system. With cloud ERP, business decisions are streamlined with various technological advancements (Abd Elmonem et al., 2016; Shang & Seddon, 2000).

Resource optimisation

Management advised that many maintenance activities were moved to the CSP. In addition, it allowed the business to obtain new skills that would contribute to business growth within the organisation as the legacy skills were no longer required.

"So that definitely is like, from [a] responsibility point of view, I mean, any company, doesn't matter which company you use for it, you're still responsible for it, but that management is quite less on the internal team [C2P5]"

In addition, the CIO from Case 2 advised that the opportunity to bring new skills to support the business is now possible. Both organisations were excited about the opportunities to innovate with new skills.

"Bring in skills that we would not have been able to use in the past [C2P1]"

The CIO further advised that the IT team has a large training budget to ensure that all relevant stakeholders were upskilled with the new technology.

"Biggest training budget out of the whole department, I mean, out of the whole business [C2P1]"

Multiple studies indicate that ERP systems automate mundane tasks and improve business efficiency, which could result in job loss (Peng & Nunes, 2009a). However, research advises organisations to upskill and train existing employees to ensure that the resources are equally capable of supporting the business (Zafar et al., 2023).

Even though the literature indicates that organisations experience restructures and that job loss is possible, both organisations denied the affirmation that there would be job loss. These organisations advised that they obtained the necessary budget to upskill employees as required.

Challenges

Figure 14 depicts the challenges identified by the management teams from both cases. Three sub-themes emerged from the analyses: cloud support inaccessibility, rising costs, and skills shortage.

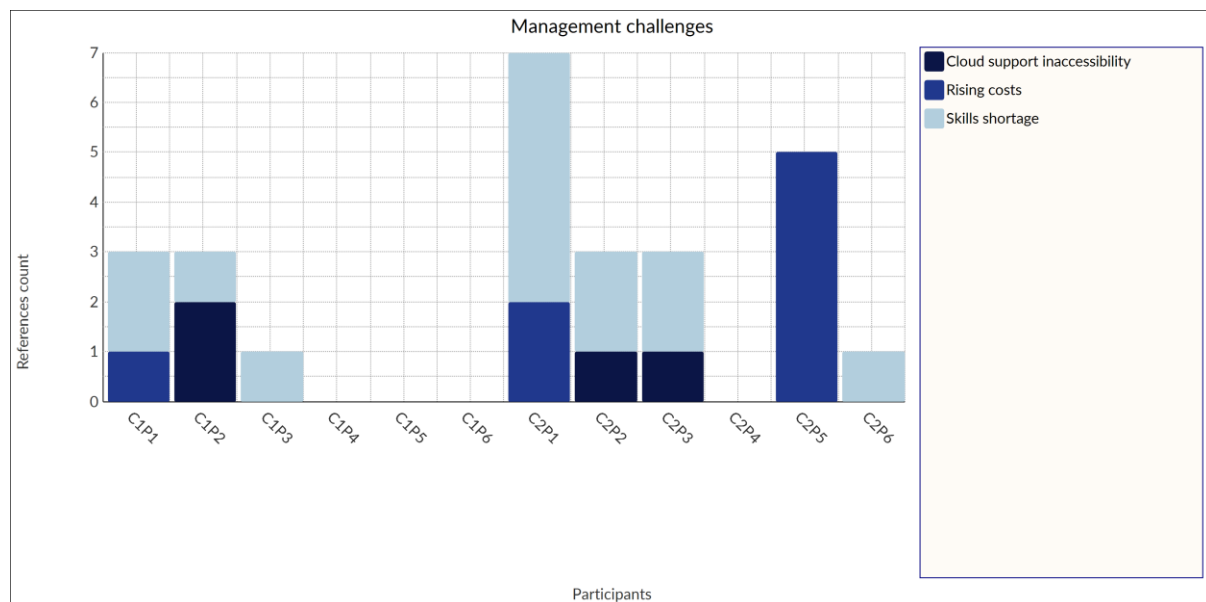


Figure 14. Management challenges

Cloud support inaccessibility

Management and technical experts discussed the challenges of managing the CSPs. Both cases are concerned about lead times regarding the service level agreements (SLAs). As with managing infrastructure internally, the responsibility sits with the organisation. Now, with SAP managing specific issues, there is no certainty that the issues will be prioritised.

“So, it's going to force me the necessitation to do better planning and forward planning, but some of this is unforeseen. So that's where the challenge with SAP in S/4HANA happens, you see. I'm a bigger partner on the cloud, because I'm bound by their lead times, obviously from a planning point of view, and their lead times from the actual execution point of view [C1P1]”

The literature argues that there are numerous challenges around SLAs as ERP vendors could become unavailable at crucial moments and advises that this could dramatically affect a business if issues are not resolved quickly (Zhong & Rohde, 2014). Further, SLAs have nuances that are often not initially discussed, and when support is required from the organisation, the ERP vendor can claim they are not contractually liable to support (Abd Elmonem et al., 2016; Mahmood et al., 2019).

Both organisations are in the infancy of SAP S/4 HANA cloud adoption, and these issues identified in the literature could pose future challenges.

Rising costs

Cloud subscription-based service models are known to have uncertainty with cost implications. During the discussions, the management team advised that they are aware of the possibility of unknown costs that could occur due to the cloud licensing policies. The CIOs from both cases were mindful of these expenses, as they explicitly discussed the possibility of rising costs.

“So that makes our RISE environment a bit expensive from additional memory and storage point of view up [C1P1]”

The CIO from Case 2 was particularly concerned that public cloud systems are based on user usage, and licenses are charged per user, as this could increase pricing and the number of users.

“We will need to watch the costs on the BTP side as well as the FUE [Functional User Equivalent] equivalence side, and to this end we have created a cloud costing role within I.T. We are also not sure how our costs will climb once the initial contract is up for renewal up [C2P1]”

Subscription fees will rise as the organisation scales, leading to unpredictable costs. Furthermore, organisations might encounter hidden customisation, integrations, and add-on technology, further elevating the total cost (Mahmood et al., 2019; Vaka, 2024; Vaka & Azmeera, 2024).

The literature consensus indicates that rising costs are not a significant concern. However, consistent with this study, the issue is being closely observed.

Skills shortage

Skills shortages is an underlining challenge identified by management teams in both cases. The management teams felt that cloud skills and SAP-specific skills were top priorities. Since new skills are needed, skills that are no longer needed within the organisation were reviewed. Senior management stated that there would not be job loss and that upskilling employees with the required skills was a priority.

“So, SAP got a bad rep. So, part of what we've done over the past 10 years is in our change management processes to address these kinds of things, and we started it out to say, look, nobody's job is going to disappear [C2P1]”

The CIO from Case 2 explicitly stated they ensured they managed the impact on employees while adopting the S/4 HANA public cloud.

“As I said, the change management process, one of the things we look at is the impact on people and their jobs [C2P1]”

Further, another participant supported the CIO's views by commenting that employees whose jobs were disrupted by cloud adoption and made redundant will be upskilled and given opportunities in various other roles.

“And then in terms of skills that were there and may no longer be required...or that we may require less of going forward, I don't think we have gone through that organisational review, and there may be a need to reorganize and then place people where they are best suited in terms of their skills or what the business demands going forward [C2P3]”

Management teams advised that the broader IT team would need restructuring as more support is required in cloud technologies and SAP due to the limited skills available in the market.

“And that brought up the need for new positions to be created in the IT area, one of those positions were business analysts [C2P2]”

Furthermore, both cases have consistently tried identifying the skills required to support the business.

but there is that effort that has already been done in identifying the skills. We call it Skills for the Future, although we will need some now [C2P2]”

Both cases advised that the requirement to upskill employees on SAP Fiori, as Fiori is SAPs new interface.

“But what has changed is that our team really needed to upskill Fiori [C1P2]”

Further, participants advised all processes uses Fiori even though they are not skilled on using the interface. This further emphasises the need for skills.

“We are not that skilled, at this stage, that we're doing everything by Fiori [C1P3]”

In addition, participants advised BTP skills are a priority.

“So, in terms of the new skills, yes, I think it's been two years now that our IT leader introduced the entire IT team to BTP. So, he even challenged us with a code exercise, a coding exercise that everyone had to take on using BTP [C2P3]”

Madathala et al. (2016) indicate that 40% of early adopters face post-implementation performance issues due to incorrect configuration caused by the lack of knowledge of experts who configured S/4 HANA. Makka (2022) and Vaka and Azmeera (2024) further aligns with previous studies, claiming that organisations must invest in the right skilled employees to ensure a successful S/4 HANA initiative.

6.4 Theme 4: Organisational

An enduring organisational structure is crucial for the efficiency of a business's operational activities (Chou et al., 2014; Hasheela, 2015). When employees view their organisation as constant, with clear communication channels, this perception encourages a positive work culture (Chou et al., 2014). In a positive environment, employees understand their roles and responsibilities, which leads to increased productivity (Chou et al., 2014; Peng & Nunes, 2009a).

The theme of organisational structure emerged during the data analysis. Participants distinguished that change management had been centralised, with a dedicated change management department established to support the expectation of ongoing innovation. Both cases reported having training initiatives to ensure that all employees are continuously upskilled during the post-implementation phase. These participants viewed change management and training as valuable benefits to the business. However, despite the enactment of these initiatives, they acknowledged that user resistance challenges are still evident. These findings are discussed in detail in the following sub-sections.

Benefits

Figure 15 depicts the benefits of the organisational theme identified during the post-implementation phase. The theme of organisational was divided into sub-themes: change management framework and training objectives.

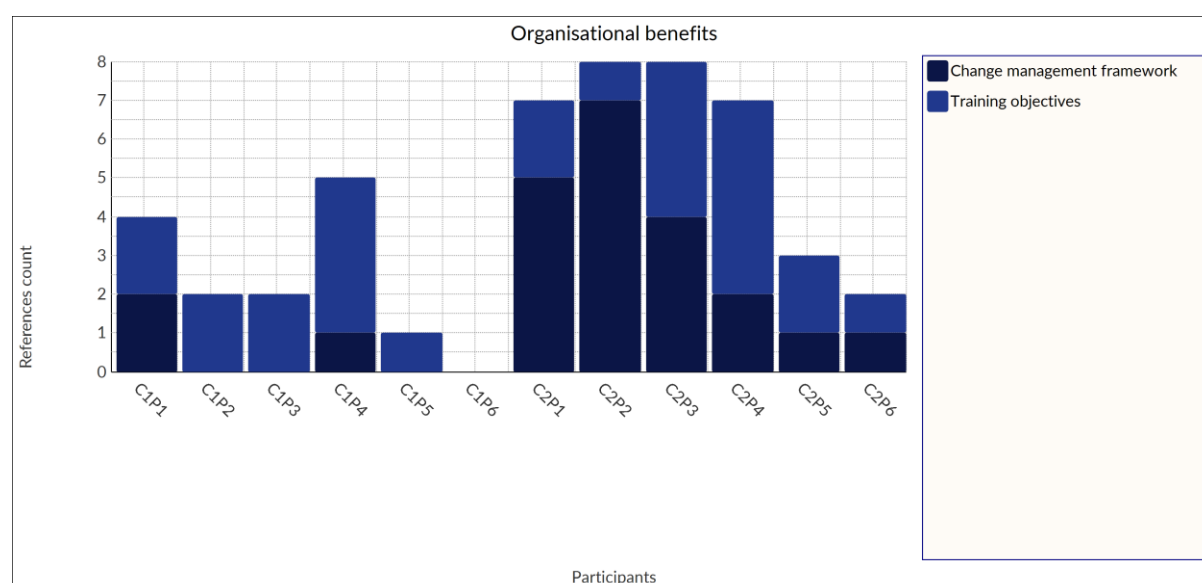


Figure 15. Organisational benefits

Change management framework

Both cases established a dedicated change management department that adheres to industry best practices, ensuring ongoing programs to prioritise employee satisfaction. However, Case 1 indicated minimal change management since they implemented a brownfield approach.

“So, the go live was smooth. So, I think there's, you know, that is evidence of, you know, of the success of the change management. Although, it really must be

said, the fact that it was Brownfield's really makes change management quite minor [C1P1]"

Even though they stated minimal change management was conducted, they emphasised the importance.

"But change management is just as important [C1P4]"

Numerous participants from Case 2 also elaborated on the importance of change management and advised that it is a crucial strategy within the broader organisation.

"We set up different structures, we do have a change management organisation within the business, and not just for IT, it's where any change, we have change management strategies, processes, and so on, which is very useful [C2P1]"

The change management department focused on industry-standard frameworks to ensure their initiatives were infallible.

"And we have just changed to ADKAR as a framework for managing our changes, or for change...as a change management initiative framework [C2P2]"

Further, participants from Case 2 advised that the change management department was established to manage future projects, innovations, and implementations. Since Case 2 is implementing a phased approach, it has multiple change managers on the project, and the change management department continuously communicates any changes at all organisational levels. The participants stated that the department continuously performs extensive analyses of the organisation and looks for opportunities to ensure stakeholders are well-informed and aware of any changes.

"So, CASE2 has a change management strategy, as well as a department that manages CASE2 changes, strategic and operational changes, and that department sits under the office of strategy management, which I believe was a good choice in terms of placing it there because, whatever is decided as the future or the strategy of the organisation, that change management office can immediately pick it up [C2P3]"

Participants also stated there are open communication channels between the change management department and business users.

"And then the team started to give regular feedback through the project managers and change management team [C2P6]"

Organisational change management is tightly linked with user training. Even with rigorous change management principles, organisations must focus on upskilling users and experts to ensure the continuous success of cloud ERP systems (Chou et al., 2014; Peng & Nunes, 2009a).

Training objectives

Case 1 conducted refresher training for all business users. The participants also indicated that these trainings have become a regular occurrence to ensure that all users are equipped for their daily tasks.

The participants also stated that users can request refresher training at any time, and the SAP business analyst will create a training schedule to ensure the users can be upskilled.

“So, the business analysts did travel to all of our locations that were impacted, and retrained, trained and retrained users to ensure that went smoothly [C1P1]”

The participants from both cases indicated that training documentation and manuals were developed to ensure users were upskilled on any change from the legacy system to the S/4 HANA cloud.

“Okay, there it was training. New manuals developer or current manuals were updated to be S/4 compliant. And we went through a whole re-business training of all users, even though...even where there were no changes, we went through a full business training review process with business [C1P3]”

Case 2 had similar training plans established to ensure user satisfaction.

“And then we also identify or define a training plan as well as the training content [C2P3]”

Similarly to Case 1, participants from Case 2 stated that refresher training was available on request to all users during the post-implementation phase.

“And we usually choose to train before the actual go live, so we train before deployment, and soon after deployment, where there are areas that require additional training or refresher training, then we can offer that training as needed [C2P3]”

Case 2 further stated they have forums where super users can enrol to upskill and receive internal certifications.

“And we’ve got a super user forum, where the end users are empowered to join or enrol for those freeze app trainings that are available on the training portal [C2P5]”

Participants from both cases stated that training users and upskilling them on new technologies requires significant effort, and a combination of change management and training is always needed.

The training initiatives and benefits align with multiple sources, indicating that training is imperative for a successful ERP implementation (Chou et al., 2014; Peng & Nunes, 2009a).

Challenges

Figure 16 depicts the user resistance challenges identified in Case 2. Participants from Case 1 identified no challenges for business users.



Figure 16. Organisational challenges

User resistance

Participants indicated that users have been using the legacy systems for more than 10 years, and expecting the users to be comfortable with new systems immediately is a highly optimistic viewpoint.

They've been in ECC for at least 10 years, or almost 10 years now. And they are only in S/4 for a few months. So, I think there is that unlearning process that still needs to be done [C2P6]"

Case 2 experienced a few challenges with user resistance. Participants from Case 2 indicated that even with significant change management and training, some users found it difficult to adjust to the new system, and they wanted to do their daily tasks without interruptions.

"And it's very difficult to get people to look at the innovation side of it, they just want to do their job every day [C2P1]"

Another participant indicated resistance in the finance team and indicated that further change management and training are required.

"It's just that a lot of the issues, I don't want to call them resistance, but, yeah, there is a lot of work that, in terms of change management, that needs to be done in finance [C2P1]"

Participants from Case 2 even stated that some business users are sceptical of the S/4 HANA system. They indicated no specific reasons other than their daily tasks being interrupted and changed to comply with SAP best practices. However, the participant advised that the organisation is working hard to upskill the business users.

"Business is either positive or negative. You know, in life there are people who embrace change quickly, and there are...what we would call laggards, who are late

buyers of anything new, who are always sceptical. But that is being managed as well [C2P4]”

Further, the participant advised that even with best practices, users will find ways to work around SAP best practices and revert to their old ways of doing their daily tasks.

“The best practices are great. However, business then finds a way to work around on those best practices. But my view is that... [C2P4]”

In addition, the participant advises that business users can become hostile and that the organisation requires patients to allow the users to accept the changes.

“it's quite hard. You, remember, it's even harder teaching an old dog new tricks. So, there is that element of being hostile and taking time to accept those new changes [C2P4]”

Furthermore, multiple studies indicate that user adoption of cloud ERP systems often presents challenges due to various factors (Chou et al., 2014; Peng & Nunes, 2009a). These include resistance to change, insufficient change management, inadequate training, and a lack of familiarity with new technology (Mohammad Saif et al., 2021). Employees frequently struggle to transition from legacy to new ERP systems, requiring significant change management and training efforts (Singh et al., 2022). However, the impact of a new user interface must be acknowledged, as it can interfere with adoption, leading to frustration and decreased efficiency (Chou et al., 2014).

6.5 Summary

This chapter answered the research question by explaining the post-implementation challenges of cloud ERP. These challenges can be categorised into four themes: operational, management, organisational, and IT.

The ERP application has significant challenges, particularly for Case 2. The challenges were configuration limitations, data inconsistencies, integration complexity and reporting obstacles. Furthermore, the participants advised that the public cloud has allowable configurations and specific configurations that are not permitted. Since most of the organisation's processes were customised in SAP ECC, and SAP S/4 HANA necessitates standard configuration. These limitations caused a massive uproar within the organisation. In addition, the reporting created business challenges, as standard reports did not cater to user requirements, and customising reports is complex.

The IT infrastructure had challenges regarding system authorisations, unspecified downtime and data protection. Since the workloads run on the cloud, the organisations can no longer control their data. Even though it is a concern, both organisations stated they have not experienced any challenges. The organisations experienced minor latency issues and implemented proactive measures to monitor the network regularly. However, since control of the infrastructure was surrendered, minimal actions can be taken.

Case 2 experienced multiple challenges regarding their operations. The participants advised that a third-party system was needed to meet some requirements due to the SAP public cloud's rigid customisation possibilities. Numerous participants questioned the decision to move to S/4 HANA public cloud and felt that the limitations had caused multiple challenges for the business. Business users advised that customised functionality was unavailable in SAP standard, and they indicated that SAP best practices could not meet their requirements. They advised that it has led to a lack of user adoption and caused multiple processes to be done outside SAP S/4 HANA.

The management teams identified that rising subscription costs could create future challenges. However, they indicated it is not a current concern, as the benefits outweigh the challenges. Furthermore, they advise that skilled resources are a top priority, and employees whose jobs were automated during the implementation would be reskilled and fitted into the current organisation's structure.

Even though both organisations considered the implementation a success, the participants advised that user resistance is still a significant concern. Therefore, it has continuous change management and training programs to ensure all users are prepared to undertake IT changes.

Chapter 7. The interrelated challenges of cloud ERP

This study integrated the various factors from the Shang and Seddon (2000) and Kiriwandeniya et al. (2013) frameworks as a starting point to conduct the research. However, both frameworks were limited to the benefits of ERP systems, which were only partially applicable to the context of this study. In addition, this study further adopted the BPCM by Kettinger et al. (1997) to explain the relationships between the different challenges of cloud ERP.

This study formed a simplified framework which was expanded from the BPCM model, as the BPCM was inadequate for this study. The BPCM contains the factors of organisational structure and people. This study merged these factors to form a consolidated organisational theme. Furthermore, the IT theme was separated into ERP applications and IT infrastructure to provide more depth to the research findings.

Furthermore, the following sections explain the factors influencing cloud ERP adoption and the migrating strategies. Moreover, the relationships between the themes and their interconnections were discussed before a conceptual model was derived.

7.1 Factors influencing cloud ERP adoption

During the pre-implementation phase, both organisations indicated that environmental factors such as vendor pressure and technology innovation influenced their adoption of cloud ERP. Both organisations clearly stated that vendor pressure was paramount to moving to cloud ERP.

“That was one of the biggest reasons, yes. We also wanted to keep our system up to date, and looking at our road path forward [C1P3]”

However, organisations agreed that technological innovation strongly supports them in streamlining business processes and allowing them to rapidly adopt new requirements.

“Either you do nothing in your business or nothing for your business in IT for the next five years, or you say, okay, this looks like it's going happen. This looks like there's going to be innovation, this looks like we can add value, we can improve things, we can streamline [C2P1]”

Furthermore, both organisations aimed to execute a digital transformation strategy, as the management's objective was to rethink business processes and organisational objectives rather than exclusively adopting the latest technology without purpose.

“So, we are going through our strategy transformation. So, we said, why don't we then use this opportunity as well, like S/4HANA, to help as a tool in transforming the business. Because, as I said, S/4HANA has those innovations and everything, there's AI that's embedded there, machine learning, IOT, it's like SAP is a step ahead of every other [C2P2]”

In alignment with the BPCM by Kettinger et al. (1997), the environmental factors and business strategy of the organisations influenced the adoption of cloud ERP. Furthermore, the post-implementation challenges were categorised into four themes: IT, operational, management, and organisational. Subsequently, the benefits were also discovered. In alignment with BPCM, the benefits are considered the overall value the business has gained from the cloud ERP implementation.

7.2 Relationships between themes

A coding matrix was developed and analysed to identify the relationships between the four key themes derived from the research. Table 12 outlines the multiple relationships between the various themes of the post-implementation phase. Furthermore, the relationships between the themes and their interconnections are explained.

Themes connected by arrows pointing in both directions indicate a mutual and interdependent relationship, where influence and feedback flow continuously between the entities. This bidirectional link signifies that neither theme performs in isolation. Consequently, each theme influences the other in a continuous process.

Table 12. Relationships between themes

	IT	Management	Operational	Organisational
IT	121	17	8	10
Management	17	93	16	9
Operational	8	16	60	17
Organisational	10	9	17	71

Relationship between IT and management

The relationship between IT and management was imperative to the success of the ERP initiative for both organisations. Participants advised that there was continuous communication between the IT and the management teams. The senior management teams advised that they learnt lessons from previous projects and made a conscious effort to ensure all IT decisions were collaborated across the business. In addition, management understood that the success of an ERP lifecycle heavily depended on their support.

“I would say we did have a lot of support. I’ll make an example on the go live day, and on the project as well. We...there were a lot of people from every aspect of the business. And there were people from change management. There were people from IT. There were people from training. [C2P5]”

Relationship between IT and operational

IT and operations are closely connected within organisations, as IT supports and enhances day-to-day operational activities. Participants indicated that the ERP system effectively automates and streamlines business operations. As the CIO discussed, overall business operations were interrupted when system issues occurred, and customers did not receive their scheduled deliveries. This relationship underpins collaboration between IT activities and business process owners, as any problems will impact business operations.

"We have a logistics warehouse, or three logistics warehouses that are on this ERP. So, they were unable to schedule their deliveries and there, you know, receipts with the courier companies which posed a problem and caused a bit of a backlog, but that was caught up. [C1P1]"

Relationship between IT and organisational

IT and organisational relationships have mainly been around user resistance and user satisfaction. Participants indicated that the organisations continuously established programs to ensure the users had adequate training on the new system. Furthermore, change management programs were developed to ensure users were comfortable with the ERP system and that the entire business understood the business objectives for adopting cloud ERP.

"Users require more training post-implementation to effectively use the new system. [C2P5]"

Relationship between management and operational

Management from Case 2 significantly influenced standardising their current processes using public cloud best practices. The public cloud was not flexible enough to incorporate complex business requirements. Thus, the organisation had to consider standard best practice content in certain areas, such as EAM, which performed well for the business. However, there were challenges in other streams, as discussed in section 6.2.

"The best practice processes that were already defined, sort of, aligned with all the processes on the ground [C2P2]"

Even though Case 1 did not adopt standard best practices and continued using legacy processes, the participants advised that the business has plans to standardise processes to alleviate technical debt.

"We aim to align processes with best practices, but make deviations for customer needs. [C1P3]"

Both management teams communicated regularly with business process owners to ensure that the cloud ERP system's capabilities would benefit the business in the long term. Thus, this evidence supports the importance of the relationship between the themes.

Relationship between management and organisational

People and management are closely connected. The senior management teams were positioning initiatives to motivate all employees to understand the importance of achieving long-term business success. The management teams ensured that the resources, training, and environment were conducive to producing positive outcomes. Despite resistance, the employees were engaged and optimistic about the organisation's direction.

"And then another thing as well is also user satisfaction. And, in that way, management does speak to the business, right. Are they happy with the implementation, how things are running, etc. [C1P4]"

Relationship between operational and organisational

Users are the backbone of operations, responsible for executing tasks, making decisions, and keeping processes on track. Effective communication, strong leadership, and a positive team culture are vital for aligning individual efforts with organisational goals. This alignment allows operations to function smoothly and adapt to changing needs and challenges. Ultimately, the success of operations relies on the dedication and performance of the individuals involved.

“Yeah. So, yeah, it has been a pain point. And, at some stage, I almost felt that, probably, maybe going public cloud was not an option for us. But, yeah, some of the things we're able to fit within the standard business processes, but there are those that we will have to try and manage [C2P3]”

7.3 Conceptual model

Figure 17 depicts the conceptual model of the post-implementation phase of cloud ERP, which was derived from the research. The model explains that IT, management, operational, and organisational factors continuously and iteratively occur during post-implementation. Each factor is interconnected, and each factor presented has challenges and benefits. Additionally, for organisations to achieve a successful cloud ERP initiative, they continuously need to resolve the challenges they experience. In return, this will ensure benefits are derived, and ultimately, the business value will be realised.

ERP vendors will continuously release new upgrades or updates for their cloud ERP system. Therefore, if organisations regularly innovate during the post-implementation phase, they must comprehend that new challenges will emerge as an ERP initiative is a continuous lifecycle. Thus, organisations should obtain the skills and resources to improve the business continuously. These practices will ensure that the cloud ERP system provides business value and is aligned with business objectives.

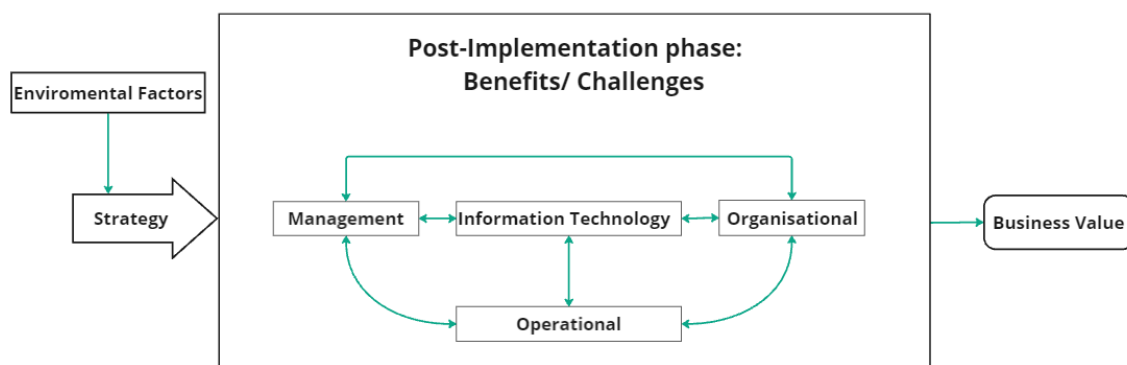


Figure 17. Conceptual model of the post-implementation phase of cloud ERP

Chapter 8. Conclusion

This study answered the research question by explaining the post-implementation challenges of cloud ERP, focusing on SAP S/4HANA cloud. A multi-case study approach examined the multifaceted nature of these challenges, incorporating insights from relevant academic literature, real-world industry practices from Panorama consulting group, Gartner, SAP Insider, and published books. Literature indicated that an ERP lifecycle can be divided into three phases: pre-implementation, implementation and post-implementation. The literature further suggested that limited research was conducted in the post-implementation phase, and no literature was found on the post-implementation challenges of cloud ERP. The research, Gartner and SAP Insider reports focused on the pre-implementation and implementation phases. Therefore, this study contributes to the literature on the post-implementation challenges of cloud ERP.

This study chose two large organisations that successfully implemented SAP S/4 HANA cloud. A comparative analysis was conducted between the two cases to understand the different challenges experienced by both organisations. The data analysis identified four key challenges organisations experience during the post-implementation phase of an ERP lifecycle. These challenges are related to IT, operational, management, and organisational. The IT challenges included configuration limitations, authorisation issues and minimal reporting capabilities. The operational issues were associated with the inefficiency of standard best practices. Management reviewed the shortage of skilled resources, the rise of subscription fees and vendor support. Lastly, the organisational challenges were predominantly around user resistance to cloud ERP. Even though there were multiple challenges related to cloud ERP, the organisations identified several benefits which provided business value. These benefits include enhanced scalability, maintenance reduction, system performance, and decision-making. This study found that benefits and challenges are interrelated. To realise value, organisations should ensure they continuously resolve challenges, which will be constant as innovation increases.

This study highlighted the importance of understanding the post-implementation phase of cloud ERP as a continuous process of adaptation and learning to ensure the business finds value in the system. This study further found that the post-implementation challenges of cloud ERP are caused by underestimating business-related activities and overestimating IT-related activities.

Chapter 9. Limitations and future research

This study used case studies from various geographical areas and industries. As a result, generalising the post-implementation challenges may be problematic since different countries and industries face distinct challenges. Additionally, this study relied on a limited number of case studies and interviews, potentially leading to a limited understanding of the post-implementation challenges. Furthermore, the cross-sectional time horizon evaluates the phenomenon at a specific period, meaning these challenges could change over time. Moreover, the data collected might not fully grasp all the challenges across diverse cloud ERP implementations.

This study used comparative analysis for two different cloud models, and this approach proved limited. Case 1, implemented SAP S/4 HANA private cloud using a brownfield approach, exhibited minimal contribution to knowledge in the area. This study was biased towards SAP, and both organisations successfully implemented the system. However, these findings may be subjective, and further research is needed on case studies of failed cloud ERP projects.

Studying cloud ERP is a broad topic with many nuances and concepts, as the cloud ERP landscape is constantly changing, influenced by technological innovation, changing business needs, and increasing competition. Future research should focus on isolated topics to gain in-depth knowledge of a particular component of a cloud ERP system. In addition, longitudinal studies that span several years enable researchers to track the long-term effectiveness and evolving challenges of SAP S/4HANA post-implementation and allow businesses to understand the phenomenon better.

Since limited literature on cloud ERP challenges is available, empirical research should be conducted on the following areas. The post-implementation experiences of using S/4 HANA public cloud using a greenfield implementation. The impact of artificial intelligence on cloud ERP. The data security frameworks required for cloud ERP. Measuring the cost implications of cloud ERP subscription models.

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Chapter 11. Appendices

Appendix A: Research instrument

The research instrument below was used to collect data from the participants. The questions continuously changed and improved in an iterative process to ensure quality data was collected.

Introduction

Thank you for agreeing to participate in the interview. We are interviewing you to better understand **the post-implementation challenges of cloud ERP**.

There are no right or wrong answers to any of our questions, we are interested in your own experiences.

The interview should take approximately one hour depending on how much information you would like to share. With your permission, I would like to audio record the interview because I don't want to miss any of your comments. The information we include in our report does not identify you as the respondent. You may decline to answer any question or stop the interview at any time and for any reason. To be clear, participation in this study is voluntary.

Are there any questions about what I have just explained? Can we begin? Can I start the recording?

Section 1: General questions:

	Questions
S1Q1	Tell me about your professional background? (Work experience and qualifications)
S1Q2	Tell me about your organisation (Background, industry, and number of employees)
S1Q3	Describe your role at the organisation and your current position?
	<i>And your role in the Transition from ECC to S/4 HANA</i>

Section 2: ERP landscape

	Questions
S2Q1	How long have you been running your current ERP system?
S2Q2	Are there any core business processes that are dealt with outside the ERP system? If "yes" then why?

Section 3: ERP Migration plan

	Questions
S3Q1	How did SAP ECC end of life influence your decision to transition?
S3Q2	How is your current SAP S/4 HANA deployed? (IAAS or SAAS)
	<i>Why IAAS or SAAS? Private or Public</i>

S3Q3	How did your organisation transition from SAP ECC to SAP S/4 HANA?
	<i>Elaborate? Upgrade (Brownfield)? New implementation (greenfield)? Bluefield?</i>
S3Q4	How complex was the transition?
	<i>SAP Activate plan? Partner support?</i>

Section 4: Operations

	Questions
S4Q1	How were your organisations operations affected by the transition to S/4 HANA?
	<i>How has it impacted the current business processes?</i>
S4Q2	How are you managing the changes to your business processes after the transition?
	<i>Positive or negative?</i>
	<i>Are challenges you experience with S/4 HANA that you didn't experience with SAP ECC</i>

Section 5: Organisational structure

	Questions
S5Q1	How did the S/4 HANA implementation affect an organisational structure?
	<i>Hierarchy?</i>
S5Q2	How did the business have to reconsider previous roles?
S5Q3	How did the business have to consider new roles?
S5Q4	How did you manage the need for new skills?
S5Q5	How did you manage the skills that were no longer needed?
S5Q6	How has your role changed?
	<i>Are challenges you experience with S/4 HANA that you didn't experience with SAP ECC</i>

Section 6: Business/ IT strategy

	Questions
S6Q1	How did S/4 HANA affect the future business and IT strategy?
	<i>IT Roadmap? Total cost of ownership calculations?</i>
S6Q2	How did your management facilitate the changes?
	<i>Change management? Did you have top management support? Training?</i>
S6Q3	How has the business responded to the changes?
	<i>Training requests? Fiori?</i>

S6Q4	How has the future costs of S/4 HANA (PE/PC) influenced you decision to migrate?
	<i>How would you evaluate the future costs (Licenses/ cloud storage/ Security) vs previous costs (On-Premises)</i>
	<i>What challenges do you foresee in the future regarding costs (Licenses/ cloud storage/ Security)</i>
	<i>Are challenges you experience with S/4 HANA that you didn't experience with SAP ECC</i>

Section 7: IT Infrastructure

	Questions
S7Q1	How has the IT infrastructure changed since the transition?
	<i>IT infrastructure capability?</i>
S7Q2	How has performance improved with the new IT infrastructure?
S7Q3	How are the SLAs from the CSP?
S7Q4	How responsive are the CSP to your issues?
	<i>Are challenges you experience with S/4 HANA that you didn't experience with SAP ECC</i>

Section 8: Security

	Questions
S8Q1	With moving to cloud, how do you consider your IT security?
S8Q2	How is the system Authorisations such as roles, transactions with S/4 HANA
	<i>Are challenges you experience with S/4 HANA that you didn't experience with SAP ECC</i>

Section 9: SAP S/4 HANA

	Questions
S9Q1	How has customisation changed?
	<i>Are there minimal customisation opportunities</i>
S9Q2	How easy or complex is it to implement new business requirements?
S9Q3	What if standard SAP does not fulfil the requirements, what are the options?
	<i>Enhancements? Extensibility?</i>
S9Q4	How did SAP best practices influence you to change your old processes?
	<i>Standardization? Clean Core?</i>

	<i>Are challenges you experience with S/4 HANA that you didn't experience with SAP ECC</i>
--	--

Section 10: Data/ Integration

	Questions
S10Q1	How complex has the integration been? BTP?
	<i>Data replication? Third Party vendors? External systems? Interfaces?</i>
	<i>Do you have any issues with Integration post-implementation?</i>
S10Q2	How complex was Data migration?
	<i>Do you have any issues with data post-implementation? Master Data/ Transactional Data</i>

Section 11: Additional

	Questions
S11Q1	Why would you consider your implementation as a success
	<i>How would you measure the success of your migration? How did pre-planning support the success</i>
	<i>Did SAP support with the transition (SAP Readiness checks, SAP Checklist etc.)</i>
S11Q2	Are there additional challenges you are experiencing that we have not discussed?

Conclusion

Thank you for sharing your time and effort with me and I appreciate your contribution to my study. The knowledge assisted me to better understanding your organisation.

My thoughts on what we discussed are.

If there is anything you feel you would like to add or retract, please contact me via email or mobile mhmfaw002@myuct.ac.za / +27 78 81 000 07

Appendix B: Organisation consent letter

Organisational consent forms were signed by the CIOs of both organisations.



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8 March 2024

Dear Sir/Madam,

In terms of the requirements for completing a Master's degree in information systems at the University of Cape Town a research study is required.

The researcher, in this case Fawwaz Mohammed, has chosen to conduct a case study entitled **Understanding the post-implementation challenges of cloud ERP**. The researcher would like to request permission to conduct this case study at organisation.

Should you have any questions regarding this research, please feel free to contact me on +27 78 81 00 007 or email: mhmaw002@myuct.ac.za.

Your organization's participation in this study would be greatly appreciated.

Management Consent

I, _____, give the researcher of this study consent to conduct their study in the following organization:

I am aware that participation is voluntary and that respondents may choose to withdraw from this study at any time, should they choose to do so.

Signature

Date

Fawwaz Mohammed

Signed by candidate

Researcher Masters Student, (UCT)
Department of Information Systems
University of Cape Town
Email: mhmaw002@myuct.ac.za

"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."

Appendix C: Individual consent letter

The individual consent forms were signed by each participants who contributed to the study.



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8 March 2024

Request to conduct research and interview participation consent form

Dear Sir/Madam,

In terms of the requirements for completing a Master's Degree in Information Systems at the University of Cape Town a research study is required.

The researcher, in this case Fawwaz Mohammed has chosen to conduct a case study entitled **Understanding the post-implementation challenges of cloud ERP**.

Your participation in this research is voluntary. All information will be treated in a confidential manner and used exclusively for the purpose of this study. No individual names will be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

The data collection method will be one-on-one interviews with a small group of the staff responsible for Enterprise resource planning support. The interviews will be conducted at virtually or a disclosed location if agreed and will last 1 hours. If you are willing to participate in this study, kindly sign the attached form and return to me at your earliest convenience.

Should you have any questions regarding this research, please feel free to contact me on [+27 78 81 00 007 or email: mhmaw002@myuct.ac.za.

Your participation in this study would be greatly appreciated but is entirely voluntary.

Sincerely,

Fawwaz Mohammed

Signed by candidate

Researcher M.Com Student, (UCT)
Department of Information Systems
University of Cape Town
Email: mhmaw002@myuct.ac.za

Professor Lisa Seymour

To be signed

Research Supervisor
Department of Information Systems
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Email: lisa.seymour@uct.ac.za

Appendix D: Research timeline

The below was the research timeline for master's dissertation.

	Deliverable	Due Date	Status
1	Critical reading assignment 1	24 February 2023	Completed
2	Research proposal presentation	15 March 2023	Completed
3	Management assignment	06 April 2023	Completed
4	Literature review	05 May 2023	Completed
5	Quantitative assignment	27 May 2023	Completed
6	HL Dissertation proposal	09 June 2023	Completed
7	Qualitative assignment	28 July 2023	Completed
8	Research design presentation	10 August 2023	Completed
9	Research design	25 August 2023	Completed
10	Systems thinking	15 September 2023	Completed
11	Critical reading assignment 2	28 September 2023	Completed
12	Journal/ conference paper	13 October 2023	Completed
13	Ethics request	14 October 2023	Completed
14	Ethics approval	9 November 2023	Completed
1	Pending: Organisation consent approval	January 2024	Completed
2	Pending: Organisation consent approval	February 2024	Completed
3	Approved: Organisation consent approval	April 2024	Completed
4	Interviews/ data collection/ data Analysis	May 2024	Completed
5	Interviews/ data collection/ data Analysis	June 2024	Completed
6	Interviews/ data collection/ data Analysis	July 2024	Completed
7	Interviews/ data collection/ data Analysis	August 2024	Completed
8	Start: Writing program	September 2024	Completed
9	Data analysis/ writing	August 2024 -October 2024	Completed
10	Data analysis/ writing	August 2024 -December 2024	Completed
11	End: Writing program	November 2024	Completed
12	Draft dissertation	December 2024	Completed
13	Dissertation review with supervisor	January 2025 - February 2025	Completed
14	Final dissertation for submission	February 2024	Completed

Appendix E: NVivo - Audit trail

This study used an audit trail to create a detailed and transparent record of data analysis in NVivo. The transcripts were uploaded to NVivo, and the coding was divided into the six phases of Braun and Clarke (2006). Each phase was described in detail in the following images.

The audit trail further ensured the study's transparency, reliability, and credibility by allowing other researchers to trace how data was collected, analysed, and interpreted. The audit trail helps confirm the research's rigour, ensures reproducibility and increases trust in the findings.

Phase 1

The image below presents the 12 transcripts utilised for the study, with each transcript assigned a unique code to maintain anonymity. Additionally, the image outlines the audit trail alongside the six phases of data analysis. It also highlights the codes derived from each transcript and the number of codes referenced.

In addition, the researcher then used the “Autocode” functionality to generate the initial codes. The codes were listed in the initial codes folder.

The screenshot displays the NVivo software interface. On the left, the 'Quick Access' pane shows the 'Data' and 'Coding' sections. The 'Data' section is expanded, showing '1. Interview transcripts' and '2. Secondary data'. The 'Coding' section is also expanded, showing '1. Audit trail' and '2. Additional codes'. The 'Audit trail' section is further expanded, showing the six phases of data analysis: '1. Initial codes', '2. Generating initial codes', '3. Reviewing themes', '4. Searching for themes', '5. Defining and naming', and '6. Producing the report'. The main pane shows a table of '1. Interview transcripts' with columns for Name, Codes, References, Modified on, Modified by, and Classification. The table lists 12 transcripts (C1P1 to C2P6) with their respective code counts, reference counts, modification dates, and classifications.

Name	Codes	References	Modified on	Modified by	Classification
C1P1	488	1410	2024/11/28 23:00	F	Interview
C1P2	615	1855	2024/11/28 23:03	F	Interview
C1P3	550	1426	2024/05/30 18:31	F	Interview
C1P4	487	1380	2024/05/30 18:31	F	Interview
C1P5	208	521	2024/05/30 18:31	F	Interview
C1P6	186	490	2024/05/30 18:31	F	Interview
C2P1	857	2762	2024/05/30 18:31	F	Interview
C2P2	685	2735	2024/05/30 18:31	F	Interview
C2P3	1019	3476	2024/11/28 23:13	F	Interview
C2P4	482	1422	2024/05/30 18:31	F	Interview
C2P5	463	1450	2024/05/30 18:31	F	Interview
C2P6	623	1759	2024/05/30 18:31	F	Interview

After reviewing the the initial codes generated from the automated functionality, the researcher started grouping the codes into segments, which contained the main points of the findings.

Phase 3

The researcher grouped initial codes into themes, then sorted the themes into the relevant research questions to NVivo and sorted the themes that matched the initial questions. Themes were then sorted accordingly to structure the findings.

Quick Access		Code	Classification	Classification	
IMPORT		3. Reviewing themes			
Data		Name	Files	References	Created on
Files		How do the post-implementation challenges of cloud ERP affect an organisation	0	0	2024/09/05 19:54
1. Interview transcripts		1. What are the post-implementation challenges of the organisation's operations	0	0	2024/09/05 19:53
2. Secondary data		Operational	0	0	2024/09/11 20:18
File Classifications		Assessing current business process	6	12	2024/07/28 22:27
Externals		Plant Maintenance EAM	5	27	2024/07/28 22:27
ORGANIZE		2. What are the post-implementation challenges for senior management	0	0	2024/09/05 20:14
Coding		Mangerial	0	0	2024/09/11 20:19
Codes		Establish decision making	10	76	2024/07/28 22:27
1. Audit trail		Post Implementation - Success indicators	5	10	2024/07/28 22:27
1. Initial codes		S4 hana costs	7	22	2024/07/28 22:27
2. Generating initial codes		3. What are the post-implementation challenges of the organisational structure	0	0	2024/09/05 19:53
3. Reviewing themes		Organisational	0	0	2024/09/11 20:19
4. Searching for themes		Change management	8	44	2024/07/28 22:27
5. Defining and naming		Post Implementation - New job roles	3	7	2024/07/28 22:27
6. Producing the report		Post Implementation - Support for business	1	2	2024/07/28 22:27
2. Additional codes		Post Implementation - Training	9	19	2024/07/28 22:27
1. Deleted		4. What are the post-implementation challenges of the organisation's IT infrastructure	0	0	2024/09/05 19:54
2. Backup		IT infrastructure	0	0	2024/09/11 20:20
3. Case data		Post Implementation - Cost	5	7	2024/07/28 22:27
4. Autocoded Themes V1 - Sente...		Post Implementation - System differences	6	15	2024/07/28 22:27
5. Autocoded Themes V2 - Paragr...		public cloud	7	91	2024/07/28 22:27
Sentiment		5. What are the post-implementation challenges of the organisations business and IT strategy	0	0	2024/09/05 19:54
Relationships		Strategy	0	0	2024/09/11 20:20
Relationship Types		Business Technology Platform	0	0	2024/07/28 22:27
Cases		Data Strategy	7	12	2024/07/28 22:27
Notes		Integration	2	2	2024/07/28 22:27
Sets		Other tools	4	7	2024/07/28 22:27
EXPLORE		Post Implementation - New requirements	8	24	2024/07/28 22:27
Queries		Post implementation - Roadmap and strategy	7	13	2024/07/28 22:27
Query Criteria		Post Implementation - SAP Support_imp partner	9	16	2024/07/28 22:27
Query Results		Post Implementation - System_process changes	6	14	2024/07/28 22:27
Coding Matrices		6. What are the post-implementation challenges of the ERP cloud customization	0	0	2024/09/09 19:30
Visualizations		ERP Cloud Customization	0	0	2024/09/11 20:21
Reports		Post Implementation - Challenges	12	62	2024/07/28 22:27
		Post Implementation - Pros	7	26	2024/07/28 22:27
		SAP Best practice	9	39	2024/07/28 22:27
		7. What are the post-implementation challenges that occurred because of the pre-implemента	0	0	2024/09/09 19:30
		Pre-Planning	0	0	2024/09/11 20:21
		Implementation phase	9	23	2024/07/28 22:27
		Pre-Implementations	9	54	2024/07/28 22:27

Phase 4

The researcher discarded, combined, refined, or separated themes. The researcher further reviewed each theme, revisited the transcripts, and thoroughly reviewed each transcript to ensure the data aligned with the relevant themes.

Quick Access		4. Searching for themes						
IMPORT		Name	Files	References	Created on	Created by	Modified on	Modi
Data		1. SAP Activate framework	9	35	2024/10/12 20:32	F	2024/10/12 20:32	F
Files		2. How do the post-implementation challenges of cloud ERP affect an organisation	12	278	2024/10/12 20:32	F	2024/10/12 20:32	F
1. Interview transcripts		1. What are the post-implementation challenges of the organisation's operations	11	38	2024/10/12 20:32	F	2024/10/12 20:32	F
2. Secondary data		Business processes	11	38	2024/10/12 20:32	F	2024/10/12 20:32	F
File Classifications		Process changes for standardization	11	38	2024/10/12 20:32	F	2024/10/12 20:32	F
Externals		2. What are the post-implementation challenges for senior management	10	60	2024/10/12 20:32	F	2024/10/12 20:32	F
ORGANIZE		Managerial	10	60	2024/10/12 20:32	F	2024/10/12 20:32	F
Coding		Cost management	6	22	2024/10/12 20:32	F	2024/10/12 20:32	F
Codes		Indications of success	4	10	2024/10/12 20:32	F	2024/10/12 20:32	F
1. Audit trail		Top management involvement	8	28	2024/10/12 20:32	F	2024/10/12 20:32	F
1. Initial codes		3. What are the post-implementation challenges of the organisational structure	11	62	2024/10/12 20:32	F	2024/10/12 20:32	F
2. Generating initial...		Organisational	11	62	2024/10/12 20:32	F	2024/10/12 20:32	F
3. Reviewing themes		Affirm support for business	4	5	2024/10/12 20:32	F	2024/10/12 20:32	F
4. Searching for the...		Change management department	4	12	2024/10/12 20:32	F	2024/10/12 20:32	F
5. Defining and na...		Establish new job profiles	4	7	2024/10/12 20:32	F	2024/10/12 20:32	F
6. Producing the re...		Importance of change management	4	6	2024/10/12 20:32	F	2024/10/12 20:32	F
2. Additional codes		Planning change management	5	10	2024/10/12 20:32	F	2024/10/12 20:32	F
1. Deleted		Planning training	10	22	2024/10/12 20:32	F	2024/10/12 20:32	F
2. Backup		Resistance to change	0	0	2024/10/12 20:32	F	2024/10/12 20:32	F
3. Case data		4. What are the post-implementation challenges of the organisation's IT infrastructure	9	26	2024/10/12 20:32	F	2024/10/12 20:32	F
4. Autocoded Them...		IT infrastructure	9	26	2024/10/12 20:32	F	2024/10/12 20:32	F
5. Autocoded Them...		Benefits of cloud	0	0	2024/10/12 20:32	F	2024/10/12 20:32	F
Sentiment		Identify cost saving	5	6	2024/10/12 20:32	F	2024/10/12 20:32	F
Relationships		Limitations of cloud	3	5	2024/10/12 20:32	F	2024/10/12 20:32	F
Relationship Types		Security of cloud	4	6	2024/10/12 20:32	F	2024/10/12 20:32	F
Cases		System authorizations	3	9	2024/10/12 20:32	F	2024/10/12 20:32	F
Notes		5. What are the post-implementation challenges of the organisations business and IT strategy	9	39	2024/10/12 20:32	F	2024/10/12 20:32	F
Sets		Strategy	9	39	2024/10/12 20:32	F	2024/10/12 20:32	F
EXPLORE		Building external relations	0	0	2024/10/12 20:32	F	2024/10/12 20:32	F
Queries		Data Strategy	6	14	2024/10/12 20:32	F	2024/10/12 20:32	F
Query Criteria		Future roadmap	7	8	2024/10/12 20:32	F	2024/10/12 20:32	F
Query Results		Managing new business requirements	7	17	2024/10/12 20:32	F	2024/10/12 20:32	F
Coding Matrices		6. What are the post-implementation challenges of the ERP application	10	53	2024/10/12 20:32	F	2024/10/12 20:32	F
Visualizations		ERP Cloud application	10	53	2024/10/12 20:32	F	2024/10/12 20:32	F
		Availability of reporting	6	16	2024/10/12 20:32	F	2024/10/12 20:32	F
		Challenges with integration	4	10	2024/10/12 20:32	F	2024/10/12 20:32	F
		Limitations cloud applications	7	19	2024/10/12 20:32	F	2024/10/12 20:32	F
		SAP S4 Hana application differences from SAP ECC	3	8	2024/10/12 20:32	F	2024/10/12 20:32	F

The researcher finalised the names and definitions.

Quick Access

IMPORT

Data

Files

- Interview transcripts
- Secondary data

File Classifications

Externals

ORGANIZE

Coding

Codes

- Audit trail
 - Initial codes
 - Generating initial codes
 - Reviewing themes
 - Searching for themes
 - Defining and naming
 - Producing the report
- Additional codes
 - Deleted
 - Backup
 - Case data
 - Autocoded Themes V1 - Sente...
 - Autocoded Themes V2 - Paragr...
- Conceptual model
- Conceptual model

Sentiment

Relationships

Relationship Types

Cases

Notes

Sets

EXPLORE

Queries

- Query Criteria
- Query Results
- Coding Matrices

Visualizations

- Maps

5. Defining and naming

Name	Files	References	Created on
1. Pre-implementation	11	130	2024/10/26 14:53
2. Implementation	10	78	2024/09/11 20:22
3. Post-Implementation	12	332	2024/11/04 14:08
Q1. What are the post-implementation challenges of cloud ERP experienced b	12	332	2024/09/11 20:22
T1. Information Technology	12	142	2024/10/31 19:37
1. ERP application	12	74	2024/10/25 20:55
1. Benefits	8	25	2024/09/11 20:22
Cloud functionalities	6	16	024/09/22 21:57
Extensibility capabilities	3	9	024/11/26 21:37
2. Challenges	11	49	2024/10/15 21:18
Configuration limitations	6	13	024/09/11 20:22
Data inconsistencies	6	10	024/10/17 17:15
Integration complexity	6	12	024/09/11 20:22
Reporting obstacles	7	14	2024/10/17 17:20
2. IT Infrastructure	12	68	2024/10/12 23:04
1. Benefits	10	47	2024/09/21 21:26
Enhanced scalability and flexibility	6	11	024/09/11 20:22
Enhanced security	3	6	024/11/11 19:02
Maintenance reduction	9	30	024/11/21 20:44
2. Challenges	11	21	2024/09/11 20:22
Authorisation concerns	3	9	024/09/11 20:22
Data protection concerns	4	5	024/09/11 20:22
Unspecified downtime	6	7	024/11/23 15:25
T2. Operational	11	51	2024/10/15 21:01
1. Benefits	10	25	2024/10/15 20:59
Integrated business processes	10	22	2024/09/11 20:22
System performance	2	3	2024/11/26 21:37
2. Challenges	6	26	2024/09/11 20:22
Inefficiency of standardised processes	3	5	2024/09/11 20:22
Lack of alignment with standardised processes	6	21	2024/09/11 20:22
T3. Management	10	80	2024/10/12 23:09
1. Benefits	10	54	2024/10/15 21:00
Business growth	9	26	2024/09/11 20:22
Cost reduction	5	16	2024/09/11 20:22
Improved decision making	4	6	2024/09/11 20:22
Resource optimisation	3	6	2024/09/16 21:29
2. Challenges	8	26	2024/09/11 20:22
Cloud support inaccessibility	3	4	2024/09/11 20:22
Rising costs	3	8	2024/10/17 17:26
Skills shortage	7	14	2024/09/11 20:22
T4. Organisational	11	59	2024/10/15 21:15

File Home Import Create Explore Share Modules

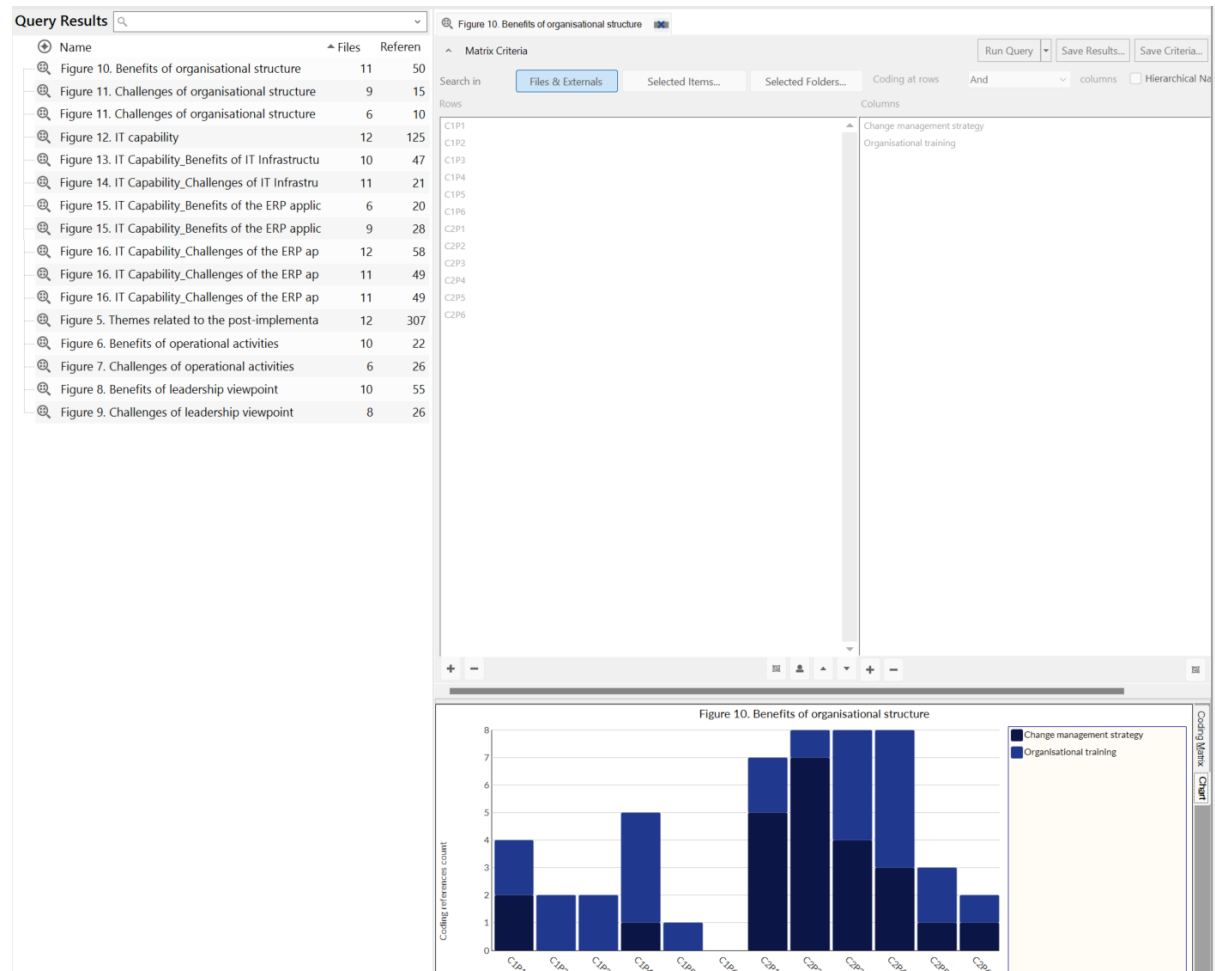
Clipboard Item Organize Query Visualize Code Autocode Range Uncode Case Classification File Classification Workspace AI Assistant

5. Defining and naming

Name	Files	References
Skills shortage	7	14
T4. Organisational	11	59
1. Benefits	11	49
Change management framework	8	23
Training objectives	11	26
2. Challenges	6	10
User resistance	6	10

Phase 6

The researcher used the query results functionality to produce a report summarising the findings and concluding with a conceptual model addressing the research question. The report discussed the identified themes in detail, with discussions provided in chapters 5 and 6.



Additional

An additional nodes folder was created; no codes were deleted. Each discarded theme or node was added to the additional nodes folder, and all versions were backed up.

	Code	Classification	Classificat
Quick Access			
IMPORT			
Data			
Files			
1. Interview transcripts			
2. Secondary data			
File Classifications			
Externals			
ORGANIZE			
Coding			
Codes			
1. Audit trail			
1. Initial codes			
2. Generating initial codes			
3. Reviewing themes			
4. Searching for themes			
5. Defining and naming			
6. Producing the report			
2. Additional codes			
1. Deleted			
2. Backup			
3. Case data			
4. Autocoded Themes V1 - Sente...			
5. Autocoded Themes V2 - Paragr...			
Sentiment			
1. Deleted			
Name	Files	References	Created on
0. Guide configuration	0	0	2024/10/01 12:34
1. Benefits	0	0	2024/10/12 22:59
1. Operations	0	0	2024/10/12 22:34
1. What are the post-impl	0	0	2024/09/11 20:22
2. Post-implementation c	0	0	2024/09/11 20:22
2. What are the post-impl	0	0	2024/09/11 20:22
3. SAP Activate Framewor	0	0	2024/10/26 15:04
3. Strategic alignment	10	28	2024/10/31 19:40
3. Strategic alignment (2)	0	0	2024/10/25 20:54
3. What are the post-impl	0	0	2024/09/11 20:22
4. Not Needed for now	0	0	2024/10/12 21:29
4. What are the post-impl	0	0	2024/09/11 20:22
5. What are the post-impl	0	0	2024/09/11 20:22
6. What are the post-impl	0	0	2024/09/11 20:22
actual costs	2	2	2024/06/06 15:56
actual data capture	1	1	2024/06/06 15:56
actual execution point	1	1	2024/06/06 15:56
actual implementation	1	2	2024/06/06 15:56
actual maintenance	1	1	2024/09/11 20:22
admin team	1	1	2024/06/06 15:56
Affirm support for busine	0	0	2024/09/11 20:22
agric system	1	1	2024/06/06 15:56
Application issues	0	0	2024/09/11 20:22
Assessing business opera	0	0	2024/09/12 19:31
backlog reports	1	1	2024/06/06 15:56
bases team	1	1	2024/06/06 15:56
basis system	1	1	2024/06/06 15:56

Appendix F: NVivo - Codebook

The below codebook for the final code structure in NVivo.

Codes\\1. Audit trail\\5. Defining and naming

Name	Files	References
3. Post-Implementation	12	332
Q1. What are the post-implementation challenges of cloud ERP experienced by an organisation	12	332
T1. Information Technology	12	142
1. ERP application	12	74
1. Benefits	8	25
Cloud functionalities	6	16
Extensibility capabilities	3	9
2. Challenges	11	49
Configuration limitations	6	13
Data inconsistencies	6	10
Integration complexity	6	12
Reporting obstacles	7	14
2. IT Infrastructure	12	68
1. Benefits	10	47
Enhanced scalability and flexibility	6	11
Enhanced security	3	6
Maintenance reduction	9	30
2. Challenges	11	21
Authorisation concerns	3	9
Data protection concerns	4	5
Unspecified downtime	6	7

Name	Files	References
T2. Operational	11	51
1. Benefits	10	25
Integrated business processes	10	22
System performance	2	3
2. Challenges	6	26
Inefficiency of standardised processes	3	5
Lack of alignment with standardised processes	6	21
T3. Management	10	80
1. Benefits	10	54
Business growth	9	26
Cost reduction	5	16
Improved decision making	4	6
Resource optimisation	3	6
2. Challenges	8	26
Cloud support inaccessibility	3	4
Rising costs	3	8
Skills shortage	7	14
T4. Organisational	11	59
1. Benefits	11	49
Change management framework	8	23
Training objectives	11	26
2. Challenges	6	10
User resistance	6	10

Appendix G: Ethics approval

The below is the ethics approval form from the UCT ethics committee.



2023/11/09

COM/00518/2023

RE: Research Ethics Committee Project Approval Letter

Dear Fawwaz Mohammed,

Your application for ethics review of your project titled

Understanding the post-implementation challenges of cloud enterprise resource planning (ERP)

has been reviewed and evaluated by the

Commerce Research Ethics Committee.

You may proceed with your research project titled:

Understanding the post-implementation challenges of cloud enterprise resource planning (ERP)

Please note that should:

- (i) any serious or adverse effects to participants occur and/or,
- (ii) aspect(s) of your current project change and/or
- (iii) any unforeseen events that might affect continued ethical acceptability of the project occur then you should immediately report this to the approving REC. You may be required to submit an amendment to this application, in order to determine whether the changed aspects increase the ethical risks of your project.

Based on the information supplied your application has been successful and is approved.

Please note the following additional conditions associated with this approval:

- (i)

Regards,

Commerce Research Ethics Committee.