Gordon Institute of Business Science
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Performance management systems and digital transformation in the manufacturing sector of Eswatini: the moderating role of leadership behaviours

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Abstract

The digitalisation of performance management systems has significantly changed how organisations make decisions as they now have access to real-time performance data. This enables data-driven decision making which aligns operations with strategic objectives. However, there is limited understanding of how leadership behaviours influence the successful implementation of digital performance management systems. The study examines how leadership behaviours influence the connection between performance management systems and digital transformation, in Eswatini's manufacturing industry. A cross-sectional quantitative research method was used to collect survey data form 126 managers in manufacturing firms in Eswatini. Pearson correlation and hierarchical regression analyses were used to evaluate four hypotheses. The findings indicate that leadership behaviours positively correlate with both performance management systems effectiveness and digital transformation. However, the results do not support the idea that leadership behaviours moderate the relationship between performance management systems and digital transformation. The findings offer practical insights for business leaders in Eswatini, highlighting the necessity for focused leadership development programs to support digital transformation in the manufacturing sector. However, concentrating on a single industry and geographic location limits the generalisability of the findings. Future research should consider longitudinal designs and comparative studies across various sectors to gain a deeper understanding of the role of leadership in digital transformation.

Keywords

Performance management systems, digital transformation, leadership behaviours, manufacturing, Eswatini

Plagiarism Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Chapter 1: Introduction

1.1 Introduction and description of the problem

Traditional performance management systems (PMS), such as the Balanced Scorecard, used to manage performance using historical data. These systems are set up such that there is a goal setting phase, periodic reviews, and feedback mechanism centred around the performance of the previous period (Garengo et al., 2022). With the advent of digital technologies, there has been a shift towards digital performance management systems. This has radically changed how organisations monitor, evaluate and improve performance. These digital systems, which feature real-time analytics, automation and AI, enable a faster and more data-driven decision-making performance management process (Demartini & Taticchi, 2022).

The adoption of digital performance management systems is particularly important in the manufacturing sector, which is heavily dependent on efficiency, productivity, and performance enhancement. Manufacturing companies are increasingly implementing digital transformation strategies to boost operational flexibility, but the success of these efforts hinges on leadership behaviours that promote digital adoption and integration (Bakker et al., 2023). While digital performance management systems offer the potential for greater efficiency and competitiveness, challenges remain, especially in developing countries like Eswatini, where issues such as technological infrastructure, leadership readiness, and organisational resistance can affect implementation (Dlamini, 2020; Simelane, 2021).

The functional and technical aspects of digital performance management systems have been extensively covered in literature, especially in the developed markets context (Hanelt et al., 2021; Demartini & Taticchi, 2022). However, there is a shortage of studies which are focusing on how leadership behaviours can support the successful adoption of digital performance management systems. This is particularly true in developing economies, especially in the manufacturing sector. This gap is what motivated the study which now aims to address it by exploring how leadership

behaviours impact the relationship between performance management systems and digital transformation in Eswatini's manufacturing industry.

1.2 Purpose of research

The study aims to investigate how leadership behaviours influence the effectiveness of digital performance management systems in Eswatini's manufacturing sector. The research intends to identify specific leadership behaviours that promote the adoption of digital performance management systems within manufacturing organisations.

The specific objectives of the study are to:

1. Investigate the relationship between leadership behaviours and performance management systems.
2. Evaluate the effect of leadership behaviours on digital transformation in manufacturing firms.
3. Analyse whether leadership behaviours affect the connection between performance management systems and digital transformation.
4. Provide recommendations for business leaders and policymakers to encourage effective adoption of digital performance management systems in manufacturing companies.

The manufacturing sector contributes approximately 40% to Eswatini's GDP and is the second-largest employer after agriculture (Central Bank of Eswatini, 2024). The Eswatini National Development Plan (2023/24–2027/28) and the Eswatini Industrial Policy (2023–2033) both emphasise digitalisation, industrial innovation, and leadership development as key economic drivers. Given this context about Eswatini, it becomes clear why understanding the role of leadership in digital transformation is important. This study thus aligns with the Eswatini's national economic priorities as its findings will assist with both leadership development and digital transformation. Other than the industry practical applications, the study also fills a significant gap in literature by researching how leadership behaviours influence the digitalisation of performance management systems

1.3 Conclusion

This chapter has presented the research problem, objectives and the significance of the study for both academic knowledge and practical application in industry. It explained both the importance of leadership behaviours in influencing the adoption of digital performance management systems, and the importance of carrying out the study within the manufacturing sector of Eswatini.

Chapter 2 presents a critical review of the relevant academic literature on performance management systems, digital transformation, and leadership behaviours. The chapter also places the research within the context of these interconnected concepts. Chapter 3 presents the primary research question guiding this study, the sub-research questions and the hypotheses forming the foundation of the study.

Chapter 4 outlines the research methodology and design that was used and offers the rationale behind the design and methodological choices that were made in the study. Chapter 5 presents and offers a detailed analysis of the results that were obtained in the research. The findings are organised in accordance with the research objectives and hypotheses, delivering a detailed analysis of the data that was collected.

Chapter 6 discusses the findings of the study in relation to existing literature on performance management systems, digital transformation, and leadership behaviours, as presented in the literature review. Chapter 7 concludes the study by summarising the principal findings, discussing the limitations of the research, stating the theoretical and practical implications of the study and concludes by sharing recommendations for future research.

Chapter 2: Literature review

2.1 Introduction

In the current era of a rapidly changing digital environment, organisations are now faced with a situation whereby they are compelled to adopt advanced technologies in their operating models. Integrating these advanced technologies enables the organisations to remain competitive by improving their efficiency, agility, and overall performance (Carvalho et al., 2022). Performance Management Systems (PMS), which are conventionally used to monitor, measure, and align activities with the organisations' strategic objectives and drive overall productivity, have changed significantly due to digital advancements (Demartini & Taticchi, 2022). This digital change, which is part of a broader process known as Digital Transformation (DT), has revolutionised how performance is managed in organisations. DT enables real-time data analysis, improves decision-making processes, and promotes better strategic alignment (Garengo et al., 2022).

However, the incorporation of digital technologies into performance management systems comes with numerous challenges. While digital transformation creates many new opportunities for operational efficiency and improved strategic alignment, it also needs significant changes in people's behaviours and organisational processes (Porfírio et al., 2021). Leadership behaviour is one of the key factors that have become an essential enabler for successful digital transformations (Nani & Safitri, 2021). It does not only impact the acceptance and successful use of the implemented digital tools within a performance management system (Tortorella et al., 2023), but leadership behaviours also influence the overall organisation's ability to manage the socio-technical challenges that are introduced by digital transformation (Weber et al., 2022).

Valuable insights about the technical and functional aspects of performance management systems and digital transformation are extensively covered in existing literature. However, there is a gap in the understanding of the relationship between these two constructs and how they interact with the human elements that impact their success (Philip, 2021). Specifically, a thorough examination of the role of leadership behaviour in aligning performance management systems

with digital transformation initiatives has not been carried out (Matsunaga, 2021). Addressing this gap is important, as it is becoming increasingly recognised that the success of digital transformation is reliant on leaders' skill to blend technological capabilities, brought about by digitalisation, with human factors like collaboration, innovation, and adaptability (Henderikx & Stoffers, 2023).

In this chapter, a critical review of the relevant academic literature on Performance Management Systems (PMS), Digital Transformation (DT), and leadership behaviours is given, whilst also placing the research within the context of these interconnected concepts. An examination of PMS that highlights their development in the digitalisation era is performed first and followed by a review of digital transformation and how it is impacting organisational processes and management practices. The chapter concludes by examining leadership behaviours, focusing on the specific characteristics and actions that improve the effectiveness of PMS in the context of digital transformation. By bringing together these constructs, this literature review identifies meaningful theoretical gaps and some unresolved arguments, and in so doing highlights the necessity for this research and cements its theoretical foundations.

2.2 Performance management systems

Performance Management Systems (PMS) have long been recognised as critical components in the strategic management of organisations as they are integral to management control systems and serve as essential tools for aligning organisational activities with strategic objectives, thus enhancing overall performance (Felício et al., 2021). PMS are based on structured frameworks that are used for the alignment of individual and organisational objectives to ensure that goals are consistently achieved in an effective and efficient manner (Garengo et al., 2022). These PMS frameworks are made up of a range of practices, processes and tools which are meant to measure, manage, and improve performance at both the individual and team levels (Norrman & Näslund, 2025). The main processes of a PMS are goal setting, performance evaluation, feedback mechanisms, and development planning, all of which contribute to continuous improvement and towards the overall success of organisations (Demartini & Taticchi, 2022).

In a study focused on examining new approaches for performance management (Faozen & Sandy 2024), the foundational tenets of PMS were found to be still applicable. The new approaches are still based on the understanding of PMS as being a strategic and integrated approach to delivering sustained success to organisations by improving the performance of the people who work in them and by developing the capabilities of teams and individual contributors. Their work highlighted that the core of PMS, which is aligning individual objectives with organisational goals and the role of performance appraisals and feedback in driving continuous improvement, remain intact even in the proposed new approaches to PMS. By connecting performance measurement tools with strategic goals, PMS have traditionally supported informed decision making, optimum resource use, and enhanced accountability (Saunila et al., 2024).

Faozen & Sandy (2024) also provide a foundational view on performance measurement and management, highlighting the necessity of aligning strategic objectives with performance indicators. They state that an effective performance measurement system (PMS) should combine both financial and non-financial measures, allowing organisations to evaluate and improve performance in a holistic way. Likewise, Garengo et al. (2022) argue that performance management has progressed from simply looking back at past results to becoming a forward-thinking system that helps in strategic decision-making and continuous improvement. They point out that organisations must embrace adaptable PMS frameworks that can respond to changing market conditions and technological advancements.

Li et al. (2022) explored the role of PMS in workforce management and planning towards improving efficiency, employee engagement and ultimately overall business performance. One of their main findings was the necessity for evidence-based policy and planning to be based on solid data and analysis. Through their investigation of the link between PMS and workforce management, the showed that decision-making and strategic alignment can be improved by leveraging data analytics. They also pointed out the need for more studies to be made on the integration of big data and PMS in other organisational contexts. Demartini and Taticchi (2022) further examined how the integrating of real-time data analytics and automation has impacted traditional PMS, and enabled organisations to better align their performance measurement systems with shifting strategic goals. Their study highlights the growing need for data-driven PMS that enable proactive decision making and agility.

Within the context of Eswatini, Dlamini (2020) and Simelane (2021) explored the implementation of PMS in Eswatini's construction and sugar industries, respectively. Dlamini identified the need for technical skills and knowledge within the construction sector to improve organisational efficiency. In the other study, Simelane highlighted the need for data-driven decision-making within the sugar industry to better manage the broad supply chains and improve organisational outcomes. These two studies highlighted the necessity for adaptions that are industry specific and called for further research into how PMS effectiveness can be improved through the integration of advanced analytics and technology. Additionally, Saunila et al. (2024) stresses the importance of digital governance in ensuring that PMS align with an organisation's maturity level, further strengthening strategic alignment. Collectively, these studies reinforce the observation that PMS should be deeply integrated into an organisation's strategic framework to achieve significant performance results.

A common thread in the ongoing research around PMS is the need for aligning individual objectives with the broader organisational goals as this ensures that the work being done by employees contributes towards the overall success of the organisation. This is unsurprising as the central tenet of performance management is to align individual efforts with business objectives (Govender & Bussin, 2020). Another common theme that is emerging from the PMS literature is the emphasis on data-driven decision-making in performance assessments. Demartini and Taticchi (2022), Simelane (2021) and Li et al. (2022) highlighted the importance of utilising data analytics to improve the effectiveness of PMS. This shows a transition in the literature whereby advanced technologies and data analysis tools are being deployed in PMS to try and improve the accuracy and reliability of performance evaluations.

In summary, despite these shared themes, there are also some differences in the findings and conclusions that some of the studies on PMS are coming up with. This shows that even though there may be agreement on the main essence of PMS, there are differences in implementations as each system must meet the specific needs and contexts of different sectors and organisations. Based on the evidence presented, there are still some aspects of PMS that need to be explored in more detail such as the emergent integration of data analytics. Research is needed on how the emergent digital technologies like artificial intelligence and machine learning can be effectively integrated into PMS. Furthermore, research is also needed on how to best implement PMS in

different cultural and organisational contexts and understand the unique challenges and opportunities encountered in these areas.

Additionally, the literature on the foundational principles behind performance management systems and their role in improving strategic alignment and organisational performance is well established. However, the rapid digitalisation of all aspects of businesses has brought a genuine and urgent need for the exploration of this field. As the digital innovation continues to gain momentum, there is a need for performance management systems to adapt and integrate the revolutionary technologies. The outcomes of these studies will contribute towards the development of performance management systems that are more effective, contextually relevant and drive sustained organisational success.

2.3 Digital Transformation

Digital Transformation (DT) is a process that encompasses the incorporation of digital technologies across an entire business processes resulting in a fundamental shift on how the business operates and create value for its stakeholders (Gong & Ribière, 2021). It requires an organisational cultural shift that promotes innovation, experimentation and adaptability as it is more than just the adoption of new technologies but affects the ways of working and organisational structures (Van Veldhoven & Vanthienen, 2022). These transformative changes in the business models and strategies enables companies to maintain a competitive advantage as they navigate the continuously and rapidly changing digital landscape (Hanelt et al.,2021; McCausland, 2021). As companies undergo digital transformation, their performance management systems (PMS) must also be transformed and incorporate real-time data, automation and advanced analytics to improve their accuracy and responsiveness towards enhancing better strategic decision-making (Hanelt et al., 2021).

Digital Transformation has led to a big change on how organisations function and manage their performance, due to the incorporation of digital technologies into business operations (Björkdahl,

2020). Conventional performance management systems relied on fixed performance indicators and scheduled regular performance evaluations. However, the advancement of digital transformation has led to the introduction of real-time data analytics, artificial intelligence, and automation into these systems (Garengo et al., 2022). A lot of research has been carried out on the transformation from conventional to digital systems, with scholars highlighting how organisational agility, decision-making, and strategic alignment have all been improved by the digital transformation (Carvalho et al., 2022; Chouaibi et al., 2022; Konopik et el., 2022; Trischler & Li-Ying, 2022;). However, not all integrations of digital technologies into PMS have been successfully or have yielded all the desired benefits (Kretschmer & Khashabi, 2020; Jedynak et al., 2021), and there remains a gap in understanding how organisations can effectively incorporate digital technologies into PMS without running into major implementation challenges (Chouaibi et al., 2022; Demartini & Taticchi, 2022).

Garengo et al. (2022) highlight the need for PMS to be not left behind in the digital transformation and evolve by integrating the digital technologies to remain relevant. The digital transformation, which is characterised by innovations in automation, artificial intelligence, and the Internet of Things (IoT) (Yaqub & Alsabban, 2023), has transformed traditional PMS and made them to be more data-driven and intelligent systems. These digital technologies improve the accuracy and responsiveness of performance management systems by enabling real-time data collection, predictive analytics and automated reporting (Cosa & Torelli, 2024). Collectively, these digital technologies enable organisations to transition from reactive to proactive and continuous performance management systems.

One of the major benefits of digitalising PMS is the ability to enable data-driven decision-making. By using real-time analytics and artificial intelligence for continuous performance monitoring, organisations can proactively respond to emerging trends and inefficiencies (Matarazzo et al., 2021). Other benefits of digital PMS which have been highlighted by studies include improved transparency and employee accountability and a marked reduction in subjectivity in performance evaluations (Saunila et al., 2024).

While the technological advancements in PMS come with many benefits, they also present numerous challenges. Kraus et al. (2022) study established that there are many organisations which do not have the necessary digital capabilities and infrastructure that is required to effectively integrate Industry 4.0 technologies into their PMS. The need for specialised digital skills was also identified by Carvalho et al. (2022) to be amongst the leading barriers, together with resistance to change, to the successful implementation of digital PMS. Therefore, organisations need to adopt a structured approach to technological adaptation and ensure that their strategic objectives and skills of the workforce align with their digital PMS aspirations.

Despite these well-documented benefits of digital PMS, researchers have not extensively studied the socio-technical challenges of adopting digital PMS (Matsunaga, 2021). The focus of most studies has been on the technological side of digital transformation, with limited examination of the human and organisational factors that are important for successful implementation (Weber et al., 2022). Furthermore, another big challenge, resistance to technological adoptions, is often overlooked (Fähndrich, 2023) in studies on digital PMS. Philip's (2021) study argue that organisations also face challenges with the governance frameworks that are required to effectively integrate digital PMS, leading to poor adoption and the underutilisation of the digital tools.

The importance of digital governance in supporting an integration of Industry 4.0 technologies into PMS is highlighted by Saunila et al. (2024). Their study indicates that well-defined digital governance frameworks assist organisations in implementing advanced technologies for effective performance measurement and management. As the PMS evolve alongside Industry 4.0 advancements, it is important to establish best practices for balancing the technological adaptation with human-centric performance management strategies.

The automation–augmentation paradox presents an additional challenge in the digital transformation of performance management systems (PMS). Raisch & Krakowski (2021) argue that whilst automation boost efficiency and reduces administrative tasks, an overreliance on automated systems may undermine human judgement, creativity and motivation. There is also the current debate about general AI-driven systems on whether they can fully replace human-

centred processes (Einola & Khoreva, 2023). Some believe that AI greatly improves objectivity in performance management while others say this improvement in objectivity comes at the cost of alienating employees and reducing their engagement (Tortorella et al., 2023). This automation–augmentation paradox points out that there is a need for a balanced approach in implementing digital PMS, that integrates the digital tools and still preserve the human discernment in performance evaluations.

The importance of leadership in overcoming these challenges is highlighted in a study by Weber et al. (2022). They assert that transformational leadership is important for creating an organisational culture that embraces digital innovation. Their research further indicates that organisations without a clear strategic vision and strong leadership are more likely to face employee's resistance to change and inefficiencies during digital PMS implementation.

The role of leadership in enabling digital transformation with PMS has not been sufficiently examined. Even though transformational leadership is generally acknowledged as an important element in successful digital transformations (AlNuaimi et al., 2022), there is still a shortage of studies which investigate the specific leadership behaviours that influence the effective implementation of digital performance management systems (Weber et al., 2022). Leadership is important for creating a culture of digital readiness, ensuring that employees are well trained and are actively involved in the transition process (Nani & Safitri, 2021). Nonetheless, there is still lack of research that provides empirical evidence on the long-term benefits of leadership interventions in the implementation of digital PMS.

In summary, the digital transformation of PMS has brought significant improvements such as enhancing efficiency, transparency and strategic alignment within many organisations. However, existing literature on digital PMS has largely focused the technological capabilities, and less on the organisational and human challenges that come with digitalising PMS. The benefits that are obtained from AI, automation, and real-time analytics are highlighted in many studies whilst the challenges like resistance to change, governance structures, and leadership influence, are often ignored.

2.4 Leadership Behaviours

Leadership is the ability to influence and guide individuals or teams toward achieving common goals (Lee et al., 2020; Henderikx & Stoffers, 2022). It is a dynamic process that does not just depend on having or using authority but needs leaders who are able to actively cultivate the culture and performance of their organisation via what they do and allow to happen (McIntosh et al., 2020; Cockerill, 2021). Leadership behaviours are thus the specific actions, attitudes, and characteristics that leaders demonstrate (Spector et al., 2024). These include showing empathy, being adaptable, communicating effectively, and having the ability to inspire and motivate followers (Bonesso et al., 2024). These behaviours are what enable leaders to direct teams, create engagement, and eventually achieve organisational goals (Bakker et al., 2023). The fact that leadership is not a fixed trait, but it develops through regular interactions between leaders and employees, makes the study of leadership behaviours essential for understanding their impact on organisational performance outcomes in the long run.

Leadership behaviours play a crucial role in navigating the complexities of performance management systems (PMS) and digital transformation. Effective leadership can either facilitate or hinder the success of digital initiatives, making it a critical factor in organisational performance (Nani & Safitri, 2021). However, while leadership has been extensively studied, researchers have not treated the specific leadership behaviours that drive successful digital transformation in PMS in much detail. Most studies in the field have focused on broad leadership styles rather than identifying the precise behavioural attributes that contribute to the effective integration of digital tools within PMS (Kraus et al., 2022).

Transformational leadership theory has been widely applied to understand the role of leadership in digital transformation. Transformational leaders, known for their ability to inspire, motivate, and foster innovation among employees, are particularly instrumental in driving digital change (Philip, 2023). They create a vision for digital transformation and encourage a culture of continuous learning and adaptability (Greimel et al., 2023). However, while transformational leadership is often considered beneficial, its effectiveness in digital transformation initiatives is not universally

agreed upon. Weber et al. (2022) and Kraus et al. (2022) argue that while transformational leaders can inspire change, they may also face resistance from employees who struggle with the pace and uncertainty of digital transformation. Moreover, empirical research linking transformational leadership directly to measurable improvements in digital PMS remains limited, highlighting a gap in the literature (Matsunaga, 2023).

Philip (2023) further explores how transformational leadership influences PMS, observing that the leaders who are more effective in implementing these systems successfully are those that inspire innovation, encourage adaptability, and promote employee engagement. The study reveals that the leadership behaviours that are important for the long-term sustainability of PMS, to be those that support collaboration and continuous learning. This was found to be especially true in organisations that are also undergoing digital transformation. Additionally, Matsunaga (2023) points outs that the effectiveness of PMS within organisations is enhanced by leadership styles that promote open communication and knowledge sharing as these reduce resistance to change.

In addition to transformational leadership, contingency leadership theory provides a useful lens for examining the role of leadership behaviours in digital transformation. This theory suggests that no single leadership style is universally effective; rather, leadership effectiveness depends on the fit between leadership behavior, the organisational context, and the technological environment (Weber et al., 2022). Tortorella et al. (2023), who investigated how leadership behaviours influence the effectiveness of PMS in manufacturing contexts, support this perspective, demonstrating that different leadership behaviours moderate the relationship between digital transformation and operational performance in manufacturing settings. Their study shows that task-oriented leadership is particularly effective in environments with high digital integration, as it ensures structured goal setting and accountability.

Another 2023 study by Siraj and Hágen also highlighted the vital role played by task-oriented leadership in the successful implementation of PMS to improve operations productivity and strategic alignment. They had also found that the key to effective adaptation of PMS lies in task-oriented leadership behaviours as they help in getting employees to understand performance

expectations and holding the employees accountable to meeting the expectations. Leaders who actively engage in coaching, goal setting, and providing performance feedback, were found to be creating a culture where PMS became an important part of daily operations. However, this finding may not be generalisable to all industries, as leadership requirements vary based on organisational culture and technological readiness (Henderikx & Stoffers, 2023).

The role of leadership in managing employee responses to digital transformation is another critical yet underexplored area. Research by Weber et al. (2022) indicates that leadership behaviours significantly influence how employees perceive and adapt to change during digital transformation initiatives. Leaders who provide clear communication, psychological safety, and structured support can reduce resistance and foster greater engagement in digital initiatives. Similarly, Matsunaga (2023) argues that uncertainty management is a key function of leadership in digital transformation, as employees often struggle with the ambiguity that comes with technological change. However, most studies have only examined leadership behaviours at the executive level, neglecting the role of middle managers who are often responsible for the day-to-day execution of digital PMS (Henderikx & Stoffers, 2023).

Despite the growing recognition of leadership's role in digital PMS, research remains fragmented regarding the specific behaviours that optimise PMS performance. Philip (2023) suggests that digital transformation requires leaders to adopt a hybrid leadership approach, blending transformational, transactional, and situational leadership behaviours. Leaders must balance strategic vision with operational execution, ensuring that digital PMS are effectively implemented while addressing employee concerns and technological challenges. However, existing research does not provide a clear framework for how leaders should navigate these competing demands, indicating a need for further empirical investigation (AlNuaimi et al., 2022).

In summary, leadership behaviours are fundamental to the successful digital transformation of PMS, yet there is no consensus on which specific behaviours are most effective across different organisational contexts. While transformational leadership is frequently cited as a key driver of digital change, its effectiveness depends on contextual factors such as industry type,

organisational culture, and employee readiness. Contingency leadership theory provides a more nuanced approach, suggesting that leadership behaviours should be tailored to the specific challenges of digital transformation.

While the acknowledgment of the importance of leadership in the effectiveness of PMS continues to grow, the research around this area is still fragmented in terms of identifying the specific leadership behaviours that improve PMS adoption in various industries. Furthermore, research to date has largely focused on leadership at the senior level, overlooking the role of middle management in executing digital PMS. Future research should investigate the relationship between leadership behaviours across different organisational levels and performance management and identify the best behaviours that enable leaders to maximise the benefits of PMS in different organisational contexts. This will provide a more comprehensive understanding of the leadership competencies required for successful digital PMS integration.

2.5 Theoretical framework

The theoretical framework developed for this study integrates Performance Management Systems (PMS), Digital Transformation (DT), and Leadership Behaviours to explain how these elements interrelate and influence each other in driving organisational performance. The foundation of this theoretical framework is built on well-established theoretical lenses of Contingency Leadership Theory and Transformational Leadership for the study construct of performance management systems, digital transformation and leadership behaviours.

Performance management systems are the essential tools and processes used to align organisational activities with strategic objectives, thus enhancing overall organisational performance (Felício et al., 2021). PMS are based on structured frameworks that are used for the alignment of individual and organisational objectives to ensure that goals are consistently achieved in an effective and efficient manner (Garengo et al., 2022). Previous studies have

demonstrated that PMS enable informed decision-making and the optimal allocation and use of resources which leads to improvements in organisational performance.

Building on the role of PMS, digital transformation is defined as a process that encompasses the integration of digital technologies across all organisational processes resulting in a fundamental shift on how the business operates and create value for its stakeholders (Gong & Ribière, 2021). These transformative changes in the business models and strategies enables companies to maintain a competitive advantage as they navigate the continuously and rapidly changing digital landscape (Hanelt et al.,2021; McCausland, 2021). DT enables real-time data analysis, process automation and advanced analytics to improve an organisation's responsiveness towards enhancing better strategic decision-making (Hanelt et al., 2021). Thus, the study proposes that:

H_1: Performance management systems are positively related to digital transformation.

Leadership behaviours play a key part in actively facilitating the adoption of new digital technologies and in so doing helps drive digital transformation. Gong and Ribière (2021) and Van Veldhoven and Vanthienen (2022) highlight the crucial role of leadership in guiding organisations through digital transformations. By actively supporting digital initiatives, leaders foster organisational environments that emphasise innovation and continuous learning, ultimately accelerating digital transformation efforts. Therefore, the study suggests that:

H_2: Leadership behaviors are positively related to digital transformation.

Numerous literature (Cockerill, 2021; Bakker et al., 2023) state that effective leadership is important for aligning the efforts of individuals with the goals of the organisation and ensuring the success of performance management initiatives. This supports the notion that leadership plays an important role in nurturing a continuous improvement culture, which drives the performance management systems effectiveness (Philip, 2021; Spector et al., 2024). Given the significant role of leadership in shaping and sustaining PMS, the study proposes that:

H_3: Leadership behaviors are positively related to performance management systems.

Additionally, leadership behaviours are credited with the ability of moderating the relationship between performance management systems and digital transformation. Effective leadership, especially through transformational and task-oriented behaviours, can either facilitate or hinder the success of digital initiatives within performance management systems (Weber et al., 2022; Philip, 2021), making it a critical factor in organisational performance (Nani & Safitri, 2021). Based on these arguments, this study postulates that:

> **H_4:** Leadership behaviors moderate the relationship between performance management systems and digital transformation, such that the positive relationship is stronger when leadership behaviors are high.

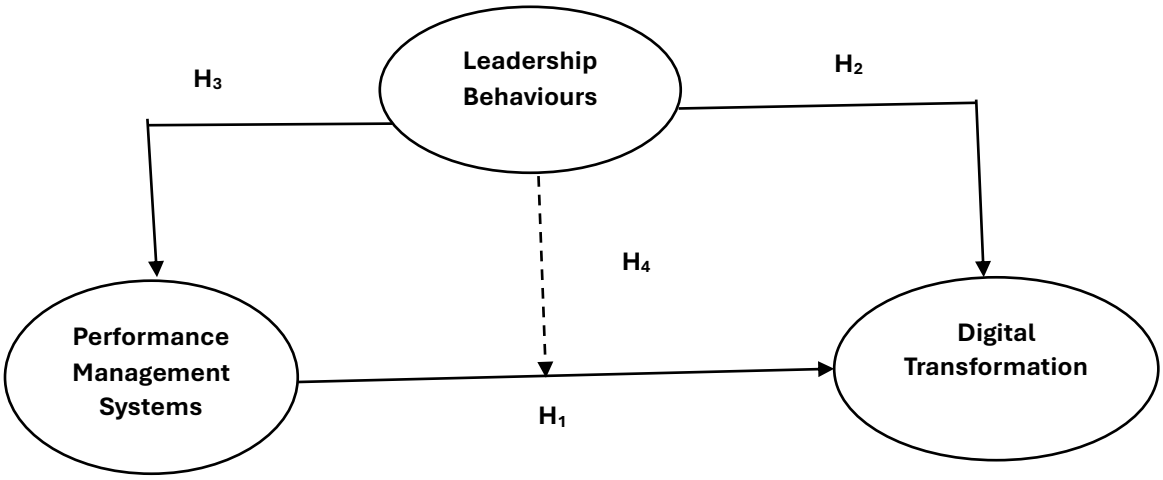

Figure 1. Conceptual Research Model

The theoretical framework developed for this study integrates Performance Management Systems (PMS), Digital Transformation (DT), and Leadership Behaviours. The foundation of this theoretical framework is built on well-established theoretical lenses of performance management systems, digital transformation and leadership behaviours. Figure 1 represents the conceptual framework for the study. In the model, PMS is positioned as an independent variable that is expected to have a direct, positive effect on digital transformation (H_1). Leadership behaviours

are hypothesised to directly improve digital transformation (H_2) and to be positively related to PMS (H_3). Furthermore, leadership behaviours are proposed to moderate the relationship between PMS and digital transformation (H_4), such that the positive impact of PMS on DT is amplified when leadership behaviors are strong. This integrated framework highlights the interplay between technological integration and human factors, offering a comprehensive perspective on how digital innovation can be advanced in the manufacturing sector of Eswatini.

Chapter 3: Research question

3.1 Main research question

The literature review shows how important performance management systems, digital transformation and leadership behaviours are in influencing organisational performance (Hanelt et al., 2021; Garengo et al., 2022; Bakker et al., 2023; Faozen & Sandy 2024; Norrman & Näslund, 2025). Valuable insights about the technical and functional aspects of performance management systems and digital transformation are extensively covered in existing literature (Hanelt et al., 2021; Demartini & Taticchi, 2022), however the role of leadership behaviours in effectively integrating digital technologies within performance management systems has not been thoroughly examined (Matsunaga, 2021; Philip, 2021).

This research intends to fill this gap through investigating the relationship between these elements, particularly how leadership behaviours influence the connection between performance management systems and digital transformation in Eswatini's manufacturing industry. The selection of Eswatini as a research site, as discussed in Chapter 1, offers an alternate setting due to it different economic and industrial context for exploring how performance management systems, digital transformation, and leadership behaviours come together in the manufacturing sector. The primary research question guiding this study is thus:

How do leadership behaviours influence the relationship between performance management systems and digital transformation in the manufacturing sector of Eswatini?

This research question addresses an important gap in the knowledge of the behavioural and socio-technical influences of digitalisation in management control systems (AlNuaimi et al., 2022; Weber et al., 2022). As the dependence of organisations on digital technologies to drive

performance increases, the need for effective leadership to manage the difficulties of integrating these technologies into the traditional performance management systems also gets more pronounced (Fähndrich, 2023; Siraj & Hágen, 2023). In answering this research question, the study intends to develop a framework that explains the complex interactions between technology, management control and leadership in the digital era. In addition to contributing to the theoretical understandings of these relationships, the framework will also offer practical guidelines for organisations that are seeking to enhance their digital transformation through effective leadership.

3.2 Sub-research questions and hypotheses

The principal research question was broken down into these four sub-research questions which the study was structured around:

1. What is the relationship between performance management systems and digital transformation in manufacturing organisations?
2. How do leadership behaviours influence digital transformation in manufacturing organisations?
3. How do leadership behaviours influence the implementation and effectiveness of performance management systems?
4. How do leadership behaviours moderate the relationship between performance management systems and digital transformation?

These sub-research questions align with the study's theoretical framework and lead to the formulation of the following four hypotheses:

H1: Performance management systems are positively related to digital transformation.

H2: Leadership behaviours are positively related to digital transformation.

H3: Leadership behaviours are positively related to performance management systems.

H4: Leadership behaviours moderate the relationship between performance management systems and digital transformation, such that the positive relationship is stronger when leadership behaviours are high

These research questions and hypotheses form the foundation of the study as they are closely tied to the study's theoretical framework. This study carries out an empirical investigation of the socio-technical dynamics of digital transformation, with a particular focus on how leadership behaviours impact the effectiveness of performance management systems in the digital era. An exploration of the methodological decisions that were made to carry out the study, in trying to answer the research question, is carried out in the following chapter.

Chapter 4: Research design and methodology

4.1 Research paradigm

The research paradigm, which is “the system of beliefs and assumptions about the development and nature of knowledge” (Saunders & Lewis, 2018, p. 107), that was applied to the study in the positivism research philosophy. According to Saunders & Lewis (2018), positivism is based on the foundation that knowledge is derived from objective observations and measurable phenomena. This makes it to be a suitable philosophy for this research as the study uses existing theories and employs a deductive approach to hypothesis testing, using a highly structured methodology to obtain quantifiable data that leads to statistical analysis. Through this positivist lens, the study will contribute to existing theoretical frameworks through validating hypotheses with empirical evidence, ultimately enhancing the understanding of leadership’s role in digital transformation within Eswatini’s manufacturing sector.

This chapter presents the research design and method which was used to investigate how leadership behaviours impact the relationship between performance management systems and digital transformation in Eswatini's manufacturing sector. The study used a research methodology and design approach that has been recently used in other studies (Matsunaga, 2021; Porfírio et al., 2021; Carvalho et al., 2022; Alharbi et al., 2023; Na et al., 2024; Ongena et al., 2024) of a similar nature to get answers to research questions. A quantitative and descriptive research design was used in the study, and it also adopted a cross-sectional approach to gather numerical data through a self-administered online Likert-scale survey. This research methodology was selected to study the connections between the three constructs of performance management systems, digital transformation, and leadership behaviours as outlined in the theoretical framework.

The chapter also covers the measurement tool and sampling techniques used to collect data from the target population. The sampling was conducted primarily using a purposive sampling technique which was subsequently supplemented by snowball and volunteer sampling methods

to expand the sample. The sample eventually comprised of 126 evaluable respondents (n = 126). The chapter also outlines the data collection and analysis procedures which include descriptive statistics, correlations and multiple regression analysis, and the measures that ensured construct reliability and validity, under quality control. Moreover, data security protocols and ethical considerations were instituted to protect the confidentiality of the participants and to uphold the research process' integrity. These research methodological elements jointly provided a strong framework for empirically testing the study's hypotheses and gives practical insights to organisations that are working towards aligning their leadership behaviours towards improved organisational outcomes.

4.2 Research design

The research was carried out using a quantitative study method under a descriptive research design. This method was selected to assist with creating a broader understanding of the relationship between performance management systems, digital transformation, and leadership behaviours. A better understanding of these interrelated concepts would assist with creating a framework that would improve organisational performance (Nani & Safitri, 2021; Alharbi et al., 2023). The collected data enabled an empirical analysis of the relations between performance management systems, digital transformation, and leadership behaviours. This gave dependable evidence to back the research hypotheses.

A survey strategy was chosen as the main data collection method. Surveys allow for data collection from many participants in a short period of time. Similar studies (Nani & Safitri, 2021; Alharbi et al., 2023) have also used the same research strategy. Surveys are well suited for descriptive studies as they are a useful tool for asking simple questions which enable researchers to gather the perceptions and attitudes of the participants (Quinlan et al., 2024).

A cross-sectional time horizon was utilised for the study and enabled data collection from a single point in time that captured a broad range of perspectives and insights from participants across different organisations and management levels. This, coupled with a decent sample size (n =

126), enhances the generalisability of findings (Quinlan et al., 2024). This approach was deemed to be adequate in getting information that would answer the research questions.

4.3 Population and sample

4.3.1 Population

The study's population comprises of managers in manufacturing organisations that have implemented a digital performance management system in Eswatini. Managers were selected as a respondent category because they can assess an organisation's performance, digital performance management systems and the leadership characteristics on display within a firm. Targeting respondents who are managers in manufacturing companies in Eswatini only, helped with preventing effect of various socio-economic settings (Hargitai & Bencsik, 2023). However, on the downside it may reduce generalisability of the results to other industries or geographies. Having the target population as only the managers of firms in the manufacturing sector in Eswatini also helped to contextualise and narrow the research focus into a manageable project. The population included frontline, middle, and senior managers as they were all able to assist with information that enabled the study to meet its objectives whilst offering perspectives from different management levels (Bjorkdahl, 2020) in organisations. The use of respondents from a variety of manufacturing firms also allows for inter-organisational triangulation.

4.3.2 Unit of analysis

The unit of analysis at the micro level was the individual manager in the manufacturing firms in Eswatini. The managers in question were frontline, middle, senior, and executive managers who collectively represent the leadership of manufacturing organisations. The data collected from the individual managers was used to carry out the analysis at the meso level. This made it possible to get insights into behaviours and practices at organisational level, which is where the effectiveness of digital performance management systems is measured.

4.3.3 Sampling method and size

For primary data collection, the non-probability sampling technique was used for sampling the target population of managers in manufacturing firms in Eswatini since there is no complete list of the population, hence no sampling frame (Saunders & Lewis, 2018). Based on the researcher's access to manufacturing firms in Eswatini, the purposive sampling technique was deployed. The initial sample was sourced from the researcher's professional network, with snowball sampling utilised to expand the sample. The sample size was 126 respondents, and this sample size is deemed by many statisticians to be sufficient in a bid to obtain statistically meaningful results (Lakens, 2022). Some studies (Porfírio et al., 2021; Yamin & Murwaningsari, 2023; Na et al., 2024) of the same nature have used comparable numbers of participants and obtained statistically acceptable results.

4.4 Measurement instrument

A survey questionnaire was developed using existing literature as shown in Appendix A. The questionnaire was used for an online survey to collect data on the relationship between performance management systems, digital transformation and leadership behaviours. The questions and statements that were used in the survey were adopted form established theories and literature in the areas of performance management systems, digital transformation and leadership behaviours. These came from adapting survey instruments that were used in previous studies (Abernethy et al., 2010; Speklé et al., 2017; Nani & Safitri, 2021; Taherdoost, 2022). The survey questionnaire was divided into five categories which were labelled Section A to Section E. Each section was targeting specific information which was going to help test the hypotheses of the study. The first section covered the demographics of the sample, which were the managers working with the manufacturing sector in Eswatini.

The second to the fifth sections used a common Likert scale of 1 to 5 to maintain consistency and make it easier for respondents to answer. On the Likert scale, 1 meant strongly disagree and 5 meant strongly agree. The first theme to be covered was leadership behaviours and performance management systems, with the focus on how leadership behaviours influence the implementation

and effectiveness of PMS. Grounded in transformational leadership theory, particularly the dimensions of clear communication, goal setting, and continuous improvement (Kasemaa & Suviste, 2020), this section assessed whether leaders are effectively guiding and supporting the use of PMS in their organisations.

The third section, leadership behaviours and digital transformation, examines the relationship between leadership behaviours and digital transformation. This section investigates how leadership traits such as adaptability and managing resistance contribute to digital transformation projects. The theory for the third section was from studies by Vial (2021) and Kraus et al. (2022).

The fourth section was focused on the relationship between performance management systems and digital transformation. It is based on the premise that effective performance management systems can support and enhance digital transformation efforts, as discussed by Kraus et al. (2022). The statements that are used aim to gauge whether performance management systems facilitate digital technologies' integration into operations and impact the overall success of digital transformation within organisations.

Finally, the fifth section, Leadership behaviours impacting digital PMS, investigates specific leadership behaviours that impact the effectiveness of digital performance management systems. This section focuses on leadership behaviours such as communication, adaptability, collaboration, innovation, and accountability, which are essential for the successful implementation and ongoing effectiveness of digital performance management systems (Weber et al., 2022; Giovanni et al., 2024).

4.5 Data collection

Adopting an online survey approach over the personal and telephone approaches assisted in eliminating data capturing errors as the online survey automates the data collating process and

saves a lot of time. This method also eliminated interviewer bias, as it gave respondents more time to consider their responses and assures the anonymity of each respondent. The collective effect of this method is that more honest responses are likely to have been received (Quinlan et al., 2024).

Upon acquiring ethical clearance, the data gathering process commenced with the pilot testing of the survey questionnaire with 10 respondents to ensure clarity, relevance, and the elimination of ambiguous questions. Using the feedback from the pilot, minor adjustments were made to two out of the thirty questions as they were deemed by more than one responded to be unclear and had ambiguous words. The survey was subsequently distributed via email, LinkedIn and Whatsapp, to the intended sample group and was open for two months with follow-up messages sent to encourage participation whilst also monitoring the response rates on a weekly basis. The data was collected using Google Forms which allows for automated data collation and reduces the likelihood of data entry errors.

4.6 Data analysis and interpretation

The online survey in Google Forms was closed to stop accepting responses after which the data for all the responses was downloaded into a Microsoft Excel sheet. Once extracted into the Excel spreadsheet, the data was first cleaned and enriched by grouping some of the responses under the first section covering the demographics of the respondents. Some of the questions in this section had the option of “other” where respondents were able to capture specific information that was not listed in the given choices. These “other” responses had to be first categorised into the pre-existing sections. An example of this was the question which asked the respondents the level of management which they were in, and many had used the “other” option and commented that they were supervisors, team leaders, or foremen. These are all first line managers, and the responses were rightfully changed into the predefined first line management category.

As part of the data preparation process, all the data that was not numeric was converted into numeric data through coding as the IBM SPSS statistical program that was used works with numerical data. The conversions were captured in a coding book (Appendix B) that was referred

to throughout the analysis stage to ensure that the correct codes were used throughout the process (Wegner, 2010).

The first analyses to be carried out using the IBM SPSS statistical software were the validity and reliability test of the data to ensure that the data represented what it was meant to measure and in a consistent manner. Once the data passed the validity and reliability tests, descriptive analyses were then performed on the demographical type data. Inferential statistics, in the form of correlations and regression analyses, were performed for the four dimensions or construct groupings to test the hypotheses of the study by examining relationships between variables.

4.7 Validity and reliability

Ensuring the robustness and rigor of this study involved implementing key quality control measures such as validity and reliability checks. According to Mohajan (2017) “validity refers to whether a study measures or examines what it claims to measure or examine”. Construct validity is influenced by all the research methodology choices made whilst designing the research, including the underlying theoretical constructs that inform the choice of a specific design and method. Internal validity is established when the study demonstrates a causal relationship between variables, and it is difficult to prove causality without conducting a longitudinal study. External validity is concerned with whether a study’s research findings can be generalised to other relevant groups or settings (Sürücü & Maslakci, 2020). To safeguard validity, the survey first underwent pilot testing to check that the survey items coved all aspects of the constructs being studied. The responses from the pilot were affirmative in terms of construct validity. For statistically testing internal validity of the different constructs, the IBM SPSS statistical software was used.

Reliability refers to the consistency of the survey results when the instrument is administered iteratively (Mohajan, 2017). Reliability is affected by the researcher bias and error, and the participant bias and error (Sürücü & Maslakci, 2020). For each of the four dimension or construct groupings, the Cronbach Alpha method of establishing reliability was used to assess the survey’s items internal consistency. A Cronbach's Alpha value that is above 0.65 (Vaske et. al, 2017;

Sürücü & Maslakci, 2020) is generally accepted as good, as it means that reliability has been established.

4.8 Ethical considerations

The University of Pretoria granted ethical clearance for the study to proceed. The researcher commits to upholding ethical standards and maintaining the confidentiality of the respondent that participated in the study. Informed consent was obtained for the survey participants, and they were informed that participating in the survey was voluntary. The respondents were also informed that they had the power and permission to stop participating in the survey at any time without being prejudiced. Since the survey instrument was administered via an offsite online link and strictly anonymous, no one in the firms from which respondents were drawn would have been able to monitor response rates or access the data. An informed consent statement, which was part of the survey questionnaire (Appendix A), details the measures which were taken to ensure confidentiality, reassuring respondents that their individual answers would remain anonymous and that only aggregated data would be reported.

These measures were put in place to ensure that the privacy of those that chose to participate is the study was safeguarded. This helps the research to maintain its integrity. To safeguard the data that was collected form the survey respondents, it will be securely kept in electronic format to prevent unlawful access to it. In line with institutional and research standards for data preservation, the information will be retained for about ten years. After this time, it will be securely deleted. These data handling and security protocols were implemented to ensure confidentiality and to protect the information of participants throughout the research process.

4.9 Limitations

The are three highlighted limitations of the study based on the selected research design and method. The first limitation comes from the adaptation and customisation of the survey questionnaire which brought about potential validity and reliability restraints, even though

statistical validity and reliability test were performed with the results confirming both statistical reliability and validity.

The second potential issue comes from having restricted the scope of the study to one geographic location and industry, which is the manufacturing sector of Eswatini. This can limit the generalisability and transferability of the research results as the results may not be fully applicable in other areas and industries.

Finally, resource restrictions such as the limited number of respondents (n = 126) and the use of cross-sectional time horizon to collect data from a single point in time, may also limit the depth and scope of the study (Taherdoost, 2022). The use of a cross-sectional time horizon also makes it difficult to prove causality, which is better established with a longitudinal study.

Chapter 5: Results

5.1 Introduction

The purpose of the research was to investigate the relationship between performance management systems (PMS), digital transformation (DT), and leadership behaviours (LB) in the manufacturing sector of Eswatini. This was carried out through a quantitative, descriptive research design and adopted a cross-sectional approach to gather numerical data through a self-administered online Likert-scale survey. The results of the study are presented in this chapter through a comprehensive analysis. The findings are presented according to the research objectives and hypothesis.

The chapter begins with the sample description which covers the demographics of the respondents and is followed by the descriptive statistics of the constructs to get an understanding of the attributes that are exhibited by the sample. The key quality control measures of validity and reliability checks are subsequently performed to confirm that the measurement constructs are statistically acceptable and appropriate for hypotheses testing. The hypotheses are then tested using correlation and regression analyses to determine the strength and direction of the relationships among the variables. Finally, a summary of the results and key findings is presented for discussion in the following chapter.

5.2 Sample description

The sample had 126 usable respondents (n = 126). All the questions were mandatory, which means that the 126 respondents are those that managed to complete all the questions during the survey. Table 1 shows the breakdown of the characteristics of the respondents based on the management level which they occupy, department in which they work within manufacturing operations, number of years in current work position, and the number of years that they have been working within the manufacturing industry.

About 45% of the managers who took part in the survey were middle managers and 38% were frontline managers. This shows a strong presence of managers who occupy operational positions, and this are the managers who are responsible for implementing performance management systems and digital transformation programs.

Table 1. Characteristics of the sample

Variable	Segments	Number of Respondents	Distribution of Respondents
Management Level	Frontline	48	38 %
	Middle	57	45 %
	Senior	15	12 %
	Executive	6	5 %
	Total	126	100 %
Department within Manufacturing Operations	Production	52	41 %
	Maintenance & Engineering	37	29 %
	Quality Control	18	14 %
	Supply Chain & Logistics	8	6 %
	Projects	7	6 %
	Strategy & Operational Excellence	4	3 %
	Total	126	100 %
Years in current position	Less than a year	18	14 %
	1 to 3 years	39	31 %
	4 - 6 years	24	19 %
	7 - 10 years	28	22 %
	More than 10 years	17	13 %
	Total	126	100 %
Years in Manufacturing	Less than 3 years	10	8 %
	3 - 5 years	10	8 %
	6 - 10 years	34	27 %
	11 - 15 years	28	22 %
	More than 15 years	44	35 %
	Total	126	100 %

In terms of functional departments within manufacturing, most respondents were from production (41%), followed by engineering and maintenance (29%), whilst quality control (14%), supply chain and logistics (6%), projects (6%), and strategy and operational excellence (3%) mad up the

balance. This sample distribution roughly mirrors the employees' distribution within manufacturing operations as the bulk of the employees and managers work in the production and maintenance departments, with fewer people in the support functions. The variation in the departmental representation provides a broad perspective of how performance management systems and digital transformation are applied across the different functional areas in manufacturing.

The classification of the managers by tenure in current roles shows that 31% of respondents had been in their positions for 1 to 3 years, while 22% had been in their roles for 7 to 10 years. Those with 4 to 6 years of experience made up 19%, whilst 14% had been in their roles for less than a year and those with over 10 years in their current positions represented 13% of the manufacturing managers that were sampled. The managers were also classified according to their overall work experience in the manufacturing industry. About 35% of them has been working in manufacturing for over 15 years, while 27% had between 6 to 10 years of work experience in manufacturing. About 22% of the manufacturing managers had between 11 to 15 years of experience, 8% had 3 to 5 years, and the remaining 8% had less than 3 years of manufacturing work experience. The spread in work experience provided a balanced viewpoint as insights were obtained across the manufacturing work experience levels.

In summary, the diversity of the sample is terms of the management levels, departments, tenure in their current roles, and years of experience in manufacturing, produced a solid foundation for analysing relationships between performance management systems, digital transformation, and leadership behaviours in Eswatini's manufacturing sector. This diversity allowed the sample to be taken as an appropriate representative of the diverse nature of managers within the manufacturing sector.

5.3 Descriptive statistics of constructs

The five-point Likert scale is considered an interval scale with the mean being very significant, as it serves as the measure of the central tendency for the dataset. Table 2 below shows the coding

and intervals of the five-point Likert scale. For each question, the mean of the responses lies in one of the intervals and indicates the majority of where the responses lie per question. This information is used to describe the average response per question in the survey. For example, if the mean lies between 1,00 and 1,80, it means that the majority of the respondents strongly disagree with that statement and if the mean lies between 4,20 and 5,00, it means the majority strongly agree.

Table 2. Five-point Likert scale intervals

Level	Scale	Interval Length	Lower Limit	Upper Limit	Interval
Strongly Disagree	1	0,80	1,00	1,80	1,00 - 1,80
Disagree	2	0,80	1,80	2,60	1,80 - 2,60
Neutral	3	0,80	2,60	3,40	2,60 - 3,40
Agree	4	0,80	3,40	4,20	3,40 - 4,20
Strongly Agree	5	0,80	4,20	5,00	4,20 - 5,00

Table 3. Descriptive statistics of leadership behaviours and performance management systems construct group

Dimension (Construct Group)	Question	N	Minimum	Maximum	Mean	Std. Deviation
Leadership behaviours and performance management systems	Q11 - Leadership influences on PMS implementation	126	1	5	4,17	0,85
	Q12 -Leaders set clear PMS goals	126	1	5	3,75	0,96
	Q13 - Leaders support for PMS optimisation	126	1	5	3,68	0,97
	Q14 - Leaders committed to PMS continuous improvement	126	1	5	3,79	0,97
	Q15 - Leaders communicate PMS importance	126	1	5	3,69	0,94

Questions 1 to 10 covered the demographic details and Questions 11 to 30 covered the different dimensions of the study. For the first dimension of leadership behaviours and performance

management systems, shown in Table 3, the respondents generally agreed that leadership influences PMS implementation (M = 4.17). The responses were the lowest for leaders effectively communicating the importance of using performance management system for achieving organisational goals (M = 3.69).

For the second dimension of leadership behaviours and digital transformation, shown in Table 4, most respondents agreed that leadership behaviours are crucial for DT (M = 4.25) whilst leaders managing resistance to change had the lowest mean (M = 3.33).

Table 4. Descriptive statistics of leadership behaviours and digital transformation construct group

Dimension (Construct Group)	Question	N	Minimum	Maximum	Mean	Std. Deviation
Leadership behaviours and digital transformation	Q16 - Leaders support DT initiatives	126	2	5	3,83	0,89
	Q17 - Leaders facilitate DT adoption	126	2	5	3,78	0,95
	Q18 - Leaders willingness to adapt to digital tools	126	2	5	3,72	0,93
	Q19 - Leaders manage resistance to DT change	126	1	5	3,33	1088,00
	Q20 - Leadership behaviours crucial for DT	126	1	5	4,25	0,86

Table 5 shows the relationship between performance management systems and digital transformation dimension whereby improved performance management through DT contributes to successful digital transformation outcomes (M = 4.08) had the highest mean. The statement about updates to performance management system occurring frequently, in response to changes and advancements in digital transformation strategies scored the lowest mean (M = 3.27).

Table 5. Descriptive statistics of Performance management systems and digital transformation

Dimension (Construct Group)	Question	N	Minimum	Maximum	Mean	Std. Deviation
Performance management systems and digital transformation	Q21 - PMS facilitates DT implementation	126	1	5	3,54	0,95
	Q22 - DT metrics within PMS align with DT goals	126	1	5	3,40	0,85
	Q23 - PMS supports DT integration into Ops	126	2	5	3,57	0,89
	Q24 - Improved PM thru DT leads to success	126	1	5	4,08	0,80
	Q25 - PMS updated in response to DT	126	1	5	3,27	1039,00

Table 6. Descriptive statistics of Leadership behaviours & digital Performance management systems

Dimension (Construct Group)	Question	N	Minimum	Maximum	Mean	Std. Deviation
Leadership behaviours & digital Performance management systems	Q26 - Leaders communicate DT vision and goals	126	1	5	3,50	1018,00
	Q27 - Leaders adaptable to DT into PMS	126	1	5	3,53	0,99
	Q28 - Leaders encourage collaboration in DT PMS	126	2	5	3,62	1003,00
	Q29 - Leaders innovative for adopting DT PMS	126	1	5	3,60	0,97
	Q30 - Leaders accountable for use of DT PMS	126	1	5	3,38	1080,00

For the last dimension of leadership behaviours impacting digital performance management systems (Table 6), leaders' role in encouraging collaboration (M = 3.62) is relatively strong whilst leaders' accountability for the use of digital PMS (M = 3.38) had the lowest mean. These insights from the descriptive analysis of the collected data enable a comprehension of the attributes that are exhibited by the sample.

5.4 Validity testing of constructs

One of the key quality measures implemented in the study was the testing of the measuring instrument for validity. The validity test determines if the measuring instrument, which was a survey questionnaire in this study, measures the behaviour or quality which it is meant to measure, and how well it performs its intended job. The validity tests, which were done at construct level, measured the degree of validity of each of the four dimensions or construct groupings of the survey questionnaire. The IBM SPSS statistical software was used to confirm the construct validity with the bivariate correlation function using the Pearson correlation coefficient.

The data was first tested to check if it meets the assumptions for Pearson correlation before running the correlation test. These verifications were achieved through scatterplots for linear relationship assumption test, Shapiro-Wilk for normal distribution testing and box plot for the outlier's assumption test as shown in Figures 2 to 7. Once the assumptions were tested and verified the Pearson correlations were then calculated.

The Item Total Score (EET) was first determined by summing up the values of the responses per question for all the five questions within each construct grouping. A bivariate correlation was then run between the EET and each question with the result used to determine the validity of each question within the construct. The results of the validity testing are shown in Table 7 whereby the Pearson correlation coefficient (r) indicates the strength and direction of the relationship between the EET and each question, with higher absolutes value of the correlation coefficient indicating stronger relationships. The Significance level (p-value) indicates the statistical significance of the correlation between the variables and where it is less than 0.05, which was the chosen

significance level, the correlation was considered statistically significant, which suggests evidence of construct validity.

Table 7. Pearson correlation for construct validity testing

Dimension (Construct Group)	Question	Item Total Score (EET) (r)	Sig, (2 tailed)
Leadership behaviours and performance management systems	Q11 - Leadership influences on PMS implementation	0,699**	< 0,001
	Q12 -Leaders set clear PMS goals	0,845**	< 0,001
	Q13 - Leaders support for PMS optimisation	0,845**	< 0,001
	Q14 - Leaders committed to PMS continuous improvement	0,830**	< 0,001
	Q15 - Leaders communicate PMS importance	0,849**	< 0,001
Leadership behaviours and digital transformation	Q16 - Leaders support DT initiatives	0,795**	< 0,001
	Q17 - Leaders facilitate DT adoption	0,891**	< 0,001
	Q18 – Leaders' willingness to adapt to digital tools	0,860**	< 0,001
	Q19 - Leaders manage resistance to DT change	0,795**	< 0,001
	Q20 - Leadership behaviours crucial for DT	0,607**	< 0,001
Performance management systems and digital transformation	Q21 - PMS facilitates DT implementation	0,875**	< 0,001
	Q22 - DT metrics within PMS align with DT goals	0,867**	< 0,001
	Q23 - PMS supports DT integration into Ops	0,884**	< 0,001
	Q24 - Improved PM thru DT leads to success	0,621**	< 0,001
	Q25 - PMS updated in response to DT	0,828**	< 0,001
Leadership behaviours & digital Performance management systems	Q26 - Leaders communicate DT vision and goals	0,811**	< 0,001
	Q27 - Leaders adaptable to DT into PMS	0,833**	< 0,001
	Q28 - Leaders encourage collaboration in DT PMS	0,896**	< 0,001
	Q29 - Leaders innovative for adopting DT PMS	0,868**	< 0,001
	Q30 - Leaders accountable for use of DT PMS	0,860**	< 0,001

**Correlation is significant at the 0.01 level (2-tailed).

From Table 7, it can be seen that all the questions have a statistically linear relationship with the Item Total Score (EET) ($r > 0.5$, $p < 0.05$), with the relationship being positive and the strength or magnitude of the association ranging from strong (interval coefficient 0,6 – 0,799) to very strong

(interval coefficient 0,80 – 1,00). It can thus be concluded that, based on the Pearson correlation analysis, all constructs demonstrated statistically significant and strong positive correlations ($r > 0.6$, $p < 0.05$), indicating that the measured variables are valid representations of their respective constructs.

5.5 Reliability testing

Another key quality measure that was implemented in the study was the testing of the reliability of the measuring instrument, which was carried out after establishing construct validity. Reliability measures the measuring instrument's capability to reproduce consistent findings if repeated under similar conditions. The reliability tests, which were also done at construct level, measured the reliability of each of the four dimensions or construct groupings of the survey questionnaire.

The Reliability Analysis function in IBM SPSS statistical software was used to confirm the instrument's reliability using the Cronbach's Alpha method of establishing reliability. Cronbach Alpha measures the internal consistency between items on a scale and is usually used to determine if a scale, such as multiple Likert questions in a questionnaire, is reliable. Table 8 shows the summary (from Appendix D) of the reliability analysis performed for the construct groupings.

Table 8. Reliability Statistics

Dimension (Construct Group)	Cronbach's Alpha	Number of Items
Leadership behaviours and performance management systems	0,874	5
Leadership behaviours and digital transformation	0,849	5
Performance management systems and digital transformation	0,875	5
Leadership behaviours & digital Performance management systems	0,929	5

From Table 8, the Cronbach's alpha for all the dimensions is above 0.65, which is the generally which indicates a high level of internal consistency for the scale within the study as a Cronbach's Alpha value that is above 0.65 generally accepted as good. This means that the instrument reliability has been established

5.6 Hypotheses testing

5.6.1 Assumptions testing

Before testing the four hypotheses of the study, the variables were first analysed to establish their nature in terms of normality, linearity, outliers and homoscedasticity. The Shapiro-Wilk test for normality was used to confirm if the data followed a normal distribution whilst the scatter plot was used to visually assess whether the relationship between variables were linear. Boxplots were used to identify if there were any outliers or extreme values in the data sets that would distort the results. Lastly, a scatter plot of difference between predicted and actual values was used to check if the variance of the errors remained constant across all levels of the independent variables, in determining homoscedasticity. All the tests were performed using IBM SPSS statistical software.

The results of the assumptions test were then used to determine which inferential statistical methods could be used for testing the hypotheses. The methods which were under consideration included the Pearson correlation which is commonly used for testing direct relationships, linear regression for predicting dependent variables, and moderation analysis, such as hierarchical regression or PROCESS macro, which were considered for examining the moderating effect of leadership behaviours in H4.

Figures 2 to 4 show the scatter plots that were used to assess the linearity of the relationships between variables and Table 9 shows a summary of the results of the linearity assumptions tests. The results show that the assumption of linearity was met for Pearson correlation and regression analysis in all cases.

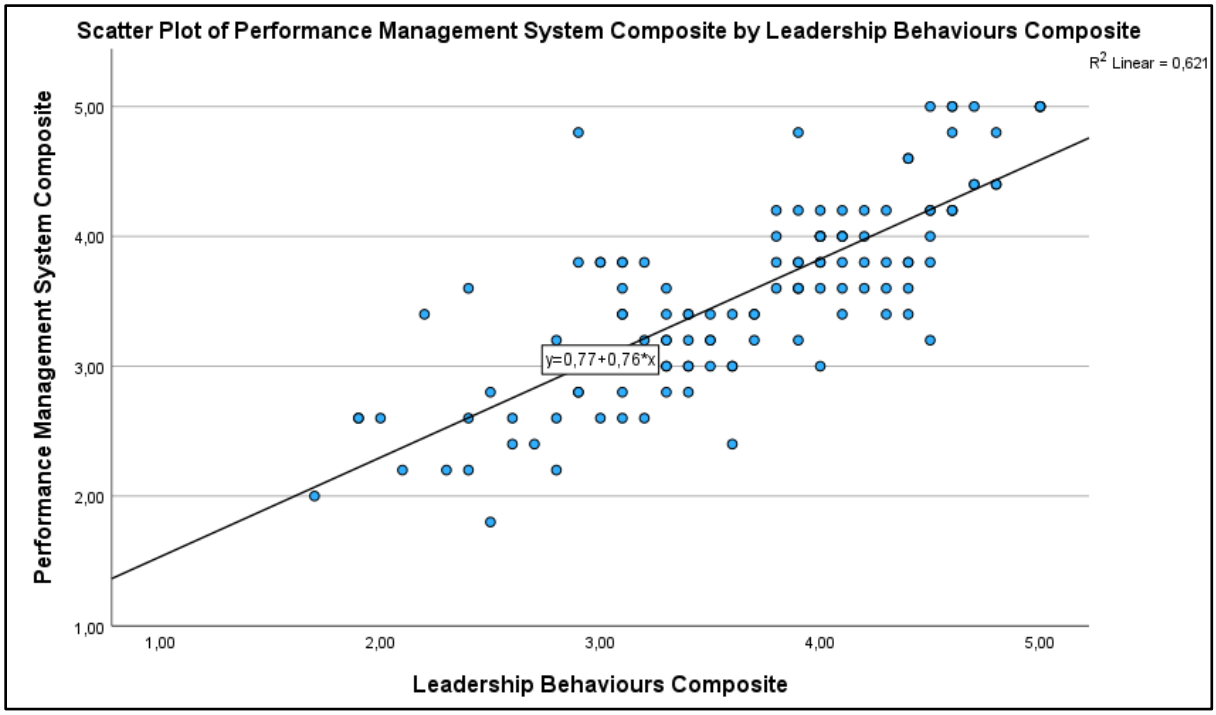

Figure 2. Scatter plot for Performance Management Systems vs Leadership Behaviours

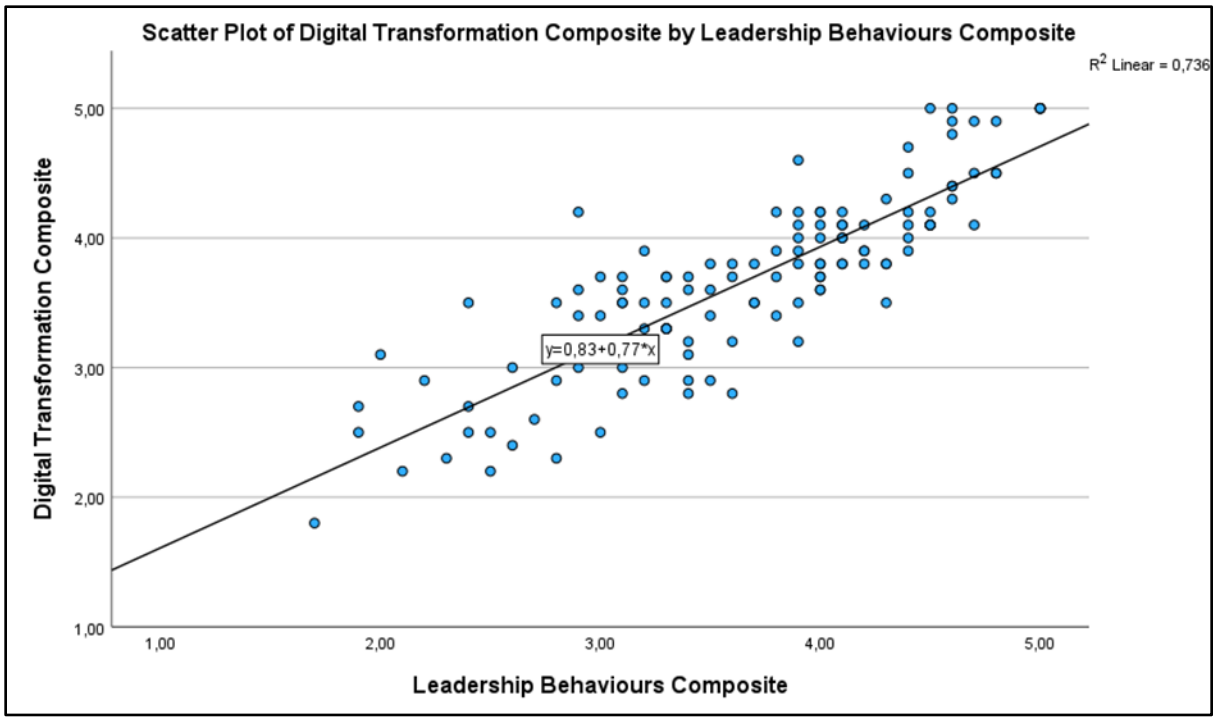

Figure 3. Scatter plot for Digital Transformation vs Leadership Behaviours

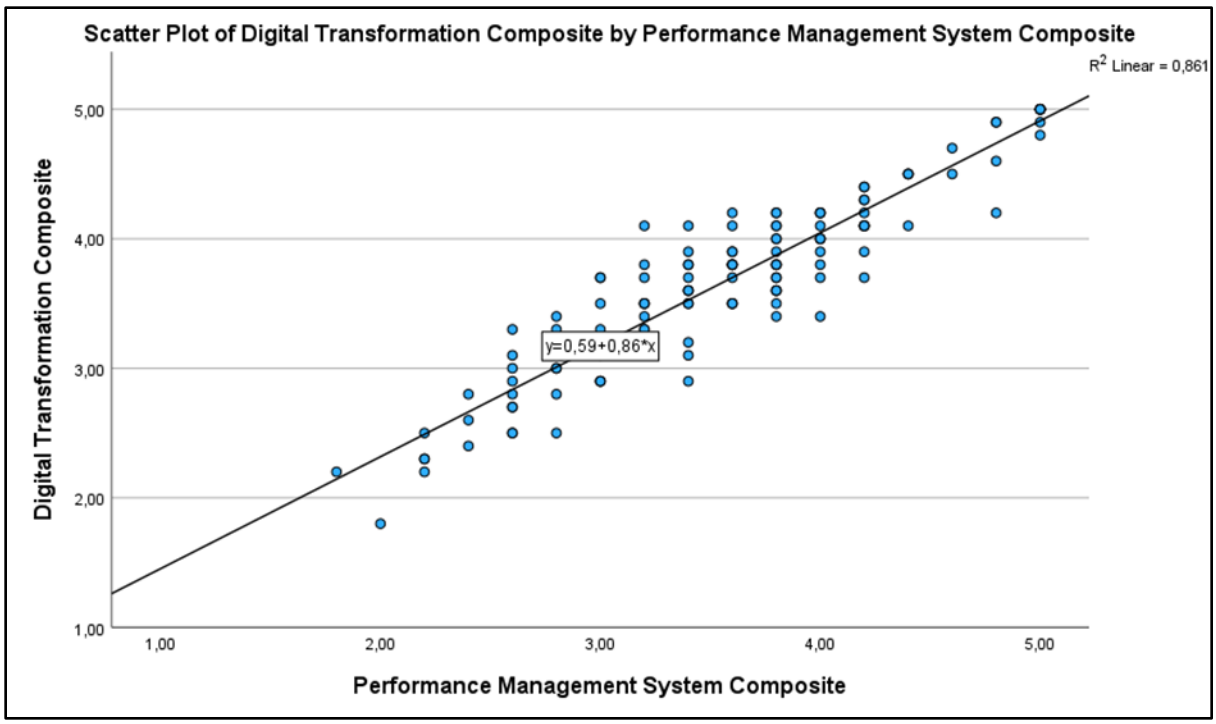

Figure 4. Scatter plot for Digital Transformation vs Performance Management Systems

Table 9: Summary of linearity test results

Independent Variable	Dependent Variable	Test Method Used	R^2 Value	Scatter Plot Visual Observation	Linearity Conclusion
Performance Management Systems	Digital Transformation	Scatter Plot & Regression	0,621	Points form a linear pattern	Linear relationship confirmed
Leadership Behaviours	Digital Transformation	Scatter Plot & Regression	0,736	Points form a linear pattern	Linear relationship confirmed
Leadership Behaviours	Performance Management Systems	Scatter Plot & Regression	0,861	Points form a linear pattern	Linear relationship confirmed

Box plots were used to test for outliers in the three composite variables of Leadership Behaviours Composite, Performance Management System Composite and Digital Transformation Composite as shown in Figures 5 to 7. Table 10 shows a summary of the outlier tests which shows that only the Digital Transformation Composite variable contained an outlier. There was one “mild” or “typical” outlier that was identified in data point 72, with all other data points falling within their expected range. Upon further investigation of data point 72, it was established that responded 72 generally scored most questions on the lower side of either 1 for strongly disagree or 2 for disagree in the survey questionnaire. A decision was made to maintain respond 72’s responses in the analyses as it represents a genuine variation within the population being studied, and not a data error. The impact of the outlier was mild considering the sample size is large (n = 126) and removing the outlier would have introduced bias into the analysis.

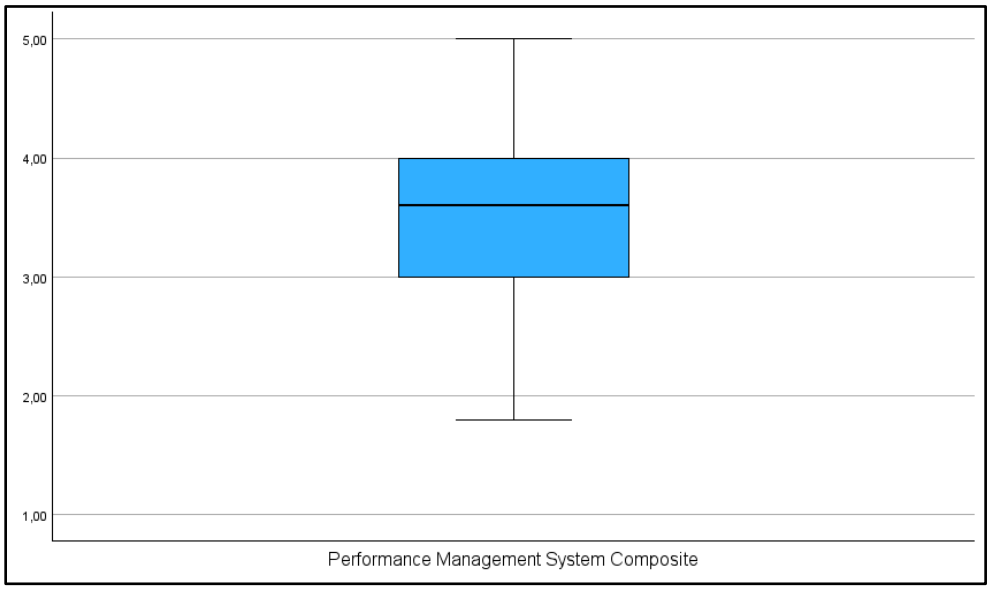

Figure 5. Performance Management System Composite box plot.

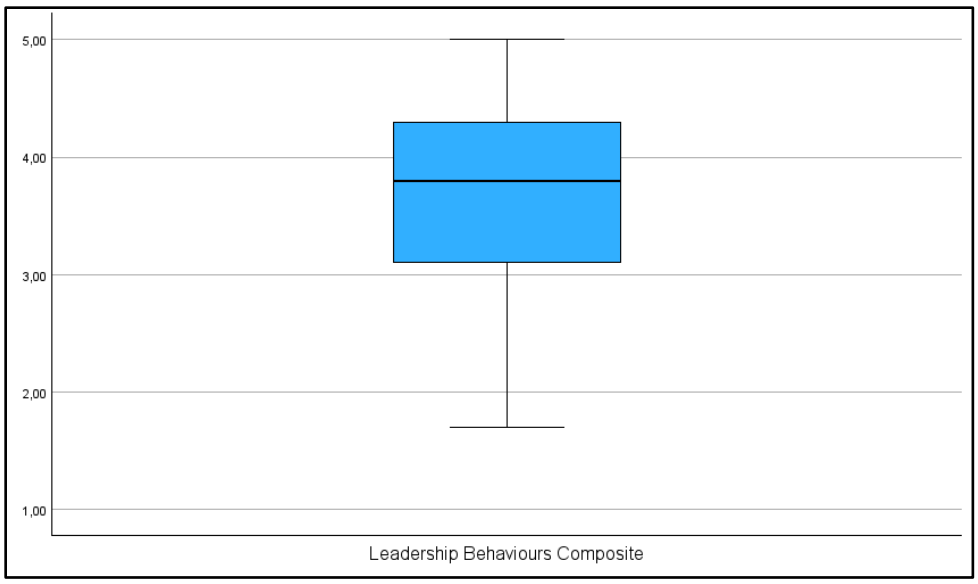

Figure 6. Leadership Behaviours Composite box plot.

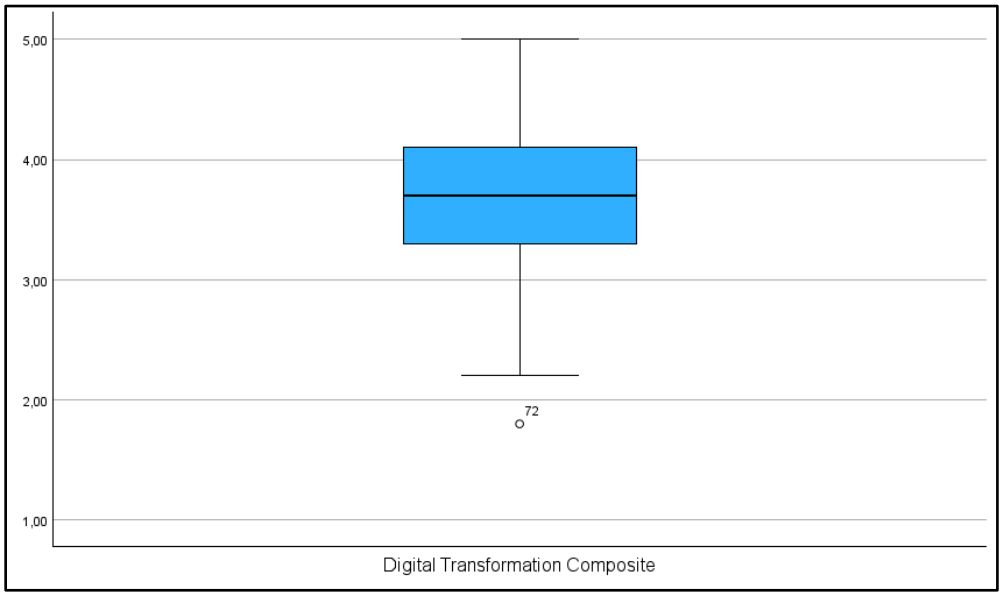

Figure 7. Digital Transformation Composite box plot.

Table 10. Summary of Outlier Tests for composite variables

Composite Variable	Outliers Identified	Outlier(s) Description	Outlier Conclusion
Performance Management Systems	No	None	No outliers
Leadership Behaviours	No	None	No outliers
Digital Transformation	Yes	Mild outlier at data point 72	Contains one outlier

The next assumption to be tested was normality which was carried out using the Shapiro-Wilk test for normality to assess whether leadership behaviours composite, performance management system composite and digital transformation composite variables follow a normal distribution. The results, shown in Table 11, indicate that normality was violated for the leadership behaviours composite variable ($p = 0.014$), as the significance value is below the threshold of 0.05. Performance Management System Composite ($p = 0.051$) and Digital Transformation Composite ($p = 0.086$) were found to be normally distributed. This means that statistical tests, like the Pearson correlation and parametric regression, that assume normality could not be used for the Leadership Behaviours Composite variable and non-parametric test, such as the Spearman correlation had to be considered.

Table 11. Shapiro-Wilk test for normality.

	Shapiro-Wilk			
Variable	Statistic	df	Sig.	Normality Conclusion
Leadership Behaviours Composite	0,974	126	0,014	Violated
Performance Management System Composite	0,979	126	0,051	Confirmed
Digital Transformation Composite	0,982	126	0,086	Confirmed

Even though the leadership behaviours composite variable was not normally distributed, the Pearson correlation was still applied in testing hypotheses that include this variable due to two reasons. Firstly, the alternative Spearman correlation is more appropriate for measurements taken from ordinal scales whilst the Pearson is most appropriate for measurements taken from an interval scale (Norman, 2010). Secondly, according to the Central Limit Theorem (CLT), “if the sample size is sufficiently large (n ≥ 30), the sampling distribution of the correlation coefficient tends to approximate normality, making Pearson correlation robust to normality violations” (Zhang et.al, 2023). Since the sample size is large (n = 126) and Pearson correlation is robust to normality violations, Pearson correlation could still be used, as the variable met the other key assumptions of linearity and no significant outliers.

5.6 2 Hypothesis 1

Hypothesis 1, stated below, was tested using a Pearson correlation, which is a test that uses bivariate analysis to measure the strength and direction of a relationship between two linear variables. The value of the correlation varies from -1 to 1, with a value of -1 meaning a total negative linear correlation, + 1 meaning a total positive correlation, and 0 being no correlation. Following that the assumptions had been tested and verified or justified, where there was a violation, the Pearson correlations were calculated as presented in Table 12.

H1: Performance management systems are positively related to digital transformation.

Table 12: Pearson correlation between Performance Management Systems and Digital Transformation

		Performance Management System Composite	Digital Transformation Composite
Performance Management System Composite	Pearson Correlation	1	,928**
	Sig. (2-tailed)		<,001
	N	126	126
Digital Transformation Composite	Pearson Correlation	,928**	1
	Sig. (2-tailed)	<,001	
	N	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the correlation of r = 0.928 (p < 0.001), Hypothesis 1 (H1), which states that performance management systems are positively related to digital transformation, is strongly supported by the results of the Pearson correlation. The correlation is strong and statistically significant.

5.6.3 Hypothesis 2

Hypothesis 2, stated below, was tested using a Pearson correlation, with the correlation results shown in Table 13.

H2: Leadership behaviours are positively related to digital transformation.

Table 13: Pearson Correlation Between Leadership Behaviours and Digital Transformation

		Leadership Behaviours Composite	Digital Transformation Composite
Leadership Behaviours Composite	Pearson Correlation	1	,858**
	Sig. (2-tailed)		<,001
	N	126	126
Digital Transformation Composite	Pearson Correlation	,858**	1
	Sig. (2-tailed)	<,001	
	N	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the correlation of r = 0.858 (p < 0.001), Hypothesis 2 (H2), which states that leadership behaviours are positively related to digital transformation, is strongly supported by the results of the Pearson correlation. The correlation is strong and statistically significant.

5.6.4 Hypothesis 3

Hypothesis 3, stated below, was tested using a Pearson correlation, with the correlation results shown in Table 14.

H3: Performance management systems are positively related to digital transformation.

Table 14: Pearson Correlation Between Leadership Behaviours and Performance Management Systems

		Leadership Behaviours Composite	Performance Management System Composite
Leadership Behaviours Composite	Pearson Correlation	1	,788**
	Sig. (2-tailed)		<,001
	N	126	126
Performance Management System Composite	Pearson Correlation	,788**	1
	Sig. (2-tailed)	<,001	
	N	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the correlation of r = 0.788 (p < 0.001), Hypothesis 3 (H3), leadership behaviours are positively related to performance management systems, is strongly supported by the results of the Pearson correlation. The correlation is strong and statistically significant.

5.6.5 Hypothesis 4

Hypothesis 4 which is stated below, was tested using a hierarchical regression analysis. This analysis allows for the testing of both the main effects and the interaction effects. The regression analysis was carried out in several key steps. First, the interaction term was computed by centering both the Performance Management Systems (PMS) composite and the Leadership Behaviours composite. Next, a hierarchical regression analysis was conducted in SPSS. In the first model, only the main effects (the centered PMS and Leadership Behaviours composites) were entered as predictors of Digital Transformation. In the second model, the interaction term was added to assess whether the relationship between PMS and Digital Transformation was

moderated by Leadership Behaviours. The regression analyses results are shown in Tables 15 to 17.

> **H4:** Leadership behaviours moderate the relationship between performance management systems and digital transformation, such that the positive relationship is stronger when leadership behaviours are high

Table 15. Coefficients for hierarchical regression testing

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3,677	,019		190,721	<,001
	PMS Composite Centered	,619	,042	,665	14,610	<,001
	LB Composite Centered	,301	,041	,334	7,341	<,001
2	(Constant)	3,683	,024		156,312	<,001
	PMS Composite Centered	,620	,043	,666	14,570	<,001
	LB Composite Centered	,299	,042	,331	7,197	<,001
	PMS_LB_Interaction	-,014	,030	-,013	-,474	,636

a. Dependent Variable: Digital Transformation Composite

Table 16. ANOVA results for hierarchical regression model

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53,963	2	26,981	576,117	<,001[b]
	Residual	5,760	123	,047		
	Total	59,723	125			
2	Regression	53,973	3	17,991	381,732	<,001[c]
	Residual	5,750	122	,047		
	Total	59,723	125			

a. Dependent Variable: Digital Transformation Composite

b. Predictors: (Constant), LB Composite Centered, PMS Composite Centered
c. Predictors: (Constant), LB Composite Centered, PMS Composite Centered,210 PMS_LB_Interaction

Table 17. Model summary of hierarchical regression analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,951[a]	,904	,902	,21641
2	,951[b]	,904	,901	,21710

a. Predictors: (Constant), LB Composite Centered, PMS Composite Centered

b. Predictors: (Constant), LB Composite Centered, PMS Composite PMS_LB_Interaction

The hierarchical regression analysis revealed that in Model 1, the main effects of both the PMS Composite and the Leadership Behaviours Composite were significant predictors of Digital Transformation ($R^2 = 0.904$, $F(2,123) = 576.117$, $p < .001$). In Model 2, adding the interaction term (PMS × LB) did not change the overall R^2 as it stayed the same at 0.904. This interaction effect was not statistically significant ($B = -0.014$, $p = 0.636$). This implies that leadership behaviours have no significant influence on the relationship between performance management systems and digital transformation. This does not support hypothesis 4, which postulated a significate that leadership behaviours moderate this relationship.

5.7 Conclusion

In conclusion, this chapter presented the statistical results of the study. This was achieved by first presenting the description of the sample and the construct groupings that are used in the study. The results for the validity and reliability quality checks were then presented. Finaly the results for the hypotheses testing were also presented. Hypotheses 1, 2 and 3 were confirmed by the results as the correlations showed significant positive relationships across the hypotheses. Hypothesis 4 was not supported by the results of the study. It was shown that leadership behaviours do not moderate the relationship between performance management systems and digital transformation. The discussion of these findings and their implications is presented in the next chapter.

Chapter 6: Discussion of results

6.1 Introduction

This chapter discusses the findings of the study in relation to existing literature on performance management systems, digital transformation, and leadership behaviours, as presented in the literature review. By relating the empirical findings with established theories and preceding studies, the discussion intends to contextualise the findings of the study within the ongoing broader academic conversations around performance management systems, digital transformation, and leadership behaviours.

The discussion is centred around each of the four hypotheses that were postulated, with each section analysing how the results align, challenge or build upon existing literature. As part of the discussion, an evaluation of the implication of the study for both academics and practitioners is also carried out. The chapter concludes by summarising how the findings contribute to the current understanding of the role of leadership behaviours in digital transformation, within performance management systems.

6.2 Summary of results

Table 18 below presents a summary of the hypothesis testing results, outlining the statistical tests conducted and the outcomes derived from the analysis in this chapter.

Table 18: Summary of hypothesis testing results

Hypothesis	Statement	Test Used	Outcome
H1	Performance management systems are positively related to digital transformation.	Pearson Correlation	Supported (Significant positive correlation)
H2	Leadership behaviours are positively related to digital transformation.	Pearson Correlation	Supported (Significant positive correlation)
H3	Leadership behaviours are positively related to performance management systems.	Pearson Correlation	Supported (Significant positive correlation)
H4	Leadership behaviours moderate the relationship between performance management systems and digital transformation, such that the positive relationship is stronger when leadership behaviours are high	Hierarchical Regression	Not Supported (Moderation effect not significant)

6.3 Hypothesis 1 discussion

For Hypothesis 1 (H_1), which states that performance management systems are positively related to digital transformation, the findings from the study provided strong evidence in support of the hypothesis as a strong and statistically significant relationship was confirmed between the two variables ($r = 0.928$, $p < 0.001$). This result aligns with the view that performance management systems enhance digital transformation in numerous ways such as aligning digital performance metrics with transformation goals, integrating digital technologies into business-as-usual operations, and continuously changing in response to digital advancements.

One of the key insights from the study is that performance management systems are enablers of digital transformation. From the survey results most respondents agreed that performance management systems facilitate the implementation of digital transformation initiatives, with a mean score that was above 3.50 across related items in the survey. This finding is consistent with the research conducted by Garengo et al. (2022) and Björkdahl (2020). They emphasised that organisations that utilise performance management systems as strategic tools tend to achieve better digital transformation outcomes. Performance management systems enable organisations to respond and adapt to evolving market conditions and technological advancements by facilitating the integration of digital technologies into daily business operations.

Another important theme that was highlighted by the study is the shift to data-driven decision making, which is enabled by performance management systems. Most respondents agreed that digital performance metrics align well with the objectives of digital transformation. This is consistent with the study of Matarazzo et al. (2021). They argue that integrating automation and real-time analytics into performance management systems improves decision making as organisations can base their decisions on accurate and well-timed insights.

The study results indicate a strong positive link between performance management systems and digital transformation. However, challenges such as resource allocation and employee adaptation could impact the implementation process. Research by Philip (2021) and Kraus et al. (2022) also points out that while performance management systems aid in digital transformation, many organisations face significant hurdles during implementation. They noted that digital skills gaps and resistance to technological change are amongst the common barriers when implementing digital performance management systems. Moreover, Weber et al. (2022) argue that there are other challenges like the socio-technical aspects of digital PMS adoption which are often overlooked, yet they can result in the implementation and use of digital technologies being ineffective. These highlighted issues are very applicable in the manufacturing sector, which this study was focused on, where workforce digital skills gaps and the reluctancy to move from legacy systems can deter digital adoption.

In conclusion, the findings from the study provide strong evidence in support of Hypothesis 1, by showing that performance management systems are positively related to digital transformation. The results show that by integrating digital tools into business processes, facilitating real-time data-driven decision-making, and aligning digital performance metrics with transformation objectives, performance management systems have become an important enabler for digital transformation.

6.4 Hypothesis 2 discussion

Hypothesis 2 (H_2) suggests that there is a positive relationship between leadership behaviours and digital transformation. Based on the correlation of $r = 0.858$ ($p < 0.001$), Hypothesis 2 is strongly supported by the results of the Pearson correlation. The correlation is strong and statistically significant. The respondents in the survey were consistent in agreeing that leaders play an important role in being advocates for and supporting digital transformation initiatives (Q16: M = 3.83). There was also general agreement that leaders play another key part in actively facilitating the adoption of new digital technologies (Q17: M = 3.78). These findings align with the theoretical insights presented by Gong and Ribière (2021) and Van Veldhoven and Vanthienen (2022), highlighting the crucial role of leadership in guiding organisations through digital transformations. By actively supporting digital initiatives, leaders foster organisational environments that emphasise innovation and continuous learning, ultimately accelerating digital transformation efforts.

A key aspect of the leadership role in digital transformation is managing resistance to change. From the survey results, even though the relationship between leadership behaviours and digital transformation came out strongly, the ability of leaders to manage resistance to change was rated low (Q19: M = 3.33) when compared to the other leadership behaviours. Despite the point that leaders are generally effective in promoting digital initiatives, this low rating indicates a potential challenge that leaders might be having in addressing employees' resistance to change during digital transformations. In literature, resistance to change is flagged as one of the usual barriers in digital transformation (Tortorella et al., 2023) which leaders need to deploy mitigation strategies.

Another important leadership behaviour, adaptability was highlighted from the study (Q18: M = 3.72) as such leaders demonstrate readiness to embrace digital tools. These adaptable leaders are more open to adopting new digital methods (Philip, 2021). This is an important leadership behaviour because digital transformation is not just an adoption of new technology, but it involves a comprehensive change in organisational processes and systems (Hanelt et al., 2021; McCausland, 2021). The strong positive correlation between leadership behaviours and digital transformation indicates that when leaders show more of these adaptive behaviours, the success of the digital transformation efforts also increases.

Overall, the analysis shows that within Eswatini's manufacturing sector, leadership behaviours play an important role in driving digital transformation, as highlighted by the strong correlation ($r = 0.858$, $p < 0.001$). The leadership behaviours such as adaptability, proactive advocacy, and the ability to manage resistance to change, are all important for advancing digital transformation.

6.5 Hypothesis 3 discussion

Hypothesis 3 (H3), which states that leadership behaviours are positively related to performance management systems, was empirically tested through a Pearson correlation analysis. A strong and statistically significant relationship was confirmed between the two variables ($r = 0.788$, $p < 0.001$). This indicates that organisations are more likely to implement effective performance management systems when leaders engage in behaviours such as establishing clear goals, encouraging continuous improvement, and offering guidance.

Numerous literature (Cockerill, 2021; Bakker et al., 2023) state that effective leadership is important for aligning the efforts of individuals with the goals of the organisation and ensuring the success of performance management initiatives. In the study there was also alignment on this point as many respondents strongly agreed that leadership significantly influences the

implementation of performance management systems (Q11: M = 4.17). There were also high ratings for other responses such as leaders setting clear goals (Q12: M = 3.75) and supporting the optimisation of performance management systems (Q13: M = 3.68).

The strong positive relationship that is observed between leadership behaviours and performance management systems is aligned to the literature which emphasises that leadership is not only about positions of authority but also involves actively guiding the performance management processes which are responsible for delivering results. Some of the important leadership behaviours which are accredited with creating an environment that supports performance management systems include the ability to inspire and motivate teams, adaptability and effective communication. This supports the notion that leadership plays an important role in nurturing a continuous improvement culture, which drives the performance management systems effectiveness (Philip, 2021; Spector et al., 2024).

Even though the overall relationship between leadership behaviours and performance management systems is strong, the slightly lower mean scores (Q15: M = 3.69) for effective communication of the importance of performance management systems indicates a possible area of improvement. Targeted leadership training would improve the leadership skills which would in turn further enhance the effectiveness of the performance management systems.

In conclusion, Hypothesis 3 is strongly supported by the analysis which shows that effective leadership behaviours are positively associated with improved performance management systems. The strong correlation ($r = 0.788$, $p < 0.001$) confirms that leadership behaviours such as those focused on clear goal setting, supportive guidance, and continuous improvement, are important in improving the effectiveness of performance management systems. This is aligned with theoretical frameworks which state that leadership drives organisational performance by aligning individual efforts with the broader strategic objectives of organisations.

6.6 Hypothesis 4 discussion

Hypothesis 4 (H_4) suggests that leadership behaviours moderate the relationship between performance management systems and digital transformation, such that the positive relationship between performance management systems and digital transformation is stronger when leadership behaviours are high. A hierarchical regression analysis, conducted in two steps, was used to test this hypothesis. In Model 1, the main effects of performance management systems and leadership behaviours were found to be significant predictors of digital transformation (R^2 = 0.904, F (2,123) = 576.117, $p < 0.001$). In Model 2, the interaction term (Performance Management Systems × Leadership Behaviours) was introduced, and the interaction effect was not statistically significant (B = -0.014, p = 0.636), with the overall R^2 remaining unchanged. These results indicate that the moderating effect of leadership behaviours on the relationship between performance management systems and digital transformation was not supported, even though performance management systems and leadership behaviours were found to individually contribute to digital transformation.

The non-statistically significant interaction effect suggests that leadership behaviours did not improve the positive impact of performance management systems on digital transformation as hypothesised. This finding is contradictory to previous studies (AlNuaimi et al., 2022; Weber et al., 2022) which stress the importance of leadership in advancing digital innovation. They argue that the creation of a supportive organisational environment and the reduction of resistance to change, which both enhance digital transformation, are results of effective leadership, especially transformational leadership.

However, the study's descriptive statistics for the leadership behaviours which affect digital performance management systems show moderate scores for some of the important leadership traits such as collaboration (M = 3.62) and accountability (M = 3.38). These relatively lower scores indicate that changes in leadership behaviours might not have significant moderating effect. Even though other studies have highlighted the important role of leadership behaviours in enhancing digital transformation, the empirical evidence from this study suggest that other factors, other than

leadership behaviours, might be more impactful in improving the success of digital performance management systems integration. The results of Hypothesis 4 suggests that even though leadership is important for driving digital change, its moderating effect may be depended on other contextual factors which were not considered in this study.

The mean values of the ratings of the leadership behaviours related to digital performance management systems form the survey show noticeable variability. This indicates that not all the leadership behaviours contribute equally to the integration of digital tools in performance management systems. This is in line with the findings form the study by Henderikx and Stoffers (2023) which argued that nuanced leadership practices, especially from middle managers, is importance for successful digital integration. Additionally, task-oriented leadership behaviours were emphasised by Tortorella et al. (2023) as also being critical as they ensure structured goal setting and accountability in environments with high digital integration. This variation suggests that even though leadership is important in performance management systems, specific behaviours influence the digital transformation efforts differently. Another plausible interpretation is that the variation in leadership behavior scores among the respondents may have been insufficient to reveal a moderating effect as other contextual factors, such as digital infrastructure and organisational culture might have overshadowed it.

In conclusion, the hierarchical regression analysis for Hypothesis 4 confirmed that individually, both performance management systems and leadership behaviours are significant predictors of digital transformation. However, the interaction term (Performance Management Systems × Leadership Behaviours) was not statistically significant. This indicates that the moderating effect of leadership behaviours on the relationship between performance management systems and digital transformation was not supported as initially hypothesised. The results suggest that, even though leadership behaviours are important for managing digital change, their ability to amplify the positive impact of performance management systems on digital transformation might be depended on other contextual factors. These findings contrast with some earlier studies (AlNuaimi et al., 2022; Weber et al., 2022) which demonstrated a significant moderating role for leadership in digital initiatives.

6.7 Conclusion

In summary, the discussion has provided an analysis of the empirical findings of the study in relation to the conceptual framework and existing literature on the interrelation of performance management systems, digital transformation, and leadership behaviours. The results provide strong evidence of the support of Hypotheses 1, 2 and 3 through statistically significant correlations as they showed that performance management systems, digital transformation and leadership behaviours all have strong positive one-on-one relations. However, for Hypothesis 4, the postulated moderating effect of leadership behaviours was not supported by the hierarchical regression analyses. This finding implies that the role of effective leadership behaviours in influencing the impact of performance management systems on digital transformation may be more complex that previously hypothesised.

The findings from the study were contrasted with the current literature on the interrelation of performance management systems, digital transformation, and leadership behaviours. The findings have contributed to the theoretical and practical understanding of the influence of leadership behaviours on performance management systems, in the context of digital transformation. The study has also laid the foundation for future research on the contextual factors that might influence leadership behaviours moderating influence, which are elaborated upon in more detail in the next chapter. The next chapter also discusses the limitations, implications and recommendations for future research in more detail.

Chapter 7: Conclusion

7.1 Introduction

This chapter concludes the study whose objective was to examine how leadership behaviours moderate the relationship between performance management systems and digital transformation in the manufacturing sector of Eswatini. This is achieved by summarising the principal findings from the four hypotheses, stated below, that were developed and tested to answer the research question.

H_1: Performance management systems are positively related to digital transformation.

H_2: Leadership behaviours are positively related to digital transformation.

H_3: Leadership behaviours are positively related to performance management systems.

H_4: Leadership behaviours moderate the relationship between performance management systems and digital transformation, such that the positive relationship is stronger when leadership behaviours are high

The chapter also discusses the limitations of the research, the theoretical and practical implications of the study and concludes by sharing recommendations for future research.

7.2 Principal findings

For Hypothesis 1 (H_1), which states that performance management systems are positively related to digital transformation, the findings from the study provided strong evidence in support of the hypothesis as a strong and statistically significant relationship was confirmed between the two

variables ($r = 0.928$, $p < 0.001$). This result aligns with the view that performance management systems enhance digital transformation in numerous ways such as aligning digital performance metrics with transformation goals (Björkdahl, 2020; Garengo et al., 2022) and integrating digital technologies into business-as-usual operations (Matarazzo et al., 2021). According to the results of the study, performance management systems are important for successful digital transformation. They integrate digital tools into business processes and align digital performance matrices with the objectives of digital transformation. However, challenges like the shortage of digital skills and resistance to technological changes still need to be addressed, if organisation in developing countries like Eswatini are to get the best of the digitalisation of performance management systems.

Hypothesis 2 (H2) suggests that there is a positive relationship between leadership behaviours and digital transformation. Based on the correlation of $r = 0.858$ ($p < 0.001$), Hypothesis 2 is strongly supported by the results of the Pearson correlation. The correlation is strong and statistically significant. These results correspond to the findings by Gong and Ribière (2021) and Van Veldhoven and Vanthienen (2022). These authors also pointed out that leadership is important in important for steering organisation through digital transformation. They argued that leaders create environments within organisations that either supports or suppress innovation and continuous learning, which are critical elements for digital transformation. The study shows that within Eswatini's manufacturing sector, the actual leadership behaviours which are rated highly and play an important role in driving digital transformation, are adaptability and proactive advocacy. The ability to manage resistance to change, which is also important for advancing digital transformation, received a low rating, which indicates that change management is an area in which Eswatini manufacturing managers need to improve upon.

Hypothesis 3 (H_3), which states that leadership behaviours are positively related to performance management systems, was empirically tested through a Pearson correlation analysis. A strong and statistically significant relationship was confirmed between the two variables ($r = 0.788$, $p < 0.001$). This suggests that organisations are more likely to have effective performance management systems when leaders engage in behaviours like setting clear goals and promoting continuous improvement. These results support the theoretical perspective that effective leadership is important for aligning the efforts of individuals with the goals of the organisation and

ensuring the success of performance management initiatives (Cockerill, 2021; Bakker et al., 2023). Even though the overall relationship between leadership behaviours and performance management systems is strong within the Eswatini manufacturing sector, the slightly lower mean scores for effective communication of the importance of performance management systems indicates a possible area of improvement. Targeted leadership training amongst Eswatini manufacturing managers would improve the leadership skills which would in turn further enhance the effectiveness of the performance management systems.

Hypothesis 4 (H_4) suggests that leadership behaviours moderate the relationship between performance management systems and digital transformation, such that the positive relationship between performance management systems and digital transformation is stronger when leadership behaviours are high. The hierarchical regression analysis that was conducted for testing Hypothesis 4 confirmed that individually, both performance management systems and leadership behaviours are significant predictors of digital transformation. However, the interaction term (Performance Management Systems × Leadership Behaviours) was not statistically significant. These results indicate that the moderating effect of leadership behaviours on the relationship between performance management systems and digital transformation was not supported, even though performance management systems and leadership behaviours were found to individually contribute to digital transformation. These findings contrast with some earlier studies (AlNuaimi et al., 2022; Weber et al., 2022) which demonstrated a significant moderating role for leadership in digital initiatives. This indicates that while leadership behaviours play a crucial role in managing digital change, their effectiveness in enhancing the positive effects of performance management systems on digital transformation may rely on various contextual factors.

In summary, Hypotheses 1, 2 and 3 were confirmed by the results as the correlations showed significant positive relationships across the hypotheses. Hypothesis 4 was not supported by the results of the study. It was shown that leadership behaviours do not moderate the relationship between performance management systems and digital transformation. These finding indicate that the main research question, how do leadership behaviours influence the relationship between performance management systems and digital transformation in the manufacturing sector of Eswatini, has been answered. It can be concluded that leadership behaviours are essential for

the successful implementation of performance management systems (H_2) and for driving digital transformation (H_3). The predicted moderating effect of leadership behaviours (H_4) on the relationship between performance management systems and digital transformation was not validated. The hierarchical regression analysis produced a non-significant interaction effect. This implies that although leadership behaviours independently influence both performance management systems and digital transformation, they do not significantly improve the direct relationship between the two within the scope of this study.

7.3 Research contribution

The study makes several important contributions to both practitioners, who are the managers working in manufacturing organisations and academia, especially in Sub-Saharan Africa and other developing countries. The findings have contributed to the theoretical and practical understanding of the influence of leadership behaviours on performance management systems, in the context of digital transformation.

7.3.1 Business contribution

From the survey results most of the leadership behaviours of the Eswatini manufacturing managers were rated high which highlights that the managers exhibit the leadership traits required for driving digital performance management systems. However, there are a couple of key leadership behaviours that were scored on the lower side such as the ability of leaders to manage resistance to change and effective communication of the importance of performance management systems. To fully leverage performance management systems for digital transformation, these gaps in the manager's skillsets, which have been identified by the study, need to be addressed.

A key aspect of the leadership role in digital transformation is managing resistance to change. Despite the point that the leaders are generally effective in promoting digital initiatives, this low rating indicates a potential challenge that leaders might be having in addressing employees' resistance to change during digital transformations. The empirical findings from the study thus highlight the need for the development of leadership skills pertaining to change management for

Eswatini manufacturing managers. Also, the slightly lower mean scores for effective communication of the importance of performance management systems indicates another possible area of improvement. Targeted leadership training would improve the communication skills which would in turn further enhance the effectiveness of the performance management systems.

The study's results can inform leadership development initiatives and digital governance frameworks in Eswatini at industry level and support the goals of the Eswatini National Development Plan (2023/24–2027/28) and the Industrial Policy (2023–2033). The industrialisation policy emphasises economic progress, industrial modernisation, and digital innovation within the manufacturing sector, a key contributor to Eswatini's GDP and employment. The insights from the study can contribute to these national objectives by providing practical recommendations for both the policy makers and industry practitioners. It can offer insights on how leadership development, that is targeted at the gaps identified in the study, can improve the effectiveness of the manufacturing leaders as they purse the digital transformation that is highlighted by the country's industrialisation policy.

7.3.2 Theoretical contribution

The outcomes of the research also add to the current conversations in the literature about the changing role of performance management systems in a more digital business setting. The study enhances existing models within the specific context of a developing economy, where there are less studies being done since most of the research is concentrated on developed economies. It also offers insights on local socio-technical issues affect digital transformation, which is a gap that has been raised in previous studies (Fähndrich, 2023; Demartini & Taticchi, 2022).

Finaly, the study paves the way for several interesting directions for future research on how leadership behaviours influence performance management systems in the context of digital transformation. These possible future studies are discussed later in the chapter.

7.4 Limitations of the research

There are several potential limitations of the study related to its research design and methodology. The first potential issue comes from having restricted the scope of the study to one geographic location and industry, which is the manufacturing sector of Eswatini. This can limit the generalisability and transferability of the research results as the results may not be fully applicable in other areas and industries. This is because the area's contexts, culture or environments might influence the study results. Confining the study to respondents working in the same industry and country was done to avoid the "influence of different socio-economic contexts" (Hargitai & Bencsik, 2023), which inevitable might come at the expense of generalisability and transferability of the findings from the study.

Another methodology limitation may come from the adaption and customisation of the survey questionnaire which brought about potential validity and reliability restraints, even though statistical validity and reliability test were performed with the results confirming both statistical reliability and validity.

Finally, resource restrictions such as the limited number of respondents (n = 126) and the use of cross-sectional time horizon to collect data from a single point in time, may also limit the depth and scope of the study (Taherdoost, 2022). The cross-sectional design, which only captures a moment in time, cannot conclusively prove causality, since doing so requires a longitudinal study.

7.5 Suggestions for future research

With the minimal amount of research being carried out in Sub-Saharan Africa, relative to the developed world, the study opens avenues for further investigations within the context of a developing country like Eswatini. The first avenue would be to consider expanding the sample to include multiple sectors across Eswatini and potentially other developing countries. This would enhance the external validity of the findings. A longitudinal research design can also be pursued within the same context as it would provide insights on how the relationship between performance

management systems, digital transformation and leadership change over time. A longitudinal study would also address one of the limitations of this research, which is the difficulty to conclusively prove causality with a cross-sectional design study.

Since Hypothesis 4 could not be confirmed in the study, yet there are numerous studies which report the moderating effect of leadership behaviours on the relationship between performance management systems and digital transformation, there is the opportunity to do qualitative research on the topic and try to explore other contextual factors that might moderate the relationship. The factors which can be considered include digital infrastructure, organisational culture, and other external market conditions.

Finaly, a more comprehensive measurement instrument that includes a construct of organisational or firm performance can help provide richer insights as the instruments would be able to measure and report on the end goal of all the constructs that were studied, which is to improve organisational performance. The current study uses an effective digital performance management system as an indirect measure of overall firm performance since both performance management systems and digital transformation are meant to enhance organisational performance.

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Appendix

Appendix A: Survey questionnaire and Informed consent letter

Performance management systems and digital transformation in Eswatini: the moderating role of leadership behaviours

Informed consent letter

I am currently a student at the University of Pretoria's Gordon Institute of Business Science (GIBS) and completing my research in partial fulfilment of an MBA. I am conducting research on the role of leadership behaviours in moderating the effectiveness of digital transformation initiatives within performance management systems in Eswatini. I would therefore like to invite you to participate in sharing your experiences and perspectives on how leadership behaviours influence digital transformation and its impact on organisational performance. This survey will assist in giving insights and should take no more than 15 minutes of your time. There are 30 questions posed. Your participation is voluntary, and you can withdraw at any time without penalty. Your participation is anonymous, and only aggregated data will be reported. By completing the survey attached, you indicate that you give consent to voluntarily participate in this research. If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher name:

Email:

Phone:

Research supervisor name:

Email:

Phone:

Section A – Manager's Demographics

1. **What is your current management level within the organisation?**

    - ○ Frontline Manager
    - ○ Middle Manager
    - ○ Senior Manager
    - ○ Other (Please specify) ……

2. **Which department or area do you manage?**

    - ○ Production
    - ○ Quality Control
    - ○ Supply Chain/Logistics
    - ○ Maintenance
    - ○ Human Resources
    - ○ Finance
    - ○ Other (Please specify) …….

3. **How long have you been working in your current managerial position?**

    - ○ Less than 1 year
    - ○ 1 to 3 years
    - ○ 4 to 6 years
    - ○ 7 to 10 years
    - ○ More than 10 years

4. **How many years of experience do you have in the manufacturing industry?**

    - ○ Less than 3 years

- ○ 3 to 5 years
- ○ 6 to 10 years
- ○ 11 to 15 years
- ○ More than 15 years

5. **Does your organisation use electronic dashboards for real-time performance monitoring?**
   - ○ Yes
   - ○ No
   - ○ Not Sure
6. **How frequently do you use electronic dashboards or digital performance management systems in your role?**
   - ○ Daily
   - ○ Weekly
   - ○ Monthly
   - ○ Rarely
   - ○ Never
7. **Which of the following best describes your familiarity with digital transformation initiatives in your organisation?**
   - ○ Very Familiar
   - ○ Somewhat Familiar
   - ○ Neutral
   - ○ Slightly Familiar
   - ○ Not Familiar At All

8. **What is the primary focus of the digital performance management systems in your organisation?**

    - ○ Financial Performance
    - ○ Operational Efficiency
    - ○ Quality Control
    - ○ Customer Satisfaction
    - ○ Employee Performance
    - ○ Other (Please specify) ……

9. **How would you rate the current effectiveness of digital performance management systems in meeting your organisation's goals?**

    - ○ Very Ineffective
    - ○ Ineffective
    - ○ Neutral
    - ○ Effective
    - ○ Very Effective

10. **Which level of management are you directly reporting to?**

    - ○ Frontline Manager
    - ○ Middle Manager
    - ○ Senior Manager
    - ○ Other (Please specify) ……

For Sections B, C, D and E please use the Likert scale shown below:

Likert Scale:

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

Section B: Leadership behaviours and performance management system

11. Effective leadership positively influences the implementation and use of performance management system in my organisation.
12. Leaders in my organisation set clear goals and expectations for the use of performance management system.
13. Leaders provide guidance and support for optimizing performance management system in my organisation.
14. Leaders in my organisation are committed to continuous improvement in performance management system.
15. Leaders effectively communicate the importance of using performance management system for achieving organisational goals.

Section C: Leadership behaviours and digital transformation

16. Leaders in my organisation effectively advocate for and support digital transformation initiatives.
17. Leaders in my organisation actively encourage and facilitate the adoption of new digital technologies and processes.
18. Leaders in my organisation demonstrate a willingness to adapt to new digital tools and methodologies.

19. Leaders in my organisation manage resistance to change during digital transformation efforts effectively.
20. Leadership behaviours are crucial for driving successful digital transformation projects in my organisation.

Section D: Performance management system and digital transformation

21. The use of performance management system in my organisation facilitates the implementation of digital transformation strategies.
22. Digital performance metrics within our performance management system align well with the goals of digital transformation initiatives.
23. Our performance management system effectively supports the integration of digital technologies into daily operations.
24. Improved performance management through performance management system contributes to successful digital transformation outcomes.
25. Updates to our performance management system occur frequently in response to changes and advancements in digital transformation strategies.

Section E: Leadership behaviours impacting digital performance management systems

26. Leaders in my organisation effectively communicate the vision and goals related to digital performance management systems.
27. Leaders demonstrate adaptability when integrating new digital tools into performance management processes.

28. Leaders in my organisation encourage collaboration and teamwork to optimize the use of digital performance management systems.
29. Leaders foster an innovative mindset that encourages the adoption and optimization of digital performance management systems.
30. Leaders hold themselves and others accountable for the effective use of digital performance management systems.

Appendix B: Data code book

Management Levels	Code
Frontline Manager	1
Middle Manager	2
Senior Manager	3
Executive	4

Department	Code
Production	1
Maintenance & Engineering	2
Quality Control	3
Supply Chain & Logistics	4
Projects	5
Strategy & Operational Excellence	6

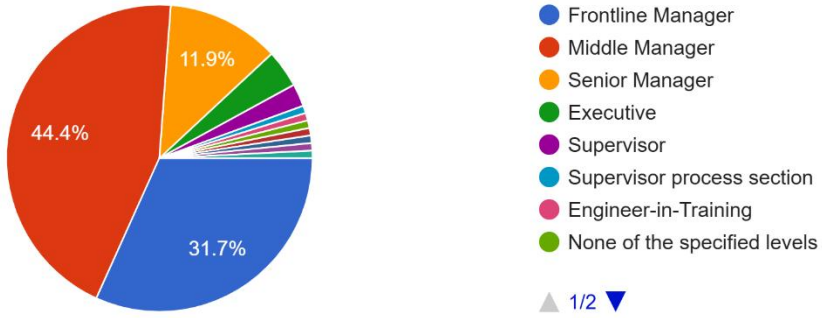
Years in position	Code
Less than a year	1
1 to 3 years	2
4 - 6 years	3
7 - 10 years	4
More than 10 years	5

Years in Manufacturing	Code
Less than 3 years	1
3 - 5 years	2
6 - 10 years	3
11 - 15 years	4
More than 15 years	5

Appendix C: Sample descriptive statistics graphs

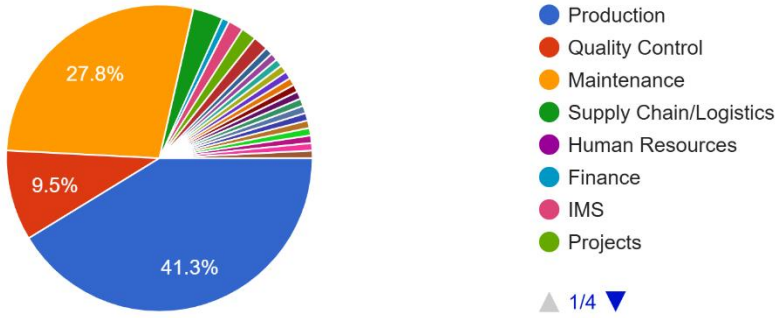
1. What is your current management level within the organisation?

126 responses



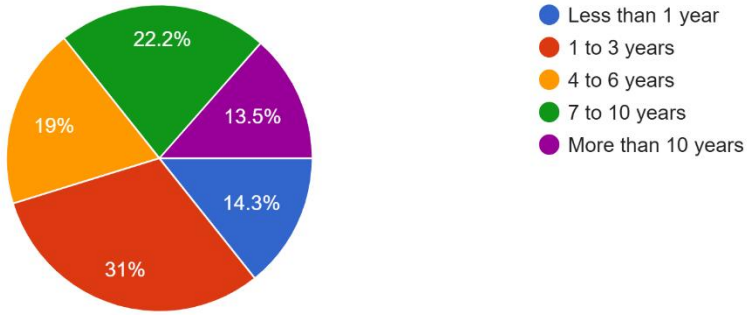
2. Which department or area do you manage?

126 responses



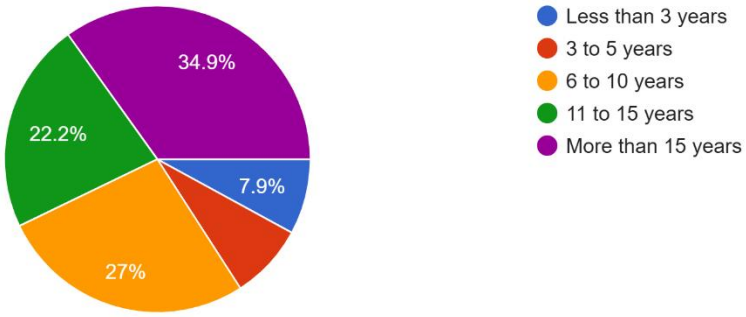
3. How long have you been working in your current managerial position?

126 responses



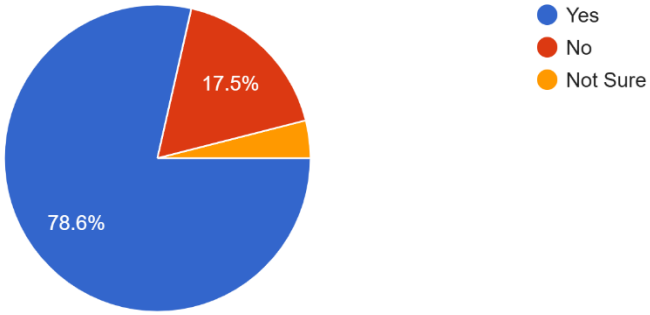
4. How many years of experience do you have in the manufacturing industry?

126 responses



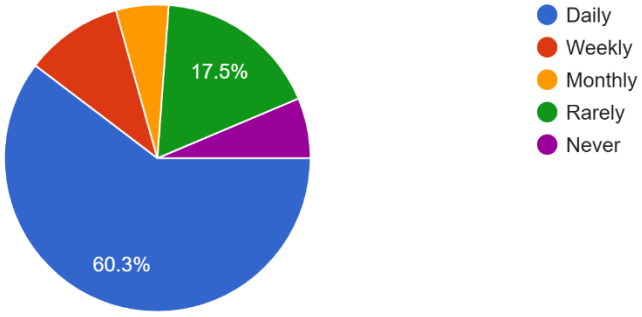
5. Does your organisation use electronic dashboards for real-time performance monitoring?

126 responses



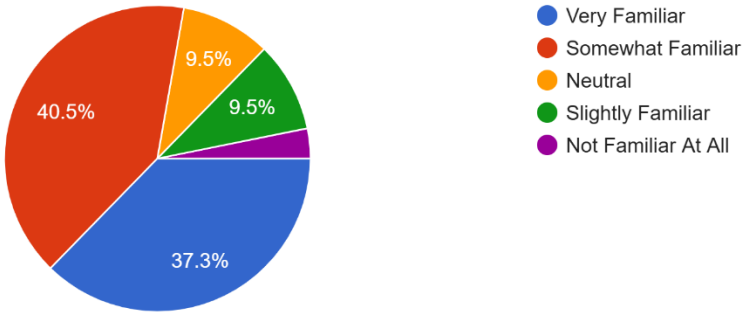
6. How frequently do you use electronic dashboards or digital performance management systems in your role?

126 responses



7. Which of the following best describes your familiarity with digital transformation initiatives in your organisation?

126 responses

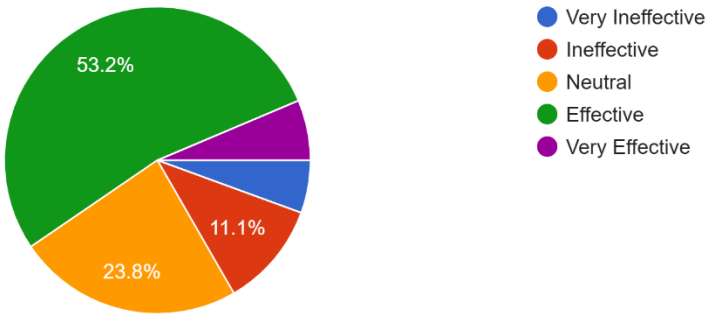


8. What is the primary focus of the digital performance management systems in your organization?

126 responses

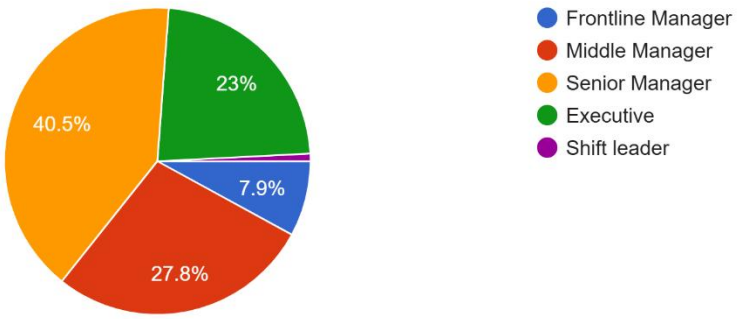
9. How would you rate the current effectiveness of digital performance management systems in meeting your organisation's goals?

126 responses



10. Which level of management are you directly reporting to?

126 responses



Appendix D: Validity tests results

CONSTRUCT 1 – LB and PMS

Correlations

		Effective leadership positively influences the implementation and use of performance management system in my organisation	Leaders in my organisation set clear goals and expectations for the use of performance management system	Leaders provide guidance and support for optimising performance management system in my organisation	Leaders in my organisation are committed to continuous improvement in performance management system	Leaders effectively communicate the importance of using performance management system for achieving organisational goals	Total of LB_PMS
Effective leadership positively influences the implementation and use of performance management system in my organisation	Pearson Correlation	1	,455**	,475**	,430**	,547**	,699**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders in my organisation set clear goals and expectations for the use of performance management system	Pearson Correlation	,455**	1	,711**	,643**	,609**	,845**
	Sig. (2-tailed)	<,001		<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders provide guidance and support for optimising performance management system in my organisation	Pearson Correlation	,475**	,711**	1	,608**	,628**	,845**
	Sig. (2-tailed)	<,001	<,001		<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders in my organisation are committed to continuous improvement in performance management system	Pearson Correlation	,430**	,643**	,608**	1	,671**	,830**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001
	N	126	126	126	126	126	126
Leaders effectively communicate the importance of using performance management system for achieving organisational goals	Pearson Correlation	,547**	,609**	,628**	,671**	1	,849**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001		<,001
	N	126	126	126	126	126	126
Total of LB_PMS	Pearson Correlation	,699**	,845**	,845**	,830**	,849**	1

	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	
	N	126	126	126	126	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

CONSTRUCT 2 – LB and DT

Correlations

		Leaders in my organisation effectively advocate for and support digital transformation initiatives	Leaders in my organisation actively encourage and facilitate the adoption of new digital technologies and processes	Leaders in my organisation demonstrate a willingness to adapt to new digital tools and methodologies	Leaders in my organisation manage resistance to change during digital transformation efforts effectively	Leadership behaviours are crucial for driving successful digital transformation projects in my organisation	Total of LB_DT
Leaders in my organisation effectively advocate for and support digital transformation initiatives	Pearson Correlation	1	,746**	,671**	,459**	,297**	,795**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders in my organisation actively encourage and facilitate the adoption of new digital technologies and processes	Pearson Correlation	,746**	1	,733**	,648**	,390**	,891**
	Sig. (2-tailed)	<,001		<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders in my organisation demonstrate a willingness to adapt to new digital tools and methodologies	Pearson Correlation	,671**	,733**	1	,593**	,406**	,860**
	Sig. (2-tailed)	<,001	<,001		<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders in my organisation manage resistance to change	Pearson Correlation	,459**	,648**	,593**	1	,363**	,795**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001

during digital transformation efforts effectively	N	126	126	126	126	126	126
Leadership behaviours are crucial for driving successful digital transformation projects in my organisation	Pearson Correlation	,297**	,390**	,406**	,363**	1	,607**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001		<,001
	N	126	126	126	126	126	126
Total of LB_DT	Pearson Correlation	,795**	,891**	,860**	,795**	,607**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	
	N	126	126	126	126	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

CONSTRUCT 3 – PMS and DT

Correlations

		The use of performance management system in my organisation facilitates the implementation of digital transformation strategies	Digital performance metrics within our performance management system align well with the goals of digital transformation initiatives	Our performance management system effectively supports the integration of digital technologies into daily operations	Improved performance management through digital systems contributes to successful transformation outcomes	Updates to our performance management system occur frequently in response to changes and advancements in digital transformation strategies	Total of PMS_DT
The use of performance management system in my organisation facilitates the implementation of digital transformation strategies	Pearson Correlation	1	,736**	,748**	,397**	,661**	,875**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Digital performance metrics within our performance management system align well with the goals of digital transformation initiatives	Pearson Correlation	,736**	1	,718**	,449**	,645**	,867**
	Sig. (2-tailed)	<,001		<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Our performance management system effectively supports the integration of digital technologies into daily operations	Pearson Correlation	,748**	,718**	1	,467**	,672**	,884**
	Sig. (2-tailed)	<,001	<,001		<,001	<,001	<,001
	N	126	126	126	126	126	126

Improved performance management through digital systems contributes to successful transformation outcomes	Pearson Correlation	,397**	,449**	,467**	1	,322**	,621**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001
	N	126	126	126	126	126	126
Updates to our performance management system occur frequently in response to changes and advancements in digital transformation strategies	Pearson Correlation	,661**	,645**	,672**	,322**	1	,828**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001		<,001
	N	126	126	126	126	126	126
Total of PMS_DT	Pearson Correlation	,875**	,867**	,884**	,621**	,828**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	
	N	126	126	126	126	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

CONSTRUCT 4 – LB vs PMS and DT

Correlations

		Leaders in my organisation effectively communicate the vision and goals related to digital performance management systems	Leaders demonstrate adaptability when integrating new digital tools into performance management processes	Leaders in my organisation encourage collaboration and teamwork to optimise the use of digital performance management systems	Leaders foster an innovative mindset that encourages the adoption and optimisation of digital performance management systems	Leaders hold themselves and others accountable for the effective use of digital performance management systems	Total of LB_DT_PMS
Leaders in my organisation effectively communicate the vision and goals related to digital performance management systems	Pearson Correlation	1	,586**	,690**	,566**	,611**	,811**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders demonstrate adaptability when integrating new digital tools into performance management processes	Pearson Correlation	,586**	1	,709**	,691**	,583**	,833**
	Sig. (2-tailed)	<,001		<,001	<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders in my organisation encourage collaboration and teamwork to optimise the use of digital performance management systems	Pearson Correlation	,690**	,709**	1	,716**	,711**	,896**
	Sig. (2-tailed)	<,001	<,001		<,001	<,001	<,001
	N	126	126	126	126	126	126
Leaders foster an innovative mindset that encourages the	Pearson Correlation	,566**	,691**	,716**	1	,741**	,868**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001

adoption and optimisation of digital performance management systems	N	126	126	126	126	126	126
Leaders hold themselves and others accountable for the effective use of digital performance management systems	Pearson Correlation	,611**	,583**	,711**	,741**	1	,860**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001		<,001
	N	126	126	126	126	126	126
Total of LB_DT_PMS	Pearson Correlation	,811**	,833**	,896**	,868**	,860**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	
	N	126	126	126	126	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix E: Reliability tests results

CONSTRUCT 1 – LB and PMS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,874	,872	5

CONSTRUCT 2 – LB and DT

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,849	,850	5

CONSTRUCT 3 – PMS and DT

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,875	,874	5

CONSTRUCT 4 – LB vs PMS and DT

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,929	,929	10