DIGITAL-RELATED CAPABILITIES AND ORGANIZATIONAL PERFORMANCE: THE ROLE OF PERFORMANCE MEASUREMENT SYSTEMS

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DIGITAL RELATED CAPABILITIES AND ORGANIZATIONAL PERFORMANCE: THE ROLE OF PERFORMANCE MEASUREMENT SYSTEMS

ABSTRACT

The performance measurement system is considered a management mechanism to ensure corporate executives. With the development of the Internet and big data technology, digitalization is not only a trend but will also with a faster speed. The impact of digitalization on enterprises is all-round, while traditional performance measurement systems' role is weakening. Therefore, digitalization and performance measurement systems should be combined to address the challenges and opportunities of digitalization. In contemporary empirical studies, only some people pay attention to how digital-related capabilities are related to performance, resulting in a knowledge gap in this area.

Consequently, to close this gap, this study aims to study how PMS can assist different types of digital-related capabilities in improving organizational performance and the relationship between PMS and organizational performance. This study focuses on relationships between data collection, data analysis, and testing structures. In quantitative research, researchers employ two standard research methods - survey and experimental (Creswell, 2009). The survey research method was used in this study because it helps to provide standardized information to describe and examine the relationship between variables (Malhotra & Grover, 1998). As part of this study, structured questionnaires were used to collect survey data from 411 large and medium-sized Internet enterprises in China.

Additionally, structural equation and model (SEM) analysis from the partial least square

(PLS) approach was used to analyze the data. This study first explains how various digital-related capabilities can promote PMS to improve organizational performance and subsequently improve organizational performance. It fills a gap in the literature on digital-related capabilities and the mediating role of organizational performance and performance measurement systems. This study encourages businesses to adapt to the digital age, aiming to improve organizational performance. The relationship between PMS, digital-related capabilities, and organizational performance is investigated in this study, which provides a detailed explanation of the relationship between each variable. This study also outlines data analysis strategies and discusses statistical studies used to determine the reliability and validity of research models.

Keywords: digital capabilities, performance measurement systems, organizational performance

KEUPAYAAN BERKAITAN DIGITAL DAN PRESTASI ORGANISASI: PERANAN SISTEM PENGUKURAN PRESTASI

ABSTRAK

Sistem pengukuran prestasi dianggap sebagai mekanisme pengurusan untuk memastikan eksekutif korporat. Dengan perkembangan Internet dan teknologi data besar, pendigitalan bukan sahaja menjadi trend tetapi juga dengan kelajuan yang lebih pantas. Kesan pendigitalan ke atas perusahaan adalah menyeluruh, manakala peranan sistem pengukuran prestasi tradisional semakin lemah. Oleh itu, sistem pendigitalan dan pengukuran prestasi harus digabungkan untuk menangani cabaran dan peluang pendigitalan. Dalam kajian empirikal kontemporari, hanya sesetengah orang memberi perhatian kepada bagaimana keupayaan berkaitan digital dikaitkan dengan prestasi, mengakibatkan jurang pengetahuan dalam bidang ini.

Oleh itu, untuk merapatkan jurang ini, kajian ini bertujuan untuk mengkaji bagaimana PMS boleh membantu pelbagai jenis keupayaan berkaitan digital dalam meningkatkan prestasi organisasi dan hubungan antara PMS dan prestasi organisasi. Kajian ini memberi tumpuan kepada hubungan antara pengumpulan data, analisis data, dan struktur ujian. Dalam penyelidikan kuantitatif, penyelidik menggunakan dua kaedah penyelidikan standard - tinjauan dan eksperimen (Creswell, 2009). Kaedah kajian tinjauan digunakan dalam kajian ini kerana ia membantu menyediakan maklumat piawai untuk menerangkan dan meneliti hubungan antara pembolehubah (Malhotra & Grover, 1998). Sebagai sebahagian daripada kajian ini, soal selidik berstruktur digunakan untuk mengumpul data tinjauan daripada 411 perusahaan Internet besar dan sederhana di China.

Selain itu, analisis persamaan struktur dan model (SEM) daripada pendekatan kuasa dua

terkecil separa (PLS) digunakan untuk menganalisis data. Kajian ini terlebih dahulu menerangkan bagaimana pelbagai keupayaan berkaitan digital boleh menggalakkan PMS untuk meningkatkan prestasi organisasi dan seterusnya meningkatkan prestasi organisasi. Ia mengisi jurang dalam literatur tentang keupayaan berkaitan digital dan peranan pengantara prestasi organisasi dan sistem pengukuran prestasi. Kajian ini menggalakkan perniagaan menyesuaikan diri dengan era digital, bertujuan untuk meningkatkan prestasi organisasi. Hubungan antara PMS, keupayaan berkaitan digital, dan prestasi organisasi disiasat dalam kajian ini, yang memberikan penjelasan terperinci tentang hubungan antara setiap pembolehubah. Kajian ini juga menggariskan strategi analisis data dan membincangkan kajian statistik yang digunakan untuk menentukan kebolehpercayaan dan kesahan model penyelidikan.

Kata kunci: Keupayaan Digital, Sistem Pengukuran Prestasi, Prestasi Organisasi

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LIST OF ACRONYMS AND SYMBOLS

IDC	**International Data Corporation**
HDI	Human Development
ABCD	Audience, Behavior, Condition, Degree
PMS	Performance Measurement System
ROT	Resource Orchestration Theory
RBV	Resource Based View
BSC	Balanced Scorecard
SRMR	Standardized Root Mean Square Residual
CITC	Corrected Item-Total Correlation
CR	Composite Reliability
AVE	Average Variance Extracted
HTMT	Heterotrait-Monotrait Ratio
SD	Standard Deviation
SRMR	Standardized Root Mean Square Residual
T	Critical Value (t-value)
PLS-SEM	Partial Least Squares – Structural Equation Modeling
OP	Organizational Performance
HC	Human Capabilities
TC	Technical Capabilities
IC	Innovation Capabilities
CC	Collaboration Capabilities

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter is divided into seven subsections. Section 1.1 explains the social environment in the digital age and elicits the problems that need to be solved urgently. Section 1.2 states the current issues in the research area of this study. Section 1.3 summarizes research gaps between past published articles that have yet to be explored in depth in this research area. Sections 1.4-1.5 present research questions and research objectives. Section 1.6 summarizes the theoretical and practical implications of this study. Section 1.7 outlines the focus of the remaining chapters of this study.

1.1 Background

The contemporary global landscape continues to grapple with the protracted period of economic crisis, resulting in significant downward pressure on the economy. In conjunction with the repercussions of the epidemic, the global economy experienced a severe downturn, marking the most severe recession since the conclusion of World War II. Nevertheless, the digital economy has effectively mitigated the downward trajectory of the economy. In the context of sluggish or recessionary global economic growth, the digital economy continues to exhibit robust expansion. Currently, the global community has initiated the process of digital transformation. The concept of digital twins has been implemented on a national level in the United States, whereas Germany is closely associated with the concept of Industry 4.0, and the United Kingdom has outlined seven specific objectives in order to achieve digital transformation (Wu & Liang, 2019). In the

report concerning the 19th National People's Congress, China additionally emphasized its intention to establish a cyber power, a digital China, and an intelligent society. This entails advancing the profound integration of the Internet, big data, artificial intelligence, and the tangible economy, thereby facilitating the development of the digital economy and the sharing economy, while nurturing novel avenues for economic expansion. The formation of new kinetic energy has been pointed out by Zhang (2019). Nevertheless, the notion of digital transformation lacks a precise and universally accepted definition. The G20 Initiative on Digital Economy Development and Cooperation, presented during the G20 Hangzhou Summit, asserts that the term digital within the context of the digital economy can be categorized into three distinct phases based on the extent of digitalization: information digitalization, business digitalization, and digital transformation. According to Hu (2023), digital transformation represents a novel phase in the progression of digital advancement. This phenomenon encompasses the potential to foster the expansion of fresh economic development opportunities, facilitate sustainable economic growth, and drive the metamorphosis and enhancement of conventional industries. Furthermore, it plays a pivotal role in the transformation and advancement of society at large.

The digital economy of China exhibited a notable growth rate of 9.7% in the year 2020, surpassing the nominal GDP growth rate of approximately 6.0% observed within the same timeframe. The digital economy has emerged as a significant catalyst for long-term and consistent growth of the national economy, while also playing a crucial role in achieving success in epidemic prevention and control, as well as fostering economic and

social development. The ongoing process of industry digitalization has resulted in the widespread adoption of digital technologies, leading to unprecedented enhancements in the industrial efficiency of Internet companies in China (Yang, 2020). A survey of 2,000 multinational CEOs was conducted by the International Data Corporation (IDC), a prominent global research firm. By the year 2020, a significant proportion of the Global 1000 companies (67%) and the Chinese 1000 companies (50%) are projected to prioritize digital transformation as a key element of their corporate strategy. Digital transformation is poised to become an inexorable trajectory for conventional enterprises, particularly those of substantial size and medium scale. In order to facilitate the attainment of strategic development objectives related to the digital transformation of large and medium-sized enterprises, it is imperative to incorporate innovation in organizational performance and performance management as a compulsory component for all such enterprises (Wang et al., 2003).

1.1.1 Performance Management in China's Large and Medium-Sized Enterprises

Performance management in large and medium-sized enterprises in China started late and has made specific achievements after years of effort. However, there are still problems, such as performance management being detached from strategic objectives, backward performance management concepts, an unscientific set of performance measurement indicators, and a lack of employee participation and communication (Xu, 2006). Performance management and performance measurement systems are inextricably linked, and in order to maximize corporate value, medium and large companies must clear up the institutional deficiencies on the road to market

development and expansion in order to effectively reduce the obstacles and risks to their survival (Feng, 2013).

Performance targets for large and medium-sized enterprises are often set by departments and declared to the enterprise rather than being broken down from the overall strategic objectives of the enterprise to the departments. This results in the performance objectives of each department of the enterprise being accomplished well, but the overall strategic objectives of the enterprise could be accomplished better. The phenomenon that performance management is detached from the strategic objectives of the enterprise results from performance management not playing its role as an effective tool for the implementation of the strategic objectives of the enterprise, and the strategic objectives are not effectively decomposed and implemented by the corresponding employees. This scenario does not effectively promote the inclination of individual employees to assume their respective duties with the aim of attaining the strategic goals of the organization. Consequently, this phenomenon exerts a detrimental influence on the overall advancement towards the organization's strategic objectives (Li, 2004).

The performance management philosophy of many large and medium-sized enterprises is mainly reflected in the importance attached to performance measurement and the disregard for performance management. The focus is on performance measurement results, which are used as an important basis for employees' income and development, and do not play a substantial role in performance management for SMEs. Although performance measurement is fundamental, it is not the whole of performance

management, but only a key part of the performance management process, which can effectively assess the actual performance of employees, stimulate the potential of employees and promote the joint development of employees and the organization (Yang, 2009). However, paying attention to prior planning and management in performance management is crucial.

As many large and medium-sized enterprises do not set performance targets from the top-down decomposition of the overall strategic objectives of the enterprise, this leads to the inability of large and medium-sized enterprises to carry out scientific decomposition when setting performance appraisal indicators, thus failing to form performance measurement indicators and indicator systems with consistent objectives. At the same time, to reflect the completeness and comprehensiveness of corporate performance indicators, large and medium-sized enterprises usually develop complex and numerous performance measurement indicators, which inadvertently increase employees' work content and work intensity. This not only does not guide employees to focus on their targeted work but also increases the difficulty of management, reduces employee satisfaction, and slows down the achievement of corporate strategic goals (Wang et al., 2018).

Performance communication is also an essential part of the performance management process. Employees should be involved in running the business, and the company should communicate with them promptly about implementing their work objectives. However, many large and medium-sized enterprises' employees need to be more active

in performance management and better understand the performance management system, performance appraisal indicators, and performance appraisal results. At the same time, employees must be aware of participating in corporate performance management. The absence of performance communication usually leads to deviations in the understanding of employees at the upper and lower levels in achieving work objectives, which in turn affects the achievement of performance goals (Chen, 2006).

The traditional performance measurement system is more like a control system. At the start of the year, goals are defined, split into quarters and months, and the results are reviewed according to the appropriate cycle. The appraisal results are linked to individual floating salaries. Revise the target conditionally in the middle of the year according to the actual situation. At the end of the review, start the next cycle. The importance of performance measurement in enterprise operations and administration cannot be contested. It indicates that the organizational strategy can be disassembled and transformed into a variety of levels of active measures. In the comprehensive digitized guide promoting the development of the industrial economy era, the effect of the traditional performance management system can be weaker and weaker, a great deal of management costs and the compared results, the more cannot meet the expectations of managers, the more the core of the problem is that in the current environment, the traditional performance measurement system is difficult to motivate employees, thereby hindering business development (Bi, 2018). The increased usage of digital technology makes it evident that lean management can be further improved through performance measurement systems. Many worldwide corporations and Internet companies have

discovered that mobile Internet, big data, and other technologies can provide a more convenient and better experience for intelligent performance evaluation, performance communication, and feedback than traditional methods (Qian, 2018).

1.1.2 The Significance of Performance Management Innovation for Large and Medium-Sized Enterprises in the Digital Age

The goal of performance measurement management in large and medium-sized enterprises is to increase each employee's sense of accountability while also enhancing their productivity and performance through a variety of ethical performance measurement tools, allowing the company to operate and grow at a higher profit margin (Li, 2019). In the process of large and medium-sized development, there is no denying that performance management plays a key role in the business process. However, traditional performance management is more like a regulatory system. From the beginning of the year, a plan is formulated, implemented in stages, assessed, and evaluated, with the assessment results related to employee personal income, and mid-year revision of performance targets based on performance. At the end of the year, take stock of the review and start the cyclical process of the next performance cycle. In this cycle, performance management is mainly controlled by managers, who themselves do not have a deep understanding of performance management and are therefore prone to unclear appraisal criteria, lack of scientific basis of appraisal indicators, employees who are only appraised but not participants, and lack of professional guidance of the appraisal process. At the same time, the performance management process is easily mixed with personal emotions, which may produce deviations from the assessment

results and cannot accurately reflect the actual performance level of employees, thus making it difficult to truly motivate employees, resulting in performance management not achieving the expected results, which is not conducive to the healthy and sustainable development of the enterprise. Agility is significant to enterprise digitalization, and the only way for a company to achieve true agility is to start with employees. Talent development people can proactively influence how the organization collects and uses data, which means they can better integrate collected performance data into PMS. Research shows that the demand for digital talent has steadily increased since 2019. Especially after COVID-19, the overall market demand for digital talents has soared, with a 91% increase compared to last year. Therefore, enterprises need to improve digital talent (Wei, 2020).

Conducting business in an increasingly digital world and as a component of the digital ecosystem (Pappas et al., 2021), companies must develop inventive ways to change their business and harness innovation to survive and thrive in a constantly changing environment. Mikalef (2020) believed that to derive value from growing digital opportunities, enterprises need to develop organizational capabilities that enable them to recognize how data-driven insights might help their operations and develop features to achieve these benefits. To put it another way, businesses must find methods to innovate digitally, and innovation will significantly increase their ability to compete in the marketplace.

Currently, advanced information technologies such as cloud computing, big data,

blockchain, artificial intelligence, and mobile Internet are accelerating iteration, and deep integration and digital business transformation have risen to the top of the management agenda for the majority of businesses across industries (Kane et al., 2015). The essence of enterprise digital transformation is leveraging the benefits of digital replication, linking, simulation, and feedback to actualize the purpose of transformation and upgrading by digitizing businesses (Wei, 2020). With digital transformation becoming the strategic choice of enterprises to implement management innovation and win competitive advantage in the future, the digital transformation of enterprises has become one of the hot spots of academic research.

Performance management as a guide to business management in large and medium-sized enterprises, which requires timely and effective access to industry data and analysis of key information to set forward-looking strategic goals for the company, all of which are supported by digital technology. Therefore, if large and medium-sized enterprises want to gain a competitive advantage in the digital era, they must make full use of digital technology to break down corporate strategic objectives, develop performance appraisal indicators, analyze complex performance measurement results, communicate with employees promptly, ensure that work is carried out according to performance plans, avoid work deviations, reduce management costs and effectively control relevant factors that affect the achievement of performance targets. As well as the need to entirely innovate enterprise performance management, establish a digital performance management mindset, adopt a performance management digital platform to standardize performance management, strengthen the analysis of industry data and

critical information, optimize the allocation of resources such as human and material resources, and intelligently conduct performance appraisals, performance communication, and feedback. Only through continuous improvement and innovation can performance management adapt to the new era and thus ensure the healthy and sustainable development of large and medium-sized enterprises in the digital age (Li, 2021).

1.2 Problem Statement

To ensure business continuity, businesses have begun optimizing and enhancing process efficiency with digital tools. Due to the ever-changing and turbulent environment, digital capabilities are gaining popularity. These are the skills, knowledge, and resources required to effectively leverage digital technologies and tools to achieve desired outcomes and create value (Zhen et al., 2021).

Nonetheless, a comprehensive analysis of the existing literature reveals a lack of consensus regarding the relationship between digital capabilities and organizational performance (Martnez-Caro et al., 2020). Several research studies have demonstrated that digital capabilities can have a positive impact on organizations, resulting in reduced costs and enhanced flexibility (Drnevich & Croson, 2013). Organizations that possess and effectively leverage these resources are more likely to develop complex and profitable strategies (Wang, 2007). Furthermore, as the availability and effective utilization of these resources increases, there is an increased likelihood that companies will be able to develop more advanced and financially rewarding strategies. However,

there exists empirical evidence indicating that the impact of digital capabilities on organizations is constrained or insignificant. As indicated by Usai et al. (2021), the primary driver of firms' innovation performance is not digital capabilities, but rather their ongoing efforts in creativity and research and development (R&D) activities. Contemporary research endeavours encounter difficulties in establishing a definitive relationship between the process of digitalization and the performance of organizations (Tan et al., 2010). These findings suggest that an exclusive reliance on digital capabilities is insufficient for achieving effective organizational performance.

Moreover, the impact of the Covid-19 pandemic exhibits significant variation across different nations. Nations characterized by a low Human Development Index (HDI) face various obstacles in their endeavours to restore economic activities. These challenges primarily stem from insufficient infrastructure, limited access to public health resources for vaccination purposes, and the prevalence of informal employment. As a result, these enterprises turned to the utilization of various digital platforms, including gig economy platforms accessed via mobile applications, to mitigate these institutional deficiencies. On the other hand, nations characterized by a high Human Development Index (HDI) demonstrated the ability to promptly address the challenges posed by the pandemic through the effective utilization of the stronger capabilities they had previously developed prior to the onset of the COVID-19 crisis (Caballero-Morales, 2021).

Therefore, these findings serve to underscore the importance of digital capabilities in the context of digitalization. This prompts the following inquiries: What are the

mechanisms by which digital capabilities exert an influence on organizational performance in facilitating the process of digital transformation in the current era of digitalization? In the context of digital transformation, what are the intermediary factors that play a mediating role in the impact of digital capabilities on organizational performance?

In recent years, the digital economy, with information technology and data as essential elements, has been necessary to drive economic growth in all countries. In the past 20 years, the performance measurement system has been considered a comprehensive procedure that affects the entire business activities, so it is often recommended for use by companies (Neely et al., 1995; Nudurupati et al., 2016). Therefore, it is also recommended to use performance measurement methods to promote the plan's implementation and improve organizational performance (Davis & Albright, 2004). Moreover, the available evidence indicates that the inconsistent and unclear findings in the literature on Performance Measurement Systems (PMS) can be attributed to the significant diversity in how PMS is implemented and utilized across different companies (Bourne et al., 2000; Henri, 2006b; Usoff et al., 2002). More than half of the CFOs surveyed by Lee (1999) cited the inability to establish a systematic and comprehensive PMS as one of the most significant obstacles to the success of their company. A practical and high-level performance measurement system can improve the overall competitiveness and management level of a company from many aspects, thereby ensuring the stable development of the company.

This showed that the Performance Measurement Systems play a very important role in company management. However, as the Internet and big data technology continue to evolve, the impact of conventional performance measurement systems is becoming less and less significant. In the 21st century, with the advent of digitalization, organizations need to process more data than ever, and traditional performance measurement systems are increasingly unable to meet the expectations of managers (Chen et al., 2012). The significance of information integration in contemporary knowledge-intensive enterprises cannot be overemphasized. This means it is imperative that the design and execution of PMS exhibit a significant level of innovation to effectively communicate the value and influence of these intangible elements.

In the view of Simons et al. (2000), the Performance Measurement System (PMS) plays a crucial role as a component of a management control system, enabling the effective management of strategic resources. The PMS plays a critical role in providing essential information pertaining to the organization's strategic assets (Kaplan & Norton, 1996). The statement "if you can't measure it, you can't manage it" (Kaplan & Norton, 1996, p. 21) suggests that the ability to measure an organization's fundamental critical success factors, including strategic assets and capabilities, is crucial for effectively managing and ultimately improving the organization's performance. This suggests that certain advantages associated with digital capabilities can indirectly impact business performance by emphasizing the design of the PMS. In the research of Kaplan and Norton (2001b), it is commonly observed that intangible assets do not exert a direct and immediate impact on performance. Instead, their influence on organizational outcomes

is often mediated through a sequence of intermediate stages in a causal pathway. consequently, it is deemed valuable to explore the intermediary function of the Performance Measurement Systems (PMS) in the relationship between digital capabilities and organizational performance.

The primary objective of this research is to provide significant insight into the claims made by Kaplan and Norton (1996, 2001b). This study aims to examine the prospective relationship between digital capabilities, PMS, and organizational performance in various organizations. Moreover, the primary objective of this study is to cover current research deficits by collecting and analyzing empirical data in a systematic manner. Consequently, the purpose of this study is to examine the connection between digital capabilities, PMS, and organizational performance. Specifically, the purpose of this study is to investigate the role of the PMS as a mediator between digital capabilities and organizational performance.

1.3 The Research Gap

The existing research literature on PMS has mainly focused on manufacturing in developed countries, while PMS in the IT industry in developing countries, particularly in firms engaged in new types of business, has rarely been studied (Nasiri et al., 2020; Joiner et al., 2009; Saunila, 2017). While studies have examined the impact of PMS on organizational performance in a manufacturing context, there is a lack of research that explores the specific nuances and challenges faced by IT industries in developing countries, particularly those engaged in new types of business, when implementing and

utilizing PMS. There is therefore a need for research on the role and effectiveness of PMS in developing countries, given the unique characteristics, resource constraints and technological environment of the IT industry in these countries. Such a study will provide valuable insights for the IT industry in developing countries to design and implement a PMS tailored to their specific needs, ultimately improving organizational performance and competitiveness.

Existing literature reviews are insufficient in addressing the knowledge deficit regarding the connection between digital-related capabilities and performance. The hypothesis of the study is that the integration of digital-related capabilities and performance measurement has the potential to affect organizational outcomes. To substantiate this claim, additional empirical research is needed. Several recent studies demonstrate that there is a lack of consensus regarding the connection between digital capabilities and organizational performance (Martnez-Caro, 2020). The utilization of Performance Measurement Systems (PMS) can be affected by strategic resources, resulting in indirect effects on organizational performance (Gul, 1991; Gul & Chia, 1994; Chong & Chong, 1997; Joiner et al., 2009; Mia, 1993; Mia & Clarke, 1999; Jusoh, 2008; Widener, 2006). The strategic resources in this study can be conceptualized as capabilities that are related to digital technologies. The utilization of diverse digital technologies within the digital realm has facilitated the seamless integration of various scenarios, data, and user value. Consequently, this has led to the fragmentation of industry segments, thereby engendering the formation of novel value spaces and the proliferation of numerous innovative business models. The advent of digitalization has ushered in a distinct

business landscape characterized by heightened competition. Hence, it is imperative to attain digitalization within the corporate landscape (Sia et al., 2016). In the present circumstances, it is imperative for Performance Measurement Systems (PMS) to support diverse digital capabilities in order to augment the comprehension of organizational performance. Hence, premenstrual syndrome (PMS) is considered an intermediary variable. The aforementioned process entails the exploration of digital-related capabilities with the aim of enhancing organizational performance.

Additional investigation is required to effectively address the third gap, which concerns the elucidation of the relationship between PMS (Performance Measurement Systems) and organizational performance (Davis & Albright, 2004; Lee & Yang, 2011; Micheli & Manzoni, 2010). PMS is employed as a means of effectively overseeing and enhancing the performance of both the organization as a whole and its individual employees. The primary objective of this initiative is to assist organizations in attaining their objectives and fostering enhanced corporate growth. It can be inferred that the influence of PMS is beneficial. Given its widespread usage in evaluating actions aimed at improving long-term performance, it can be argued that PMS has a positive impact. Although several studies have indicated a potential impact of PMS on organizational performance, the precise mediating factors that facilitate this relationship, such as employee behavior, organizational learning, and innovation, have not been definitively established. Additional investigation can yield valuable knowledge regarding the mediating mechanisms and pathways by which PMS influences the performance of organizations, achieved through comprehensive analysis and empirical research.

1.4 Research Questions

Based on the problem statement and research gaps, this study develops the following research questions:

RQ1. What are the relationships between the four dimensions of digital-related capabilities and organizational performance?

RQ2. What are the relationships between the four dimensions of digital-related capabilities and PMS design?

RQ3. Does PMS design influence organizational performance?

RQ4.Does PMS design mediate the relationship between the four dimensions of digital-related capabilities and organizational performance?

1.5 Research Objectives

Based on the research questions, this study develops the following research objectives:

RO1. To examine the relationships between the four dimensions of digital-related capabilities and organizational performance.

RO2. To examine the relationships between the four dimensions of digital-related capabilities and PMS design.

RO3. To examine the relationship between the PMS design and organizational performance.

RO4. To determine whether PMS design mediates the relationship between the four dimensions of digital-related capabilities and organizational performance.

1.6 Significance of the Study

In a business environment that is more dynamic and complex under the boom of digital technology (Hanelt et al., 2021), such as the instability of actor networks, the volatility of institutions, the weakening of organizational cognitive and behavioural inertia due to digital applications, and the increased agility of organizations to perceive and capture opportunities, organizational competitive advantage in digital contexts becomes transient and not durable, and enterprise digitalization offers adaptation acceleration. The digitalization of the enterprise provides useful ideas for accelerating organizations to gain a sustainable competitive advantage. Among them, whether digital-related capabilities through PMS can improve organizational performance under the pull effect of the new crown epidemics and new information infrastructure-building policy is an emerging phenomenon of high interest to the practice community.

Digital capabilities work towards strategy realization and organizational value creation by providing managers with valuable information for decision-making through the PMS. Improving organizational insight into customers, facilitating resource sharing between heterogeneous players, and re-engineering organizational manufacturing processes are key capabilities that drive digital transformation (Yu et al., 2017; Annarelli et al., 2021). In the context of the new economic norm, the development of technology and changes in business models has profoundly affected and changed how companies create value. Therefore, following the direction of policy support and introducing digital-related capabilities to be applied to PMS is an important option to improve organizational performance.

This study offers valuable guidance to managers of large and medium enterprises

regarding the development of digital capabilities in the current digital era. First and foremost, it is important to recognize that various functions within the digital environment do not hold equal significance and can have varying impacts on organizational performance. Human capabilities in the realm of digital, for instance, are at a shallow tier but have far-reaching consequences. Therefore, managers can increase organizational performance using PMS by building digital-related human capabilities. In addition, given the limited resources available to medium and big businesses, selecting the right capabilities becomes crucial. Therefore, it is crucial to focus on the capabilities needed to support PMS in a digital environment and thus improve organizational performance.

The traditional competitive advantage is determined by the industry structure selected by the enterprise and the resources controlled by the enterprise. However, in recent years, digital technology has made the determinant of the enterprise's competitive advantage and the ability to utilize external ecological resources effectively. Enterprises need to achieve digital growth, and enterprises must realize that digital assets are the most significant wealth in the future. China officially entered the second half of digitalization in 2021, and more and more industries have begun to join the army of digital transformation. Performance transformation is also one of the crucial requirements for digital organizational transformation. It is clear that the competition mechanism could be better, the reward and punishment mechanism could be more effective, and the members could be unit and more active. As a result, the traditional performance measurement system can no longer meet the status quo. Therefore, the

performance measurement system of digital organizations also needs to be redesigned. In fact, the Internet, big data, and other technologies have enabled many global enterprises and Internet companies to achieve more convenient and better intelligent performance evaluation, performance communication, and feedback experiences, as well as improved performance communication and feedback. This study suggests that the integration of digital-related capabilities and performance measurement can potentially influence companies, although existing research does not provide conclusive evidence to support this claim. Additionally, there is a need for further investigation to clarify the relationship between PMS and organizational performance. Therefore, the findings of digital capabilities, organizational performance, and PMS may differ from previous studies. In summary, this study aims to make the following theoretical contributions in order to achieve the aforementioned research objectives:

1. This research can improve our understanding of the mix of digital-related capabilities and organizational performance to get the most from this critical success factor.

2. Based on the Resource Orchestration Theory, this study will discuss whether an effective combining of digital-related capabilities and PMS can improve organizational performance.

3. A structural equation (PLS) model examines the relationship between digital-related capabilities and PMS in organizational performance.

1.6.1 Theoretical Implications

This study presents a conceptual model that aims to integrate the existing literature on Performance Measurement Systems (PMS) from diverse academic disciplines. Based on

this theoretical framework, the majority of initial investigations primarily concentrate on examining the influence of Performance Measurement Systems (PMS) utilization on financial performance and organizational performance, while neglecting to consider the influence of PMS design on organizational performance. This study presents a comprehensive framework that establishes the relationship between four dimensions of digital-related capabilities, PMS design, and organizational performance. This study offers a more extensive empirical examination of the relationship between effective Performance Measurement Systems (PMS) design, digital-related capabilities, and organizational performance. Furthermore, this study makes a valuable contribution to the current body of research, as evidenced by Nasiri et al.'s (2020) findings. This study aims to examine the impact of effective Performance Measurement Systems (PMS) design on resource coordination mechanisms, specifically focusing on four dimensions of digital-related capabilities. The study further investigates how these mechanisms contribute to enhancing organizational performance, drawing insights from the resource orchestration theory. Moreover, the implementation of Performance Measurement Systems (PMS) has been found to enhance organizational performance by facilitating the comparison of operational outcomes with predetermined objectives. Furthermore, PMS aids in the efficient allocation of resources, thereby contributing to the enhancement of future performance within organizations. Metrics and performance measurement are of significant importance in operationalizing an organization's mission or strategy, as they facilitate the establishment of alignment and coordination (Melnyk et al., 2014). Hence, the design of PMS that is effective is typically evaluated in a favorable manner. As previously indicated, it is imperative for organizations to respond

to the demands posed by the digital era through the modification of their operations, approaches, and established procedures (Loureiro et al., 2021). Nevertheless, prior experimental investigations have failed to explicitly analyze the mediating function of PMS design in the relationship between digital-related capabilities and organizational performance. Hence, an additional fundamental theoretical contribution of this study is to integrate it within the existing body of preliminary research on the four dimensions of digital-related capabilities in the context of management control systems. The objective of this study is to investigate the mediating effect of PMS design on the relationship between four digital-related capabilities and organizational performance.

The existing body of literature in managerial accounting and Performance Measurement Systems (PMS) has predominantly emphasized empirical investigations pertaining to the concept of measurement diversity, as evidenced by the works of Ittner et al. (2003). Within the realm of Performance Measurement Systems (PMS), it is imperative to direct attention towards comprehensively examining PMS, encompassing its overall structure and configuration. In this particular study, the examination of the influence of organizational culture on the utilization of PMS and its diversity was conducted, drawing upon the theoretical framework of resource orchestration theory as proposed by Henri (2006b). According to Henri (2006b), the utilization of PMS and the measurement of diversity are influenced by organizational culture, as observed from a contingency standpoint. This study seeks to expand upon the existing body of management accounting literature by adopting a different perspective, specifically resource orchestration theory. In essence, this study examines the issue of PMS by

considering it from two distinct yet interconnected perspectives: the diversity of performance indicators and the design of PMS. The latter encompasses key performance indicators, causality, clear goals and action plans, and reward linkage. This research contributes to the existing body of literature by offering a more comprehensive and rigorous conceptualization of PMS.

1.6.2 Practical Implications

This study provides an alternative perspective for managers within organizations, thereby contributing to existing knowledge in the field. Practitioners can acquire valuable insights into the effective development and management of information dissemination, as well as the potential of well-designed Performance Measurement Systems (PMS) to enhance the management of an organization's key strategic resources. Consequently, this can lead to an improved impact of digital-related capabilities on firm performance. However, this study offers valuable insights for managers and organizations regarding the adoption of suitable managerial accounting practices, specifically tailored to the digital capabilities of the organization. This statement supports the argument made by Widener (2006) that organizations should develop suitable Performance Measurement Systems (PMS) to effectively acquire and oversee strategic resources and capabilities. One notable implication of this finding underscores the significance of allocating resources towards information communication and knowledge. Consequently, organizations that prioritize these aspects may need to approach the design and structure of Performance Measurement Systems differently compared to those that do not prioritize them to the same extent. It is imperative for

managers to acknowledge this phenomenon and respond in a manner that will ultimately enhance the overall effectiveness of the organization.

To sum up, the relationship between digital-related capabilities, PMS design and organizational performance can provide the development level of the organization's digital-related capabilities, construct a design compatibility Performance Measurement Systems, and achieve the direction of competitive advantage. In addition, understanding the impact of digital-related capabilities and PMS design on organizational performance will help managers formulate future development strategies. It also highlights to managers the fact that digital-related capabilities are critical to the success of organizations operating in volatile and uncertain environments. In addition, considering the importance of industry types as an accidental factor of digitalization, it is crucial for Internet large and medium-sized enterprises to seize the opportunities of emerging digital technologies and trends in industry digitalization and to have the ability to transform their presence in the digital environment by designing appropriate PMS improves organizational performance.

1.7 Organization of the Dissertation

This study provides a new conceptual framework that related digital-related capabilities to organizational performance and Performance Measurement Systems and examines their interrelationships and their impact on organizational performance. This study has five chapters, and the remainder is structured as follows. Chapter 2, the literature review, discusses the conceptual background and the development of assumptions. Introduce the

literature on the importance of digital-related capabilities in businesses in the digital age and the relationship between PMS and organizational performance. In addition, the literature review explains the need for digital transformation for businesses, as well as discusses the relationships and hypothesis development between the variables. The literature review also discusses resource orchestration theory and how it is integrated with the variables in this study. Chapter 3 explains the research methodology, and this study adopts a positivist research paradigm, using tables to explain what was measured and the source of the dimensions for each research question. This chapter also discusses the quantitative research methodology used in this study - the data collection method and the questionnaire instrument. This section of Chapter 4 covers the pilot study that validated the validity of the questionnaire and its study prior to the formal research investigation, followed by the formal survey analysis. This is followed by an overview of data analysis strategies (e.g., structural equation modeling or partial least squares) and a discussion of statistical studies used to determine the reliability and validity of research models. This is supplemented by the use of data analysis software to produce the results of the data analysis. Chapter 5 reviews and discusses the findings of each research question, setting out the findings for each question. Finally, this chapter also identifies limitations and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter explains how having digital capabilities in the Internet industry can create value for a company, starting from the concept of four digital-related capabilities and how PMS, combined with organizational performance, can maximize the value of a company. This study then analyzes the theory, and a theoretical model is presented. The hypothesis development is then presented one by one.

The body of the chapter is divided into six subsections, sections 2.1-2.3, which focus on explaining the concepts between the independent, dependent, and mediating variables. Section 2.4 explains the theory of resource orchestration, in which combined resource diversity is a critical practice in orchestrating digital capabilities, organizational performance, and PMS. Section 2.5 constructs a theoretical model based on the theory. Section 2.6 focuses on the relationships between the variables from which hypotheses are formulated.

2.1 Independent Variables (Digital-Related Capabilities)

In the face of a rapidly changing external competitive market, digital technology can assist companies in monitoring market trends and changes in public opinion, accurately analyzing individual changes in customer demand and overall trend orientation based on extensive data analysis, guiding companies to focus on providing high-quality, highly

accurate operational services or products for their core customers, making the entire business operation more efficient and scientific (Zang, 2021).

Companies are increasingly compelled to adopt and utilize digital technology due to the constantly changing business environment. This has resulted in significant and permanent transformations in various business processes (Lyytinen & Rose, 2003). As a result, this has implications for the nature of product-service innovation and competitive dynamics (Yoo et al., 2012; Porter & Heppelmann, 2014;). The concept of digital transformation stems from the broader concept of digitalization, which entails utilizing digital technology to fundamentally change business models and explore novel opportunities for generating revenue and creating value (Parida et al., 2019; Kohtamäki et al., 2019). To fully leverage the advantages linked to effective digital transformation, organizations must actively cultivate distinct capabilities throughout their organizational and operational structure at various levels (Battistella et al., 2017; Eller et al., 2020). As stated by Afuah and Tucci (2003), companies can enhance their ability to navigate digital transformation and gain a competitive advantage by effectively developing and utilizing digital resources and capabilities. As a result, the possession of digital capabilities is an essential requirement for organizations to attain a lasting competitive edge.

In accordance with Porter and Heppelmann (2014), the integration of advanced digital capabilities can enhance reliability, efficiency, and optimization potential for novel functionalities, resulting in a significant augmentation of the value that companies offer

to their customers. In a more precise context, it is imperative for organizations to cultivate digital capabilities by implementing systematic procedures that effectively harness digital resources in order to gain a competitive advantage. As a result, the advent of the digital era and the societal transition towards digital transformation have led to an increasing need for a greater focus on digitalization in its entirety, encompassing the enhancement of digital capabilities.

Having digital capabilities has become essential for businesses, with some CEOs stating clearly that all businesses of the future will either be digitally native or digitally transformed, and those that are not will no longer exist (Zhang, 2018). This statement is a bit extreme, but it does show how important it is for companies to have digital capabilities in future development. Whether or not a company is digitally capable becomes a watershed moment for whether it will have a chance to move into the future. Three essential characteristics of digitalization have been summarized in studies on digitalization connectivity, symbiosis, and the present moment, which are the fundamental differences between digital survival and survival in the industrial age.

These three essential characteristics also determine the difference between companies' capabilities in the industrial and digital eras. Thus, digital capabilities are defined as the ability to connect, co-exist, and be in the moment. This is not a strict definition but simply a way of understanding digital capabilities from an intrinsic logical, and meaningful point of view (Li, 2022). In the industrial era, companies needed to own their resources and capabilities and build core competencies to realize their strategies. In

the digital era, through connectivity and symbiosis, companies can leverage external resources and capabilities to quickly gather the resources and capabilities needed to realize their strategies without being limited by themselves. Therefore, in understanding the value and meaning of the now, companies must seek to aggregate resources and capabilities on a larger scale, with connectivity becoming a key element in realizing the strategy (Chen, 2018).

The inclusion of Huawei in the automotive industry would have been deemed implausible had it adhered to the principles of the industrial era, as Huawei necessitated the acquisition of requisite competencies and resources within the automotive sector. Nevertheless, in the contemporary era of digitalization, this notion has become a tangible actuality, owing to Huawei's cutting-edge technological advancements that facilitate seamless connectivity between automotive manufacturers, thereby paving the way for the emergence of a novel breed of automobiles. Based on Chen (2018), the capacity for connection and symbiosis implies that each discipline transcends its boundaries and generates novel value. The potentialities presented by digital technology encompass various domains and are readily observable in our current context. Tencent Inc. (2018) reported that Tencent Healthcare is leveraging the artificial intelligence technology developed by Tencent to enhance diagnostic accuracy by assisting doctors in making complementary diagnoses. In the words of Zhang (2021), the Rhino Smart initiative by Alibaba has stimulated innovative thinking in the realm of new manufacturing. Both companies have expanded their digital capabilities across various domains, thereby introducing novel value propositions and boundless opportunities

within their respective industries.

With digital transformation, the business environment of modern enterprises is also quietly changing. Businesses must adapt their operational models and develop strategies for dealing with change. To operate effectively in an increasingly digital business environment as a member of the digital ecosystem (Delgosha et al., 2020), businesses must not only identify novel and new ways to alter their business and acquire continually changing capabilities. Pioneering and innovative in the environment. Mikalef et al. (2020) believed that companies must find ways to use digital innovation to survive in an increasingly digital environment. The prominence of innovation capability in the corporate landscape is increasing, leading to potential benefits for enterprises such as higher profitability and improved customer satisfaction (Bednar & Welch, 2019; Parida et al., 2015). The origins of digital innovation can be attributed to the process of digitalization in society and culture (Chan et al., 2019), which has established the essential prerequisites for innovation (Yoo et al., 2010). The combination of this development and digital-related capabilities will allow the organization to adapt better to digital transformation and market opportunities.

Prior studies have established that the organizational capabilities of a company exert a substantial influence on its overall performance. This research defines digital-related capabilities as organizational capabilities that exist in multi-dimensional structures, encompassing various aspects such as people (Kane et al., 2015; Legner et al., 2017), collaboration (Amit & Han, 2017; Chuang & Lin, 2015; El Sway et al., 2016; Pagani &

Pardo, 2017; Sjödin et al., 2016), technology (El Sawy et al., 2016; Parida et al., 2015; Sjödin et al., 2016; Yoo et al., 2010), and innovation (Parida et al., 2015; Sjödin et al., 2016; Sousa & Rocha, 2019; Xue, 2014).

Numerous academic research studies investigate digital capabilities, either through direct or indirect methods, by analyzing various research instances that primarily concentrate on the correlation between digital-related capabilities and business transformation. The primary focus of this study revolves around manufacturing enterprises, with a specific emphasis on investigating the correlation between digital transformation capabilities and organizational performance (Neely et al., 2020). This study aims to investigate strategies for facilitating the process of digital transformation in large and medium enterprises, considering the limitations of limited resources and insufficient capacity. These strategies are proposed by Li et al. (2018). Hence, this topic has attracted the interest of scholars in the academic community. Cenamor et al. (2019) conducted a study to examine the influence of digital platform capabilities and networks on entrepreneurial activities within the context of large and medium-sized enterprises. In a similar manner, Neirotti et al. (2018) conducted a study aimed at examining the strategies employed by large and medium-sized enterprises in effectively utilizing information and communication technology (ICT) capabilities to adapt to their unique business contexts. There exists a dearth of research that has specifically investigated the correlation between digital-related capabilities and organizational performance, as well as Performance Measurement Systems (PMS) in general. The objective of this study is to examine the intention to perceive digital capabilities as a more advanced skill set

within the context of Internet-based businesses. This study aims to investigate the intention to regard digital capabilities as a higher-order competency within the context of Internet enterprises. Additionally, it will explore how PMS can enhance firm competitiveness and subsequently enhance organizational performance.

2.1.1 Human Capabilities in Digital-Related Capabilities

Digital talent plays a crucial role in driving the digital operations of a company. In the digital age, individuals must comprehend the significance of digitalization in business operations and management and possess proficiency in employing core digital technologies in their work (Zhao, 2021). While some companies concentrate on attracting IT professionals with digital expertise, it is important to also emphasize the development of digital management skills among other personnel. During the process of digital transformation, not only should operational staff enhance their digital operational abilities, but functional departments should also cultivate their understanding and skills in digital management (Wei, 2022). The HR department should prioritize digitalization efforts to foster digital talent within functional departments. Only when the HR department possesses a digital mindset and capabilities can the organization's recruitment, hiring, retention, motivation, and assessment align with the demands of the digital era (El Sawy et al., 2016).

In addition, a digital approach to operations and management requires more empowerment and empowerment of employees so that they can be motivated to work harder and more efficiently to complete the organization’s tasks and help it achieves the

goals it has set while allowing their values to be recognized and realized (Zhou & Song, 2020). Business leaders and human resources management should make creating digital talent a significant work focus.

The evolution of the talent concept holds significant importance within the context of digital transformation, warranting careful consideration (Zhang & Tan, 2022). The emphasis placed by companies on talent has shifted in the transformation process, moving away from conventional capabilities towards the digital attributes deemed essential in the contemporary era. What are the defining characteristics of a digital talent? The possession of digital talent necessitates the cultivation of a digital strategic mindset, digital thinking capabilities, proficiency in digital execution, and a propensity for digital innovation.

Digital thinking mainly includes thinking about some concepts or thinking about data, systems, and so on because in the development of many things are swift changes, and in the face of this rapid change in all aspects of uncertainty, how to use their own thinking to make a judgment is very important. If always in the original concept and framework for thinking, then it is likely to be what these people need to do is to find the essence of the problem and consider it in many ways, primarily through a series of big data to observe the causes and changes behind it, so that they can find a better response (Chen, 2008).

Digital Execution is mainly reflected in three dimensions: result orientation, online

collaboration, and flexibility.

(1) Result orientation requires digital talents to take results as an essential criterion for measuring behavior and not to focus too much on the process (Li, 2021).

(2) Online collaboration necessitates individuals with digital skills who can utilize technology to address internal and external challenges while employing online remote communication and collaboration for resource allocation (Chen, 2021).

(3) Flexible and responsive requires digital talents to think quickly, react quickly, and be flexible in the face of unforeseen events and problems (Cao et al., 2022).

Digital innovation is mainly reflected in three levels: openness and inclusiveness, breakthrough innovation, and continuous learning (Li et al., 2022).

(1) Digital talents should possess an attitude of openness and tolerance, be receptive to diverse perspectives, and actively embrace and acquire new knowledge and ideas.

(2) Digital talents need to embrace a mindset of breakthrough innovation, avoiding conventional thinking and stereotypes, and instead generating novel ideas and insights based on dynamic data.

(3) Digital talents need to demonstrate a continuous learning mindset, exhibiting the drive and actions to consistently enhance their skills, broaden their knowledge, and continuously grow in various domains.

Innovation means being inclusive of all things, actively learning and accepting new knowledge and ideas, so it is important that such people do not just stick to the rules but are aware of the need for new ideas and thoughts.

Human capability is the wellspring of digital innovation, and digitalization necessitates employee engagement, preparedness, and comprehension of digital-related knowledge. Due to the complexity of the current digital age (Kache and Seuring, 2017; Lerch and Gotsch, 2015), companies that lack employees with digital skills or problem-solving employees must have insufficient capabilities. This research defines digital-related human capabilities as the accumulation of abilities, knowledge, and skills required for employees to transition to a digitalized workplace. Previous studies have shown that human factors often affect performance evaluation results, and the influence of human factors will play a specific role in it. Enterprises have encountered various challenges in implementing performance appraisal, particularly during the design and formulation of appraisal standards. Reliance on non-quantitative indicators exacerbates the impact of human factors, resulting in a significant portion of assessment issues and rendering the performance appraisal process ineffective. The assessment is not rigorous, unfair, and even to a certain extent, it needs to be more formal and effective.

2.1.2 Collaboration Capabilities in Digital-Related Capabilities

In the context of the vigorous development of enterprise informatization today, the problems of traditional office scenarios have become increasingly prominent. More and more companies have reported that employees' requirements for office experience are constantly improving, information management is becoming increasingly complex, and the status quo of the IT industry cannot meet business needs, which has become an obstacle to their corporate transformation. The outbreak of the epidemic has posed new challenges to corporate office scenarios. Flexible access to office methods, secure and

controllable enterprise information, and convenient and quick operation and maintenance support have become the standards for the new generation of digital workspaces. At present, most Internet large and medium enterprises have the following pain points:

(1) The existing working environment cannot be managed uniformly, user data is scattered, and data control needs to be included. An efficient and unified management mode of the digital workspace is required to ensure enterprise data security.

(2) The digital workspace provides access capabilities at any time, on any device, and anywhere, perfectly matching the current mobile development of enterprise business.

(3) The digital workspace is released by a standardized image, which can quickly meet the maintenance requirements of large-scale applications and systems and meet the development of business applications.

(4) The policy management, authority control, and intelligent monitoring capabilities of the digital workspace improve the efficiency of operation and maintenance and simplify the complexity of desktop management.

The era of cloud and digitalization is an era of interconnection, but due to the complexity of digitalization, it is impossible to gain a competitive advantage through a single player. Therefore, collaboration capabilities must be acquired to maintain cooperative alliances and partner to build value networks (Amit & Han, 2017; El Sawy et al., 2016; Pagani & Pardo, 2017; Sjödin et al., 2016). Given that digitalization has changed the structure of social relations inside and outside organizations (Pagani & Pardo, 2017), large and medium enterprises must explore opportunities to collaborate

with partners to enhance their existing skills with partners (Chan et al., 2019). Collaboration capabilities can also be used to exchange and learn information and expertise through digital channels, among other purposes. Digitalization also facilitates the exchange of knowledge and experience (Chuang and Lin, 2015; Legner et al., 2017; Maravilhas & Martins, 2019). Every enterprise needs to establish a more flexible business model, efficiently connect employees, customers, and suppliers, break the boundaries of time and space, and allow everyone to collaborate efficiently on any device, anytime, anywhere, to make decisions and solve problems. Therefore, collaboration is the basis for enterprises to carry out digital transformation and achieve business goals. It needs to focus on user experience, provide overall collaboration and digital workspace solutions, create a sustainable development platform for enterprises, realize on-demand deployment and flexible expansion, and realize that anyone, anywhere, and through any device can collaborate seamlessly.

The study conducted by Zahra and George (2002) provided evidence to support the notion that the establishment of robust inter-firm connections is contingent upon the presence of trust and cooperation. Additionally, this cooperative relationship enhances the exchange and application of external knowledge. To successfully navigate ambiguous situations, it is crucial for organizations to disseminate precise and prompt information pertaining to their business decisions and operations, thereby facilitating the synchronization of collaborative initiatives (Wang, 2007).

There is a growing tendency among enterprises to increasingly depend on external

sources for innovation. An illustration of the process employed by Microsoft and IBM to explore novel product and service innovations necessitates collaboration both within and among organizations (Greenemeier et al., 2007). This study examines the necessity of collaboration among different departments within an enterprise as well as with external enterprises in order to enhance work efficiency and service quality. Smith et al. (1995) posited that cooperation encompasses the amalgamation, interaction, and establishment of novel relationships among individuals, groups, and organizations, with the aim of achieving mutual gain or benefit. The ability to collaborate refers to the act of working together with partners to gather and exchange knowledge, make strategic decisions, or offer specialized services.

To ensure the efficient and flexible functioning of virtual teams while maintaining management control, organizations must adeptly utilize digital tools to segment the team's interactions and performance. By doing so, they can effectively balance the team's diversity and autonomy with the organization's requirements. Systematic and consistent with achieving an organic balance. A model combining flexible and co-working hours can be used, allowing employee autonomy and organizational unity to function simultaneously. Use video conferencing instead of traditional telephone conferences to improve team trust and interactive assistance (Schaubroeck & Yu, 2017).

In addition, enterprises should also pay attention to the synergy between different teams, adopt an effective linkage incentive mechanism, so that cross-departmental teams can break the traditional barriers, and produce a synergistic effect in the cooperation, so that

the cooperation between the teams is smooth, and the team members get the due rewards. Recognition and a sense of accomplishment.

The ability to collaborate through digitalization can bring many benefits to enterprises. For example, improve the working experience of employees, embrace remote offices, and use the intelligent digital workspace to support remote offices more easily (Zhou, 2013). Form an efficient virtual team anytime, anywhere to achieve efficient interaction, improve work efficiency and promote mobile productivity. In terms of creating company business value, it provides collaboration tools and integration of production flow to optimize business processes (Shen, 2010). Efficient meeting communication speeds up decision-making time and makes business more agile. Establish rapid collaborative relationships with business partners and customers to promote business links. In addition, it can also reduce operating costs and improve operational efficiency. Integrate business processes through collaboration functions, optimize travel costs, reduce costs, and improve communication efficiency. Ensuring users, applications, and data are always secure, no matter where employees work, boosts mobile productivity. In conclusion, this study identifies digital collaboration capabilities as a necessary capability for digitalization.

2.1.3 Technical Capabilities in Digital-Related Capabilities

Technical refers to the methodical utilization of scientific and other structured knowledge in the execution of practical undertakings (Galbraith, 1971). Technical capability encompasses the amalgamation of technology, managerial and institutional

knowledge, and skills that empower productive firms to efficiently utilize equipment and technology (Biggs et al., 1995). The concept of technical capability encompasses the comprehensive endeavors undertaken by each organization to assimilate and cultivate the knowledge necessary for productive activities. The technical capability of a company transcends the mere aggregation of its employees' education and training. This encompasses the process of learning that individuals undergo while working within an organization, as well as the strategies employed by the organization to integrate and incentivize individuals in fulfilling their respective roles (Hoffman, 1989; Biggs et al., 1995). This aligns with the definition provided by Rosenberg and Firschtak (1985), wherein technical capability is characterized as the accumulation of technological knowledge or organizational learning. This particular capability is unique to various sectors and firms in a general sense and can be characterized as a type of institutional knowledge that encompasses a blend of skills that have been acquired by the members of the organization over a period of time. Technical capability includes the knowledge that each firm must itself use to produce. This involves acquiring certain skills and information from external sources while developing others internally, with the selection being influenced by factors such as technology, market dynamics, and corporate strategy.

The scholarly literature pertaining to management places significant emphasis on the crucial role of a robust dedication to technology in order to successfully navigate and adjust to evolving technological circumstances (Al-Ansari et al., 2013). The Resource-Based View (RBV) has been extensively employed in the field of innovation research to

analyze the strategies implemented by organizations in order to attain a competitive edge and attain outstanding performance. Based on Barney's (1986) theoretical framework, the attainment of exceptional organizational performance can be ascribed to the firm's possession of resources and capabilities that are distinct, limited in availability, and challenging for competitors to replicate. The present study utilizes the theoretical framework of the Resource-Based View (RBV) to conceptualize the importance of technological orientation in relation to emerging digital technology trends as a crucial asset for information technology (IT) firms. The viability of these enterprises is significantly contingent upon their capacity to adapt and proficiently leverage these emerging digital technologies. This study introduces a conceptual framework that defines digital technology as a company's commitment to employing digital technology to deliver innovative products, services, and solutions. Based on the provided definition, organizations that possess a digital orientation display a heightened willingness to embrace digital technology and showcase a tendency to promptly implement digital initiatives.

Digital technology has come to the fore in all aspects of economic and social development. For example, in the development of the education sector, there are currently 232 million online education users in China. To promote the sharing of quality resources and the balanced development of education, the government will invest a total of US$30 billion in education technology by 2020 and is committed to making personalized learning platforms available to students at the compulsory education level. The Indonesian non-profit group Room to Read, on the other hand, is committed to

further improving national literacy through the creation of an open-source platform containing children's stories, literacy videos, and teacher training videos (Ludanga, 2014). Furthermore, technology has changed not only the way people learn but also what they learn: the number of courses teaching coding and web development skills has increased elevenfold in the last six years. The importance of digital technology in people's lives is undeniable, but how and how companies launch technological products and services raises some questions. For example, existing data models limit the amount of personal data generated in smart devices and products. Companies compete to control ownership of user data through digital products, dictating their rules for sharing and using data and erecting a wall between data. In addition, there is much debate about the impact on jobs when AI is used on a large scale.

On the one hand, technology is advancing at a rapid pace, but on the other hand, people hear a technology boycott, where people question the value of technology. In fact, the real question is not whether technology is valuable but whether companies are careful in their approach to its use. To develop further, companies must first recognize the important role technology plays in people’s lives today and explore the changing relationship between people and technology, addressing the 'technology conflict' that arises between the old application models of companies and the new expectations of users.

In the contemporary era of digitalization, the utilization of both internal and external organizational collaboration has become imperative, thereby requiring the acquisition of

technical competencies to effectively deliver products before they enter the market (Legner et al., 2017; Sjödinetal, 2016). As a result, the capabilities are dependent on digital technology and play a significant role in the integration of products and services (El Sway et al., 2016). Additionally, they facilitate access to modern borderless services and activities (Parida et al., 2015; Sjödin et al., 2016; Yoo et al., 2010). Hence, within the context of this research, the concept of digital-related technical capabilities refers to a diverse set of technical proficiencies that enable organizations to achieve digital transformation. Moreover, the empirical validation of the correlation between digital technical factors and organizational performance remains inconclusive, particularly within the realm of digital technology. Wroblewski (2018) conducted a study on Swedish companies, revealing a negative and weak correlation between digital maturity and company operating performance. Hence, it is crucial for organizations to investigate and comprehend the relationship between digital capabilities, PMS, and organizational performance within the realm of large and medium-sized enterprises. This examination is imperative as organizations strive to provide indispensable digital offerings such as software, hardware, and information technology services.

2.1.4 Innovation Capabilities in Digital-Related Capabilities

The ability to innovate has always been an essential element for companies to win in the market. Many companies launched investments in new technologies during the new crown epidemic, but this conventional reactive and unanalytical follow-through approach could have improved their plight. At the same time, there were many companies that accelerated their digital transformation during the epidemic, using it to

increase their willingness and intensity to innovate and to leverage the big data and intelligent analytics of digital platforms to find business opportunities, successfully turning around their woes and achieving leapfrog growth (Wang et al.,2022).

The concept of innovation capabilities encompasses various interpretations. The concept of an organization's innovation capabilities refers to its inherent ability to generate outcomes that are novel and inventive (Neely et al., 2001). According to Lawson and Samson (2001), innovation capabilities can be defined as the continuous ability to convert knowledge and ideas into original products, processes, and systems, resulting in benefits for both the organization and its stakeholders. The concept of innovation capabilities is distinguished by its multifaceted nature. Perdomo-Ortiz et al. (2006) argued that the lack of a universally accepted analytical framework for investigating innovation management can be ascribed to the diverse array of viewpoints present within this domain. The existing literature often prioritizes the investigation of specific types of innovation, such as product innovation, rather than undertaking a comprehensive evaluation of overall innovation capacities (Ibrahim et al., 2009). Sen and Egelhoff (2000) proposed a categorization of innovation capabilities into two distinct types: breakthrough innovation capabilities and incremental innovation capabilities. Forsman and Annala (2011) stated a considerable portion of large and medium-sized enterprises demonstrate a predilection for engaging in incremental innovation initiatives. As a result, this tendency leads to a wide array of categorizations of innovation, which include but are not limited to products, services, processes, production methods, and single-function innovations. Moreover, the existing scholarly

literature primarily concentrates on evaluating an organization's innovation capacities by delineating the various types of capabilities included within its overarching innovation framework. The literature has extensively examined various capabilities, encompassing a wide range of domains such as product innovation, process innovation, market innovation, strategic innovation, organizational capabilities, manufacturing capabilities, network capabilities, entrepreneurial capabilities, and R&D capabilities (Christensen, 1995; Guan & Ma, 2003; Wang & Ahmed, 2004; Forsman, 2009).

An alternative viewpoint entails placing greater emphasis on the organizational dimensions of innovation. Lawson and Samson (2001) propose that innovation capability functions as a theoretical framework that delineates strategies undertaken to augment the effectiveness of innovation endeavours. According to Saenz et al. (2009), the concept of innovation can be understood as a dynamic capability, which pertains to an organization's capacity to effectively incorporate, build, and adapt both internal and external capabilities to address the ever-changing business landscape (Teece et al., 1997). This notion encompasses various dimensions. Moreover, it is possible to view different components of innovation capabilities as factors that contribute to the initiation and execution of innovation activities. According to Davila et al. (2006), inputs are regarded as valuable resources that are utilized in the process of innovation creation. The inputs can be classified as either tangible or intangible. Tangible inputs encompass individuals, finances, time, and equipment, among others. On the other hand, intangible inputs comprise motivation, knowledge, and organizational culture, among other factors. Prajogo and Ahmed (2006) conduct a comprehensive examination of innovation

management, encompassing both technical and human dimensions. Human factors refer to the collective influence of individuals and social practices on the overall effectiveness and achievements of an organization. The term firm innovation capability as employed by Perdomo-Ortiz et al. (2006) pertained to the essential factors that contribute to the success of the innovation process. These key factors can be understood as the dimensions of corporate innovation capabilities so that these factors can be used to measure corporate innovation capabilities.

This study examines the factors that contribute to successful innovation, specifically focusing on the drivers and organizational aspects that influence an organization's capacity to effectively manage innovation. Based on earlier literature, these aspects include, for example, leadership practices (Bessant, 2003; Tidd et al., 2005; Perdomo-Ortiz et al., 2006; Martensen et al., 2007; Skarzynski & Gibson, 2008; Smith et al., 2008; Paalanen et al., 2009), employee skills and innovation capabilities (Perdomo-Ortiz et al., 2006; Martensen et al., 2007; Skarzynski & Gibson, 2008; Tura et al., 2008; Smith et al., 2008; Paalanen et al., 2009; Liu, 2009), processes and tools of idea management (Lawson & Samson, 2001; Tidd et al., 2005; Skarzynski & Gibson, 2008; Smith et al., 2008), Supporting culture (Lawson & Samson, 2001; Tidd et al., 2005; Martensen et al., 2007; Skarzynski & Gibson, 2008; Smith et al., 2008; Paalanen et al., 2009; Liu, 2009), external sources of information (Romijnand Albaladejo, 2002; Tidd et al., 2005; Perdomo-Ortiz et al., 2006; Paalanen et al., 2009; Laforet, 2011), the development of personal knowledge (Bessant, 2003; Tidd et al., 2005), employee benefits (Laforet, 2011), and links to strategic objectives (Bessant, 2003; Martensen et

al., 2007; Smith et al., 2008). Based on the research conducted by Francis and Bessant (2005), it can be deduced that innovative capabilities do not constitute a singular set of characteristics. Alternatively, it may be imperative to consider various aspects in order to foster the advancement of diverse forms of innovations.

The concept of disruptive digital business is rooted in the process of digitalization and necessitates effective management of innovation (Sousa & Rocha, 2019). The essential capabilities necessary for disruptive digital enterprises encompass creative aptitude, the aptness to identify and capitalize on entrepreneurial prospects, and the proficiency to expand the range of organizational offerings. According to Sousa and Rocha (2019), in the contemporary era of digitalization, the capacity to generate innovative concepts, resolutions, and commodities is deemed as a crucial organizational competence (Parida et al., 2015; Sjodin et al., 2016; Xue, 2014). Hence, it is interconnected with the process of digitalization. The innovation capabilities are a crucial factor for the success of an enterprise. Extensive research has been conducted on the relationship between innovation and organizational performance, as evidenced by the studies conducted by Yang et al. (2012), Sainio et al. (2012), and Hortinha et al. (2011). The existing body of literature on the relationship between digital innovation and organizational performance in the realm of digital technology is insufficient in providing substantial evidence. Bughin and Zeeebroeck (2017) conducted a study and found that companies that prioritize the maximization of their digital potential tend to achieve higher returns compared to businesses that have a general focus on technology and possess technical capabilities. Hence, it is plausible that the impact of digital orientation and digital

capabilities on organizational performance is mediated by innovation, rather than exhibiting a direct relationship.

When individuals clearly define their professional objectives and priorities and diligently strive towards achieving these goals, it can also contribute to the overall enhancement of the company's performance. Each company has its own core technology, and the level of core competitive technology capabilities determines the company's competitiveness in the industry, which in turn affects the company's performance. Innovation is the source of enterprise core competitiveness and profit. How to make innovation truly improve corporate performance is also a question worth pondering. Current research lacks knowledge about how digital-related capabilities are related to organizational performance. In this analysis, organizational performance can be seen as the result of the successful use of PMS. Therefore, the performance measurement system can also be regarded as an intermediate variable, which allows us to explore digital-related capabilities to improve the process of organizational performance.

2.2 Dependent Variable - Organizational Performance

Organizational performance is a multidimensional concept that typically comprises three dimensions: (1) Financial performance (such as profit, return on assets, and return on investment) based on the extent of achievement of the organization's economic objectives. (2) Market performance based on market evaluation (non-financial performance, such as market share and sales growth). (3) Organizational effectiveness

based on management evaluation (mainly related to product quality and social responsibility. Such as employee satisfaction, environmental protection, and social responsibility) (Du, 2012). This study examines the components of innovation capabilities, which encompass the factors that contribute to the achievement of successful innovation or the elements that influence an organization's capacity to effectively oversee innovation. Based on earlier literature, these aspects include, for example, leadership practices (Bessant, 2003; Tidd et al., 2005; Perdomo-Ortiz et al., 2006; Martensen et al., 2007; Skarzynski & Gibson, 2008; Smith et al., 2008; Paalanen et al., 2009), employee skills and innovation capabilities (Perdomo-Ortiz et al., 2006; Martensen et al., 2007; Skarzynski & Gibson, 2008; Tura et al., 2008; Smith et al., 2008; Paalanen et al., 2009; Liu, 2009), processes and tools of idea management (Lawson & Samson, 2001; Tidd et al., 2005; Skarzynski & Gibson, 2008; Smith et al., 2008), Supporting culture (Lawson & Samson, 2001; Tidd et al., 2005; Martensen et al., 2007; Skarzynski & Gibson, 2008; Smith et al., 2008; Paalanen et al., 2009; Liu, 2009), external sources of information (Romijnand Albaladejo, 2002; Tidd et al., 2005; Perdomo-Ortiz et al., 2006; Paalanen et al., 2009; Laforet, 2011), the development of personal knowledge (Bessant, 2003; Tidd et al., 2005), employee benefits (Laforet, 2011), and links to strategic objectives (Bessant, 2003; Martensen et al., 2007; Smith et al., 2008). Based on the research conducted by Francis and Bessant (2005), it can be deduced that innovative capabilities do not constitute a singular set of characteristics. Alternatively, it may be imperative to consider various aspects in order to foster the advancement of diverse forms of innovations.

Bernadin (1995) believes that performance should be defined as the result of work because these work results are closely related to the organization's strategic goals, customer satisfaction, and investment funds, which regard performance as a result. In Brumbrach's (1998) definition, performance is regarded as a quality point of view, that is, performance refers to behavior and results. This point of view emphasizes the relationship between employee potential and performance and no longer thinks that performance is a response to history but pays more attention to the quality of employees and future development. In summary, the term performance in this study pertains to the exhibited work performance, workability, and work attitude demonstrated by employees during the course of their work. These factors are interconnected with organizational objectives and can be subject to evaluation. Work performance encompasses the outcomes of one's work, the ability to perform tasks effectively, and the attitude displayed towards work. Work attitude pertains to the manner in which individuals conduct themselves in the context of their professional responsibilities. The organizational performance is influenced by the interactions among individuals and between different enterprises.

The concept of organizational performance is inherently intertwined with the process of measurement. Organizational performance measurement refers to the establishment of a benchmark that enables the quantification of the efficiency and effectiveness of a particular behavior (Neely, 1999). The assessment of organizational performance typically encompasses the impact and effectiveness of business operations and necessitates the evaluation of both financial and non-financial indicators, the latter being

considered more objective in nature. Although early performance measurement was rooted in accounting records, the content of performance measurement is not static and has evolved over time (Bititci & Garengo et al., 2012). The emergence of large-scale manufacturing in 1922 is a typical representative of the industrial age. At this stage, the division of labor was particularly emphasized, so the piece-rate wage system was generally used to monitor the productivity of employees. As businesses grew and multi-plant operations emerged, many large companies began to employ sophisticated budgeting and management accounting techniques, including standard costing, return on investment, and other key financial ratios (Bourne & Mills et al., 2000). Performance measurement in this period is mainly based on individuals or teams, and its typical feature is the extensive use of budgetary control methods.

With the rapid development of globalization in the 1950s, more sophisticated methods of managing productivity emerged, such as quality control, and movement time research, and productivity improvement is usually achieved by meeting the needs of customers, employees, and stakeholders. Performance measurement in this period used more financial indicators, and the measurement content still focused on the performance of individuals and teams (such as subsidiaries). Budget control was used, but the idea of management by objectives was added (Neely, 1999). Performance measurement content has not changed significantly. With the development of the economy, until the 1980s, the traditional accounting management method was criticized for paying more attention to the short-term benefits of the internal financial aspects of the enterprise. During this period, the measurement of organizational performance needed to seek internal financial

benefits and external unity and balance of environmental and social benefits, and thus a more comprehensive and balanced performance measurement method, such as quality, time, flexibility, customer satisfaction, and other specific indicators (Neely, 1995). Until this period, the focus of performance measurement was still strategic control. The core point was whether the strategy could be implemented according to the plan and achieve the expected results. More short-term performance indicators, such as strategic control, were developed and applied. Some scholars have also identified factors that affect the success of performance measurement, including key elements such as organizational structure, enterprise size, management style, corporate culture, and information systems (Bititci & Garengo et al., 2012).

Obviously, with the continuous development of subject knowledge and social economy, more performance measurement content in specific scenarios is emerging, such as performance measurement of public sector and non-profit organizations, large and medium-sized enterprises, innovation systems, supply chain cooperatives enterprises, etc. The performance measurement system may need to be redesigned and measured, and there are specific differences in the measurement content.

This study will study how PMS is promoted by different kinds of digital-related capabilities to improve organizational performance. Previous researchers have concluded that the development of every enterprise is inseparable from organizational performance, so we can regard organizational performance as an important indicator used to determine the status of enterprise development. From a practical standpoint,

organizational performance relates to the amount, quality, efficiency, and profitability of organizational tasks done over a specified period. From the standpoint of management, it is the desired outcome of the organization, as well as the effectual output presented on many levels by the organization, that allows the organization to accomplish its objectives.

It is generally believed that organizational performance and corporate performance are inseparable. If an organization can adjust business strategy and performance measurement well, corporate performance will improve (Lee & Yang, 2011). In addition, there is a part people believe that as long as the organization designs and formulates business strategies, and monitors the implementation of the organization through PMS, then organizational performance can be improved, which shows that the improvement of organizational performance is inseparable from the implementation of PMS, which can demonstrate that the implementation of PMS has a beneficial impact on organizational performance (Atkinson et al., 1997; Van der Stede et al., 2006; Wouters & Sportel, 2005; Cadez & Guilding, 2008).

2.3 PMS

The notion of PMS is delineated within the context of information systems. It is conceptualized as a formal system design for providing information to managers. These include a comprehensive and diverse set of performance measures, the integration of the measures with strategy and the linkage to value outcomes, and the coverage of performance measures related to different parts of the company (Malina & Selto, 2001;

Ittner et al., 2003b; Fullerton & McWatters, 2002; Ullrich & Tuttle, 2004; Choe, 2003). In brief, the concept of Performance Measurement Systems (PMS) encompasses a set of metrics that aid in the objective assessment of organizational activities, thereby offering a comprehensive evaluation of enterprise performance (Neely et al., 1995). According to Kaplan and Norton (2001), the process of identifying and selecting these metrics is crucial in effectively aligning a company's strategy with its day-to-day operations. Based on the perspective of market influence, organizations can attain their objectives, specifically performance, by surpassing competitors in terms of efficiency and effectiveness in meeting customer demands (Kolter, 1979). Therefore, the concept of performance measurement can be described as the systematic procedure of quantifying the degree of efficiency and effectiveness exhibited by various activities (Garengo et al., 2005). Several surveys have indicated a significant prevalence of the adoption of PMS, with a particular emphasis on the Balanced Scorecard (BSC) (Crabtree & DeBusk, 2008; Neely et al., 2008; Rigby & Bilodeau, 2009; Speckbacher et al., 2003). Nevertheless, it seems insufficient to examine usage simply by using a dichotomous question about whether to implement PMS.

Additionally, it is worth noting that the concept of the Balanced Scorecard (BSC) as proposed by Kaplan and Norton has undergone substantial evolution over the years (Hoque, 2014; Speckbacher et al., 2003). Furthermore, it is asserted by companies that they employ Performance Measurement Systems (PMS) when they utilize a blend of both financial and non-financial metrics. However, Kaplan and Norton (2001) contend that their Balanced Scorecard (BSC) framework extends far beyond the mere utilization

of these measures. To substantiate the rationale behind the design of the PMS, it is imperative to utilize suitable metrics that accurately capture the essence of the PMS design process.

Since the 1980s, there has been a notable increase in the pace of economic globalization, accompanied by heightened market competition. Consequently, in order to sustain a competitive edge, it is imperative for companies to continuously augment their overall efficiency and performance. Levinson (1976) asserts that there is a general consensus regarding the substantial shortcomings prevalent in the majority of currently employed PMS. One notable drawback of PMS is the inherent subjectivity, impressionism, and arbitrariness associated with performance evaluations. Additionally, the lack of comparability between ratings assigned by different managers poses a clear disadvantage. The delay in providing feedback can lead to employee frustration, as they may feel that their good performance is not being acknowledged in a timely manner. Additionally, employees may become irritated by evaluations that focus on their past shortcomings.

An effective way to improve performance has proven to be the use of a PMS design that is appropriate for the company. The rationale behind the implementation of PMS lies in its conceptualization as a managerial concept and a strategic, cohesive approach aimed at enhancing the productivity of an organization's workforce, as well as fostering the growth and development of both teams and individuals, ultimately contributing to the sustained prosperity of the organization (Taticchi et al., 2008). According to Grindle

and Hilderbrand (1995), the implementation of a sound Performance Measurement Systems (PMS) design can assist companies in attaining ongoing performance improvement, fostering a corporate culture that emphasizes performance, enhancing employee motivation, and increasing their level of engagement in their job responsibilities. To encourage the growth of employees' potential, increase their job satisfaction, strengthen team cohesion, and boost team performance (Zhuang, 2019). Develop constructive and open relationships between employees and managers through constant communication and exchange in the workplace and encourage employees to express their aspirations and expectations for the workplace. The challenges facing contemporary organizations have led them to refocus on the adaptability of PMS design and explore ways to improve organizational performance based on this. As business environments and innovation models change, so does the PMS to remain relevant and valuable. Related research themes should focus on how to structure and design the PMS in response to organizational change.

Several studies have consistently shown a significant level of adoption of Performance Measurement Systems (PMS), specifically Balanced Scorecard (BSC) implementation (Crabtree & DeBusk, 2008; Neely et al., 2008; Rigby & Bilodeau, 2009; Speckbacher et al., 2003). Nevertheless, it appears that relying solely on PMS may not suffice to directly facilitate the economic expansion of enterprises. Previous research has utilized Performance Measurement Systems (PMS) as a means to assist managers in closely monitoring both internal and external factors within an organization. This monitoring process aims to ensure that the organization remains aligned with its strategic priorities

and ultimately attains its organizational objectives (Hoque & James, 2000; Ittner et al., 2003; Said et al., 2003; Hoque, 2004; Widener, 2006; Hall, 2008).

Existing scholarly research indicates that the attributes of control systems are contingent upon the specific circumstances in which the organization functions (Chenhall & Morris, 1986; Dent, 1990). Furthermore, numerous investigations have endeavored to explore the design of Performance Measurement Systems (PMS) (Hoque & James, 2000; Malina & Selto, 2004; Chenhall, 2005; Henri, 2006a). These studies contend that PMS ought to be designed to align with the organization's requirements, facilitate the attainment of objectives, and consistently monitor the performance of the business. According to Tuomela (2005), it is necessary for companies to undertake the task of redesigning their Performance Measurement Systems (PMS) in order to maintain alignment with their evolving organizational environment and strategic objectives. Furthermore, it has been demonstrated in prior research (Hoque & James, 2000; Henri, 2006b) that the design of the Performance Measurement Systems (PMS) should be tailored to the specific needs of the organization. This entails placing emphasis on internal factors within the company and establishing meaningful connections between firm size, product life cycle, organization, and the PMS. Therefore, the findings suggest the need to integrate the organization with the design of the PMS to help managers cope with the uncertainty of their business.

Speckbacher et al. (2003) argue that comprehensive research on Performance Measurement Systems (PMS) should cover all stages of PMS development. This is

because the nature of PMS, including its content, implementation, and expected advantages, may vary depending on the specific form of PMS utilized. The extent to which performance indicators are aligned with the overall strategy, the extent to which the strategy is communicated through cause-and-effect relationships, and the extent to which management performance is tied to compensation are all significant factors to be taken into account when designing a Performance Measurement Systems (PMS). Al. (2003) also discussed the inclusion of goals and action plans in a Performance Measurement Systems (PMS), as identified by Franco-Santos et al. (2012), who described these elements as means to inform management decisions and evaluate organizational performance. According to Franco-Santos et al. (2012), research findings indicate a developing consensus in the literature that the implementation of PMS does not automatically lead to improved firm performance. Based on the evidence, it appears that the design and development of these systems will improve performance.

Mohrman et al. (1989) considered that a crucial principle in the design of Performance Measurement Systems (PMS) is to incorporate the participation of system users in the design process. Hence, it is imperative to embrace a participatory approach in the development and design of Performance Measurement Systems (PMS). The primary users of the Performance Measurement System (PMS) are line managers and employees. Their active participation and engagement are crucial for enhancing the efficacy of performance measurement. Additionally, the involvement of senior management is crucial in the development, execution, and administration of Performance Measurement Systems (PMS). The systems should align with the strategic direction and management

philosophy of the organization, as outlined by senior management (Qu, 2013). According to Sheard (1992), it was proposed that a committee consisting of seasoned managers from various departments within the organization should be established in order to supervise the process of development and design. The inclusion and contribution of senior management can enhance the credibility of the proposed organizational change. Moreover, it is imperative for managers to assume a crucial facilitative function in the development and design of Performance Measurement Systems (PMS) through the provision of assistance, coordination, and targeted direction during the entirety of the development and design phases.

2.4 Underlying Theories

2.4.1 Resource Orchestration Theory

The concept of Resource Orchestration Theory (ROT) is an emerging theoretical framework that has been constructed based on the foundational studies conducted by Sirmon et al. (2007), Helfart et al. (2009), and Hitt et al. (2011). In regard to these scholars, the concept of resource orchestration refers to the activities carried out by leaders in order to facilitate the efficient management of resources within an organization. These actions encompass various strategies such as organizing a company's resource portfolio, consolidating resources into capabilities, and utilizing these capabilities to generate value for customers (Hitt et al., 2011; Sirmon and Hitt, 2003; Sirmon et al., 2007). According to the findings of Hitt et al. (2011) and Holcomb et al. (2009), the significance of individual actions and their particular intricacies notwithstanding, the coordination of actions can yield favorable outcomes in terms of

performance. The resource orchestration theory covers the process of constructing resource combinations, bundling resources to form capabilities, and using capabilities to create value. It opens the "black box" of the process from resources to sustainable competitive advantages. It clarifies the relationship between resources and capabilities and the relationship between their role in achieving sustainable competitive advantage (Sirmon et al., 2007).

The dynamic nature of resources means that resource orchestration operations are continuous. Changes in the internal and external environments of an organization lead to short-lived competitive advantages, and companies must constantly coordinate their resources to develop resource combinations and capacity allocations that meet environmental needs to maintain short-lived competitive advantages (Sirmon et al., 2010). The resource orchestration theory integrates these two viewpoints by embedding the dynamic management capabilities of managers (Ander & Helfat, 2003) into the process of resource evolution, capability formation, and capability utilization, and believes that sustainable competitive advantages come from corporate resources, The combination of competence and managers' competence (Chadwick et al., 2015). Resources are a necessary condition for sustainable competitive advantage capabilities, which are bundled from scattered resources, and are intermediate products that improve resource utilization efficiency (Makadok, 2001). Managers dynamically adjust resource structure and capacity allocation according to internal and external environments, as resources are the bridge to sustainable competitive advantage. Resources are the basis for the formation of capabilities, capabilities come from the integration of resources,

and the formation and utilization of capabilities are also the directions of resource evolution. Both determine the performance of enterprises—the role of dynamic management capabilities.

The effectiveness of enterprise value creation is affected by the dynamic capabilities formed by resource orchestration. Enterprises need to build a diversified array of dynamic capabilities for resource allocation and use resource integration capabilities, resource acquisition capabilities, resource reconstruction capabilities, and resource release capabilities to continuously enhance dynamic capabilities and maximize the value of limited resources (Chen, 2017). Especially in constructing dynamic capabilities, it is necessary to recognize the limited value of resources. Not all resources can realize the expected value created through acquisition, integration, and reconfiguration (Cui et al., 2021). Therefore, the process of resource scheduling should judge the value of resource behavior based on market operating data. If it is lower than expected, release some resources, acquire new resources, and focus scheduling on resources that are more in line with expectations. Enterprises need to keep up with the trend of the times, mainly in terms of user resources and data resources, to avoid missing out on development opportunities.

Research on resource orchestration theory is still in the exploratory stage. Mainly empirical studies aim to determine the effectiveness of resource orchestration, Bridoux et al. (2013) showed that resource orchestration is positively related to a firm's innovation capability and innovation performance. In recent years, research on resource

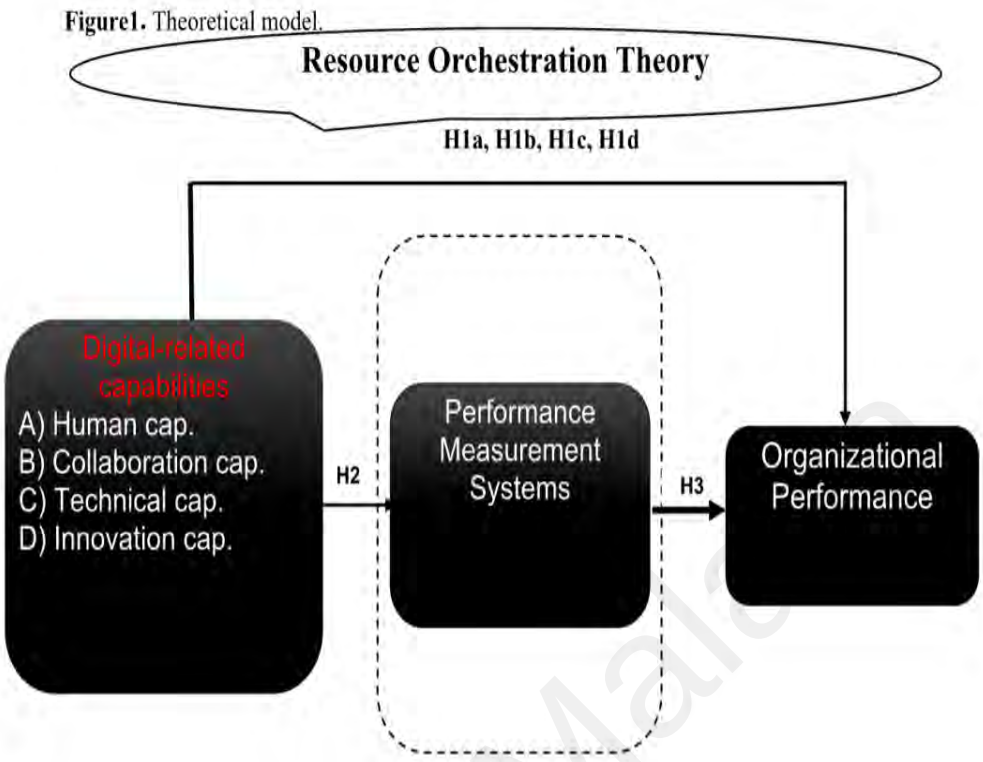
orchestration has mainly focused on two themes: one is to verify the role of resource orchestration on enterprise capabilities and performance through empirical research (Liu et al., 2017). Secondly, the scholars use case studies to open the mechanism of resource orchestration and deepen the understanding of resource orchestration theory itself (Meng et al., 2019).

The organization of resources is not merely a collection of individual behaviors, but rather a complex system. Companies are required to enhance their resource utilization by adhering to a resource orchestration framework. The effectiveness of resource arrangements is contingent upon a firm's capacity to identify, organize, combine, and exploit resources, while the focal point of resource arrangements is influenced by key strategies (Hu et al., 2021). Hence, it is imperative for enterprises to employ rational strategies in order to effectively identify, organize, integrate, and rejuvenate resources. Additionally, leveraging the Internet platform to transmit brand value to customers through value transfer mechanisms, such as product innovation and brand communication, is crucial for maximizing the benefits of resource orchestration (Hu et al., 2021). Based on the Resource-Based View (RBV) theory, organizations are able to fully capitalize on the value of their resources when they are structured, bundled, and managed in an effective manner (Sirmon et al., 2011; Asiaei et al., 2020). As stated by Helfat et al. (2007), the resource orchestration perspective encompasses the fundamental concept of "resource mobilization. This concept entails the integration of mobilized resources into a resilient system that facilitates improved alignment, coordination, and orientation towards specific purposes. One of the difficulties associated with the

implementation of resource orchestration is the identification and utilization of appropriate channels for management to effectively mobilize and develop resources (Miao et al., 2017). By drawing upon the existing body of knowledge in managerial accounting, the implementation of PMS can serve as a viable approach for managers to effectively facilitate the mobilization of resources within an organization (Solovida & Latan, 2017; Gunarathne et al., 2020). The utilization of an appropriate organizational control system, such as a Performance Measurement System, is assumed by the theoretical framework. This system serves as a means through which a firm's underlying assets or capabilities, specifically those related to digital capabilities, can be mobilized more efficiently to enhance organizational performance. Consequently, the implementation of PMS can enhance the utilization of digital resources within an organization, leading to increased operational efficiency and ultimately resulting in improved overall organizational performance.

2.5 Research Framework

This study provides a framework that comprises the following: digital-related capabilities (human, collaboration, technical, and innovation capabilities), PMS, and organizational performance as follows:



H4: Mediating Effect (H4a, H4b, H4c, H4d)

Figure 2.1: Theoretical model

2.6 Hypothesis Development

2.6.1 Digital-Related Capabilities and Organizational Performance

Based on the following review and arguments, the hypotheses of the study are proposed:

H1: There is a relationship between digital-related capabilities and organizational performance.

H1a: There is a relationship between human capabilities and organizational performance.

The digital future will require most knowledge workers to be technology generalists, knowing, understanding, and utilizing evolving digital tools and solutions with a

minimum level of technical acumen. This capability requires the skills to talk and collaborate with technical people, identify commonalities between different technologies, and understand coded logic in business terms. Workers need a skill set that allows them to quickly learn new technologies and integrate them into their processes. Leading in this field requires the ability to assess the value and feasibility of new technology solutions in an evolving business environment (Tony, 2022).

The human capabilities and proper management will lead businesses to greater success through digitalization. Because a person is a flexible individual, who can change as the environment changes. Egan et al. (2004) found a positive relationship between the learning culture of IT employees and organizational performance. Kontoghiorghes et al. (2005) found that certain characteristics of learning organizations are closely related to adaptation to change, innovation and organizational performance. A study by Lopez et al. (2005) demonstrated the positive impact of human capabilities on innovation, business competitiveness and economic/financial outcomes. Furthermore, Rhodes et al. (2008) asserted that a person's ability to learn is positively related to human capability and ultimately leads to positive organizational performance. Therefore, in the digital age, humans can also adapt quickly. Employee engagement is beneficial for market orientation (Naqshbandi et al., 2019), spillover effects (Llies et al., 2009), customer satisfaction and retention (Simons & Roberson, 2003), and buyer-seller interaction (Simons & Roberson, 2003), intimacy with clients (Heide & John, 1992). Human beings possess the cognitive and behavioral capacities necessary to effectively adjust and respond to shifts and modifications within the professional setting. In the digital era,

it is imperative for enterprise employees to possess certain key skills. In other words, the utilization of human capabilities and the implementation of efficient management and support systems can contribute to the improvement of organizational performance in companies by means of digitalization (Nasiri et al., 2020).

H1b: There is a relationship between collaboration capabilities and organizational performance.

There is a strong relationship between collaboration capabilities and performance. When done right, collaboration in the workplace can have a positive impact on teams and organizations. It improves efficiency, innovation, and relationships between teams (Ahsan, 2018). Teams that work well together lead to higher levels of team satisfaction. Collaboration on projects will help team members come together, highlight their strengths and talents, and make employees feel like they are part of the bigger picture. The climate of a team can also directly affect the quality of an employee's work, which ultimately affects the success of the organization, especially in high-tech organizations. There is a good correlation between the cohesion indicators of the senior management team and the financial performance indicators of the organization.

Previous research has found that successful manufacturers have close collaborative relationships with their supply chain partners, allowing real-time information to flow up and down the supply chain promptly. Consequently, the expeditious and dependable delivery of products at the designated time and location enhances responsiveness within a limited timeframe, ultimately leading to an enhancement in organizational

performance (Lee et al., 1997). An example of a successful collaboration that employed Collaborative Planning, Forecasting, and Replenishment (CPFR) is the strategic alliance between Sears and Michelin. This partnership resulted in a noteworthy decrease of 25% in inventory levels for both organizations (Steeman, 2003). Similarly, a recent collaboration between General Motors and its suppliers resulted in a notable reduction in the vehicle development cycle, shrinking it from a duration of four years to a significantly shorter timeframe of eighteen months (Gutman, 2003). Ultimately, it is anticipated that the integration of digital collaboration capabilities will contribute to the enhancement of organizational performance. The empirical study conducted by Vickery et al. (2003) offers substantiated evidence supporting the relationship between integration and customer service performance. This study provides evidence to support the notion that the presence of collaboration capabilities has a noteworthy influence on customer service performance factors within companies operating in the automotive industry. In a similar vein, Stank et al. (2001) conducted a study that revealed a positive relationship between the utilization of digital-related collaboration capabilities and the performance of firms.

H1c: There is a relationship between technical capabilities and organizational performance.

The current economic situation has imposed stricter standards for the growth of the industry, and to cope with the current extreme competitive situation, the technological advancement of the company is a necessary condition for its development. According to Khin and Ho (2019), it has been previously stated that innovation has the potential to

enhance organizational performance through the conversion of a company's digital orientation and digital capabilities into improved performance. The incorporation of technical capabilities is a fundamental component of the innovation process. The efficacy of digital product development is heavily contingent upon the manner in which the enterprise handles digital technological aspects. Hence, the utilization of technical capabilities can significantly contribute to the enhancement of Performance Measurement Systems. In their study, Khin and Ho (2019) provided a definition for technical capabilities, which they described as the capacity of a business to create and develop capabilities pertaining to new products and their associated processes (Khin & Ho, 2019). Overall, it has been demonstrated that technical capabilities related to digital technology have the potential to enhance organizational integration, leading to anticipated improvements in organizational performance (Vickery et al., 2003). The examination of existing scholarly works pertaining to digital-related technical capabilities has yielded varying findings regarding the influence of digital technology on organizational performance (Hu & Plant, 2001). Hitt and Brynjolfsson conducted a study in 1996. The study revealed that the disparate outcomes observed across different studies can be attributed to distinct variations in the methodologies and metrics employed during the analysis.

A study by Wroblewski (2018) on Swedish companies showed that digital technology maturity is weakly negatively correlated with company operating performance. However, most of the recent research results have been that supporting digital technology has a direct impact on organizational performance (Bharadwaj, 2000;

Kearns & Lederer, 2003; Santhanam & Hartono, 2003). For example, when Griliches (1998) studied the impact of technological innovation capabilities on Chinese corporate performance, he found that although R&D investment is small, but significant relationship between technological R&D and performance indicators (Yam et al., 2004). Wang (2007, p356) pointed out, "New knowledge and new technologies generated by R&D activities increase productivity, not only at the firm's level but also at the industry and country level." In studying the relationship between R&D and market value in developed countries, Ehie and Olibe (2010) learned that successful technological R&D leads to innovative products and services, enabling firms to improve its intangible assets. From this, it follows that technological R&D has a positive impact on firm performance. Apart from some specific findings, most of these studies somehow show that there is a positive relationship between technical capabilities and organizations. These findings reinforce the assumption that the better the use of technical capabilities, the better the economic performance of firms. It follows that a substantive relationship between digital-related technical capabilities and organizational performance has not been established empirically, especially in a digital context. Next. Therefore, it is necessary to establish the relationship between digital-related technical capabilities and performance in the context of IT enterprises. Based on these studies, we can expect a significant positive relationship between digital-related technical capabilities and organizational performance.

H1d: There is a relationship between innovation capabilities and organizational performance.

Innovation is essential to the company's survival and growth. Innovation is widely acknowledged as essential to the survival and expansion of businesses (Agarwal & Dev, 2003). Over the past several decades, researchers have endeavoured to establish the relationship between innovation and organisational performance. Researchers analyse business performance using a variety of financial and non-financial metrics, which can be both subjective and objective. Yldz et al. (2014) demonstrated that innovation positively affects firm performance. According to Oke (2007), innovation that is either radical or incremental contributes significantly to the performance of a company. Despite the volatility of the markets in which businesses operate, it remains a significant factor in determining business performance (Hurley et al., 2005).

Extensive research has previously documented the favorable impacts of innovation on businesses (Valmohammadi, 2017; Choi et al., 2013; Ussahawanitchakit, 2012). There is a substantial body of research that provides strong evidence for the existence of a positive relationship between innovation and organizational performance (Yang et al., 2012; Sainio et al., 2012; Hortinha et al., 2011; Sainio et al., 2012). In the realm of digitalization, Bughin and Zeebroeck (2017) conducted a study which revealed that enterprises that strive to fully harness their digital capabilities achieve superior financial performance, exhibit greater technological focus and competence, and yield higher returns compared to their counterparts. In contrast, the study conducted by Westerman et al. (2011) revealed that organizations exhibiting digital innovation value that surpasses the average demonstrate enhanced profitability and increased revenue generation capabilities. In a study conducted by Weill and Woerner (2015), it was

demonstrated that companies that embrace digital technologies and engage in digital ecosystems experience a notable enhancement in both sales growth and profitability. Particularly within the realm of information technology (IT) enterprises. Enterprises that possess robust digital orientation and capabilities, grounded in the fundamental principles of innovation, are more adept at generating innovative products and enhancing customer satisfaction. Consequently, these enterprises experience amplified sales and improved financial performance. Therefore, this study hypothesizes that digital-related innovation capabilities can improve organizational performance by translating a firm's digital direction and capabilities into better performance.

2.6.2 Digital-Related Capabilities and PMS Design

Based on the following review and arguments, the hypotheses of the study are proposed:

H2: There is a relationship between digital-related capabilities and PMS design.

H2a: There is a relationship between human capabilities and PMS design.

Effective PMS design often influences the skills and capabilities of employees, thereby accelerating corporate innovation (Jackson et al., 2014). Digital performance is an improvement over traditional ways of working. Bourne et al. (2013) posit that the efficacy of PMS is primarily influenced by the employees and the company culture. The ability of employees will also exert an influence on the design of Performance Measurement Systems. PMS is advocated for adoption by enterprises due to its capacity to enhance managers' strategic concentration, enhance the clarity and efficacy of corporate strategy communication, facilitate the implementation of strategies, and foster

alignment of individuals' behavior with the strategic objectives of the organization. For instance, the works of Ahn (2001), Franco-Santos et al. (2012), Garengo et al. (2005), Jazayeri and Scapens (2008), and Kaplan and Norton (2006) have been referenced. According to Robson's (2005) study, the implementation of a well-structured PMS has the potential to influence employee behavior and subsequently enhance employee performance. The phenomenon of Performance Measurement Systems (PMS) has been observed to have an impact on the cognitive processes and motivational tendencies of managers. The design of Performance Measurement Systems can incorporate both objective and subjective indicators. Objective indicators pertain to quantifiable metrics such as the time and cost required for design completion. On the other hand, subjective indicators encompass aspects such as the level of creativity and innovation demonstrated in the design process. The concept of digital talent is intricately connected to the relationship between performance metrics and organizational strategy, as discussed by Hall (2008). This finding provides additional evidence that individuals with digital skills can offer technical assistance in designing Performance Measurement Systems, while employees can leverage their professional expertise and abilities to aid companies in developing and executing such systems. Furthermore, PMS assumes a pivotal role in the development of organizational strategies, facilitating the assessment of the efficacy of projected or emerging strategies. Additionally, the literature suggests that there is a growing emphasis on promoting a perspective among executives that regards strategy as an ongoing and iterative process, involving comprehensive evaluation and necessary adjustments (Bisbe & Malagueno, 2012; Franco-Santos et al., 2012; Garengo et al., 2005; Kaplan & Norton, 2008). Hence, the proficiency of

individuals with expertise in digital technology significantly influences the development of Performance Measurement Systems. Digital talents possess the capability to offer technical assistance for the performance measurement system, enhance operational effectiveness and precision, and facilitate companies in conducting more comprehensive evaluations of employee performance.

H2b: There is a relationship between collaboration capabilities and PMS design.

In order to attain a competitive advantage and establish a market position within a multifaceted business environment, it is imperative for a company to foster its own resilience and capabilities for integrating resources (Dong & Ge et al., 2011). In their study, Nudurupati et al. (2016) conducted an investigation on the subject of PMS within the context of the digital economy. The researchers reached the conclusion that organizations should not solely rely on internal assessments when evaluating their performance, but should also consider collaborative and social networks, as well as social media platforms. The integration of collaboration capabilities into the design of PMS is deemed necessary for digital enterprises to achieve enhanced performance, as suggested by Maestrini et al. (2017) and Nudurupati et al. (2016). To enhance performance through collaboration, it is imperative for PMS to integrate intercompany performance metrics. However, this integration presents challenges in terms of intercompany data integration and sharing. According to Maestrini et al. (2017) and Nudurupati et al. (2016), the management of supply chain partner relationships and the coordination of inter-firm infrastructure and processes are recognized as crucial components within the measurement process. Furthermore, the study conducted by

Nudurupati et al. (2016) yielded the conclusion that trust, security, and accountability play a significant role in fostering collaboration within the context of the digital economy. Furthermore, it was underscored that the establishment of a shared platform for the exchange of relevant skills and resources is imperative in order to engage in collaborative efforts for ongoing enhancement, guided by mutually agreed upon goals and metrics. In summary, the integration of digitalization within businesses offers avenues for collaboration in the development of novel products, services, and the management of supply chains. The aforementioned capabilities possess the potential to incentivize actions that are essential for enhancing the effectiveness of the PMS.

H2c: There is a relationship between technical capabilities and PMS design.

Cui (2021) conducted an analysis of the simulated annealing algorithm within the framework of the enterprise performance measurement systems. The intelligent recommendation system is initially formulated using mathematical modelling techniques that are grounded in the principles of relationships. Upon conducting an analysis of the requirements of the enterprise Performance Measurement Systems, the technology employed is utilized to partition the system architecture into three distinct layers: the presentation layer, the business logic layer, and the data layer (Cui, 2021). In their study, Wan and Li (2017) introduced a novel enterprise Performance Measurement Systems that utilizes a simulated annealing algorithm for the purpose of enhancing enterprise management. The proposed PMS has the potential to significantly improve the effectiveness of business management practices within enterprises (Wan & Li, 2017). Fu (2021) utilizes the simulated annealing algorithm to optimize, analyze, and develop

the enterprise Performance Measurement Systems. The incorporation of novel technologies can enhance the advancement of research pertaining to the application of performance data. This research is of utmost importance as it directly impacts the efficacy, scientific integrity, and sustainability of enterprise Performance Measurement Systems.

The maximization of the application of the simulated annealing algorithm is hindered by the limitations and singularities of conventional enterprise performance management methods. The integration of enterprise performance management and computer technology and informatization can be achieved by means of analyzing Performance Measurement Systems. The advent of computer technology has facilitated the development of a streamlined and efficient platform for conducting enterprise performance appraisal. This platform allows for the active involvement of all employees, leading to improved effectiveness and accuracy in enterprise performance management and evaluation. The utilization of PMS for the purpose of conducting enterprise performance management has the potential to yield notable benefits such as a reduction in working hours, cost savings, and alleviation of the workload on the human resources department. There is minimal necessity to expend significant effort in the management of employees. The utilization of information-centric storage and retrieval systems enables the efficient management of performance communication interviews conducted between employees and performance managers. This practice aims to assess the alignment of objectives and enhance the dissemination of information within the organizational context (Zhang, 2022).

In Zhang's (2022) study, the application of the simulated annealing algorithm is explored as a means to enhance Performance Measurement Systems. The findings indicate that this algorithm has the potential to optimize the system, quantitatively assess appraisal results, prioritize actual performance, promote transparency, and improve the objectivity and fairness of performance appraisal. The Performance Measurement Systems restrict the operational scope of performance appraisal personnel by pre-programming all processes in the computer. Furthermore, the utilization of digital technology has the potential to streamline the data collection procedure and minimize the probability of inaccuracies, consequently augmenting the reliability and precision of performance evaluation outcomes while diminishing subjective biases.

In conclusion, digital-related technical capabilities are a firm's ability to leverage digital technologies to develop new products and services as well as provide opportunities for designing more complex PMSs. Technical can create a competitive advantage through a sophisticated PMS. These technical analysis and strategic management capabilities can therefore be both encouraging and crucial to improving the effectiveness of PMS.

H2d: There is a relationship between innovation capabilities and PMS design.

The topic of Performance Measurement Systems that are suitable for modern businesses has received considerable interest from both academic researchers and industry professionals (Neely, 1998). Extensive discussions and documentation have addressed the limitations of current systems, specifically those based on traditional cost accounting principles (Dixon et al., 1990; Hall, 1983; Johnson & Kaplan, 1987; Neely

et al., 1995; Skinner, 1971). A significant drawback of the Performance Measurement Systems utilized by numerous companies is their historical tendency to adopt a limited or unidimensional perspective.

During the 1970s and 1980s, prominent scholars including Berliner and Brimson (1988), Hayes and Abernathy (1980), Johnson and Kaplan (1987), Kaplan (1984), and Skinner (1971) voiced substantial criticism towards the conventional measures employed by firms. The aforementioned critiques have prompted the emergence of novel approaches to product costing, including activity-based costing and by-output accounting (Cooper & Kaplan, 1988; Galloway & Waldron, 1988a, 1988b, 1989a, 1989b). Various alternative methods for evaluating firms and brands have been suggested in the literature, including shareholder value analysis and brand valuation (Ambler & Kokkinaki, 1998; Rappaport, 1998; Stewart, 1991).

Prior studies have established that innovation yields multiple favorable outcomes in the context of performance measurement. Neely et al. (2000) argued that the assessment of innovation should not be perceived as intrusive or contradictory. The application of innovation capability in the design of Performance Measurement Systems has the potential to facilitate the advancement of performance measurement. Particularly within the realm of innovation, it is imperative that these measures exhibit dynamism, and variability, and undergo continuous evaluation and enhancement throughout the transitional phase of cultivating innovation capabilities (Neely et al., 2000; McAdam & Keogh, 2004). The report additionally highlights the necessity for performance

measurement to possess increased strategic and operational significance, encompassing a broad spectrum of metrics that reflect the diverse nature of innovations (McAdam & Keogh, 2004). The advancement of innovative capabilities enables the utilization of these measures as instruments for daily management, specifically designed to direct and facilitate performance evaluation in order to attain organizational strategy.

2.6.3 PMS Design and Organizational Performance

It is generally accepted that organizational performance is inextricably related to Performance Measurement Systems. In addition, some studies have validated that if the organization designs and formulates business strategies, and monitors the organization's implementation through PMS, then organizational performance can be improved, which shows that the improvement of organizational performance is inseparable from the implementation of corporate performance. Thus, the use of PMS can be shown to have a positive impact on organizational performance (Atkinson et al., 1997; Van der Stede et al., 2006; Wouters & Sportel, 2005; Cadez & Guilding, 2008).

A manager emphasized (Mohd, 2011) that there are several points to consider when designing Performance Measurement Systems to maximize organizational performance. First, the performance measurement system should be consistent with the goals and strategies of the organization to ensure that it has a positive impact on organizational performance. Second, Performance Measurement Systems should be fair and impartial to ensure that all employees can develop their strengths on a level playing field. In addition, the Performance Measurement Systems should have enough information so

that employees and managers can accurately evaluate employee performance. As studied by Tuomela (2005), Performance Measurement Systems is an effective tool that can help organizations improve their performance. Through Performance Measurement Systems that is consistent with organizational goals and strategies, is fair, just, informative, and provides meaningful feedback, organizations can promote employee performance improvement, thereby improving organizational performance.

Werther and Davis (1996) pointed out that one of the purposes of designing performance measurement is to improve employee performance. Sin (1996) added that one of the benefits of designing performance reviews is to improve employee performance. Armstrong (1990) believed that designing an effective performance measurement can help improve performance by understanding employees' strengths and weaknesses. The research of James Kwame Mensah (2004) found that the implementation of PMS will improve employee performance, and the results of some empirical studies also support the positive correlation between the design of performance measurement proposed by theoretical research and organizational performance.

In China, most studies have found that PMS has a significant contribution to organizational performance. For example, a series of studies by Su (2010) showed that PMS in Chinese companies contains both some commitment-oriented Western PMS work practices and some control-oriented local HR practices and that there is a significant positive correlation between this combined commitment and control PMS

and organizational performance (Su, 2010; Su, 2010b). Using a sample of Chinese pharmaceutical companies, Zhang and Li (2008) tested Becker and Huselid's suggestion that the ability to implement the corporate strategy is a mediating variable of PMS on organizational performance and one of the results was that PMS has a significant effect on organizational performance (Wright et al., 2005). The study of Cheng and Zhao (2006) introduced employee human capital specialization as a mediating variable and the dynamics of environmental change as a moderating variable based on the previous use of PMS, which verified the findings of previous related studies: PMS has a positive impact on organizational performance. Zhang and Zhao (2006) collected data on PMS and organizational performance from 56 manufacturing companies in Shanghai and Shenzhen cities in China by data. The results of correlation analysis and hierarchical regression showed that there was a positive association between PMS and organizational performance at each level.

However, some studies showed that the relationship between PMS and Chinese organizational performance in Western companies is not significant or does not necessarily apply in some specific industries in China, and there are even studies that show a negative correlation (Tsai, 2006; Jiang & Zhao, 2004; Liu et al., 2005; Zhang & Zhao, 2006; Zhang, 2006). Thus, PMS may be different in China and the West.

However, the existence of findings that some PMS lack a relationship with organizational performance does not suggest that PMS cannot have a significant impact on organizational performance. When companies adopt PMS, employees receive more

benefits from the exchange relationship, including higher salaries, better working environment and relationships, and more training opportunities, and the exchange relationship implied by this system affect employees' attitudes and behaviors, and employees will develop an emotional commitment to the company and will work harder to reward the company, which in turn will improve organizational performance (Blau, 1964). Resource orchestration theory suggests that implementing PMS can induce or control employees to perform the valuable and scarce employee behaviors that the firm expects and that are difficult for competitors to imitate and that these behaviors can lead to significant increases in performance for firms that use PMS (Barney, 1964; Wright et al., 2001). In the empirical literature on the relationship between PMS and organizational performance, it is undoubtedly essential to explore the strength of the relationship between PMS and firm performance in a holistic manner.

The existing empirical literature on the impact of PMS on organizational performance presents mixed findings and occasional inconsistencies (Davis and Albright, 2004; Lee & Yang, 2011; Micheli & Manzoni, 2010). Several studies have found a beneficial relationship between the adoption of PMS and organizational performance (Bisbe & Malagueno, 2012; Burney & Widener, 2007; Hoque & James, 2000; Ittner & Larcker, 1998). However, contrasting findings have been reported by other studies, which have found no relationship (Ittner et al., 2003a; Perera et al., 1997; Verbeten & Boons, 2009; Yongvanich & Guth, 2003b). Consequently, Franco-Santos et al. (2012) and Hoque (2014) advocated for further empirical investigation to clarify the relationship between PMS and organizational performance. Based on the extensive range of empirical

evidence, this study presents research hypothesis 3 as an extension of previous findings.

H3. There is a relationship between the PMS design and organizational performance.

2.6.4 Digital-Related Capabilities, PMS Design, Organizational Performance

Although numerous studies have examined the relationship between digital capabilities and organizational performance, there remains a lack of consensus on this matter (Martnez-Caro et al., 2020). Drnevich and Croson (2013) contended that digital capabilities have a favorable effect on businesses, as they lead to cost reduction and enhanced flexibility. According to Wang (2007), companies that possess a greater abundance of resources and utilize them in a more efficient manner are more inclined to formulate intricate and beneficial strategies. Conversely, there exists empirical evidence suggesting that the impact of digital capabilities on firm performance is negligible or inconsequential. Organizational performance of a company is not solely determined by its digital capabilities (Usai et al., 2021), but rather by the ongoing endeavors in creativity and research and development (R&D). Recent research has presented challenges in establishing conclusive evidence regarding the positive relationship between digital capabilities and organizational performance (Tan et al., 2010). This observation suggests that the mere presence of digital capabilities is inadequate for achieving organizational success. The findings of this study indicated that digital capabilities may have an indirect impact on organizational performance through PMS.

The implementation of PMS holds significant importance in the effective management

of a company and its strategic resources, as it equips managers with pertinent and crucial information (Winder, 2006). Widener (2006) posited that upon obtaining strategic resources and capabilities, organizations implement the PMS to effectively capture and manage these critical assets. Subsequently, it furnishes valuable feedback and pertinent information pertaining to the fundamental capital, with the intention of aiding the organization in the effective allocation of strategic resources, consequently enhancing overall performance. This implies that certain benefits arising from digital capabilities have an indirect impact on firm performance by placing a greater emphasis on the utilization of PMS.

The existence of this indirect relationship is substantiated by a plethora of empirical evidence (Chong & Chong, 1997; Gul, 1991; Gul & Chia, 1994; Joiner et al., 2009; Jusoh, 2008; Mia, 1993; Mia & Clarke, 1999; Widener, 2006). The study conducted by Joiner et al. (2009) discovered that the utilization of Performance Measurement Systems (PMS) consisting of both financial and non-financial performance measures played a moderating role in the relationship between flexible manufacturing strategies and the financial and non-financial performance of organizations. In their study, Baines and Langfield-Smith (2003) conducted an analysis of the impact of various factors on management accounting. Their findings revealed that alterations in organizational design, technology, and advanced manufacturing practices have a beneficial influence on firm performance. This positive effect is mediated by modifications in nonfinancial management accounting information. As a result, organizations create PMS to implement performance measures, aiming to furnish senior management with crucial

insights into the organization's underlying resources and capabilities (Simons, 2000). This, in turn, is expected to yield favorable outcomes in terms of performance (Kaplan & Norton, 1996; Lev, 2001).

In a similar vein, Jusoh (2008) made a noteworthy finding indicating that the utilization of multidimensional performance measures, such as the Balanced Scorecard, can serve as a partial moderator in the relationship between the external environment and organizational performance. In the study conducted by Widener (2006), a resource-based perspective was employed to examine the relationship between strategic resources, performance measures, and performance. The findings of the study revealed that performance measures play a crucial mediating role in the relationship between strategic resources and performance. Consequently, the study concludes that performance measures hold considerable importance in organizational performance. Siengthai et al. (2013) discovered a relationship between competitive strategic priorities and firm performance through the utilization of performance measures (Spencer et al., 2009; Joiner et al., 2009). Moreover, this research emphasizes the significance of performance measurement as a mediating factor in comprehending the crucial function of performance measurement as a managerial tool for implementing competitive strategies aimed at enhancing firm performance.

Therefore, as mentioned above, although the previous article has outlined the direct relationship between digital-related capabilities and PMS, and PMS and organizational performance, there is no conclusive evidence to prove that PMS design has an indirect

relationship between organizational performance and digital-related capabilities. This study aims to understand the role of PMS design as a mediating variable between digital-related capabilities and organizational performance. It is thus assumed that there is an indirect path between the design of the PMS, digital-related capability, and organizational performance. Therefore, in this study, we hypothesize:

H4. PMS design mediates the relationship between digital-related capabilities and organizational performance.

H4a: PMS design mediates the relationship between human capabilities and organizational performance.

H4b: PMS design mediates the relationship between collaboration capabilities and organizational performance.

H4c: PMS design mediates the relationship between technical capabilities and organizational performance.

H4d: PMS design mediates the relationship between innovation capabilities and organizational performance.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter is divided into six sub-sections. Section 3.1 focuses on the design methodology of this study. This study is categorized under the positivist research paradigm, with quantitative research as the research method. Quantitative research is the representation of issues and phenomena in a quantitative manner. The information collection process is highly automated, with digital and mobile devices allowing respondents worldwide to participate in the survey simultaneously and obtain results quickly. Section 3.2 describes the sample characteristics and data collection, specifying the sample size requirements, how the sample size was calculated and how the questionnaire was collected. Section 3.3 describes the questionnaire that was used as the research instrument for this study. In addition, this section explains the structure of the questionnaire, which is divided into four parts with 19 questions. The first section and second and third sections are based on the research questions for this study, while the fourth section is for general information statistics. Section 3.4 provides a measure of all the research variables (independent, mediating, dependent) measurement in this study and a 5-point Likert scale was used to measure this study to ensure that the questionnaire was in-depth enough to uncover useful information while facilitating respondents to be able to easily mark their positions.

3.1 Research Design

Chua (1986) introduced a framework consisting of three distinct classifications that are based on epistemological assumptions, specifically the underlying assumptions concerning the acquisition of knowledge. These classifications include positivist, interpretivist, and critical perspectives. The question of whether these three paradigms can be adopted individually or in combination is a subject of debate. In their seminal work, Vari et al. (1998) provided a comprehensive analysis of the distinctions between positivism and anti-positivism. The objective of this study is to examine the relationship between digital-related capabilities, performance measurement systems, and organizational performance. Hence, this study aligns with the positivist paradigm. Positivist scholars argue that the social world is comprised of natural phenomena. The prevailing belief suggests that impartial observers, utilizing established scientific methodologies, can objectively assess social phenomena, including attitudes, satisfaction levels, beliefs, and norms. Given the aforementioned discourse, a significant portion of contemporary scholarly investigations employs quantitative measurement and statistical analysis techniques. Chua (1986) posited that traditional accounting research, commonly referred to as positivist, encompasses formal propositions, objective measurement of variables, hypothesis testing, and drawing inferences about phenomena from samples to specific populations.

In this study, the questionnaire method was adopted as a quantitative research instrument for understanding and assessing social phenomena and issues from a macro research perspective, based on objective data validation. Using questionnaires, the

researcher was able to collect survey data from an objective perspective on large and medium-sized companies in the Chinese IT industry. This empirical research paradigm and choice of quantitative research design allowed the research to be conducted on a larger sample size and to gather broader and more comprehensive information. The online questionnaire approach provides convenient access to data collection and ensures the anonymity and confidentiality of participants, thereby promoting honest and truthful responses.

The quantitative research design and questionnaire approach enables the researcher to gain a more comprehensive understanding of the impact of digital-related capabilities and performance measurement systems on organizational performance. At the same time, by collecting a large amount of data, researchers can conduct statistical analysis and quantitative comparisons, leading to more generalized conclusions and inferences. Ultimately, the findings can provide policymakers and practitioners with useful insights into digital capabilities and performance management for sustained business development and improved organizational performance.

3.2 Sample and Data Collection

Fraenkel et al. (2023) argued that it is important for the researcher to describe the population in sufficient detail so that interested parties can determine whether the findings are applicable to their own situation. The research objective of the study was to investigate whether large and medium companies in the Chinese IT industry believe that digital-related capabilities can improve business performance through PMS. It is clear

from this that the researcher wanted to expand the group studied to large and medium companies in the IT industry. A total of 1,000 large and medium Internet companies as the units were involved in this study, based on the ranking of China's overall Internet power in 2021.

In order to ensure the integrity of the survey findings, it is imperative to determine the appropriate sample size before commencing the sampling process. While it is true that a larger sample size generally leads to a more accurate representation of the population and reduces sampling error, it is important to consider the potential drawbacks of an excessively large sample size, such as increased survey costs. Therefore, it is crucial to determine the sample size in a scientific and rational manner. The method chosen for this study is the sample size confirmation method developed by Viechtbauer et al. (2015), which is calculated as follows.

$$N=Z^2\times(P\times(1-P))/E^2$$

In this context, N denotes the scale of the sample size, Z represents the statistical measure, P represents the probability, and E represents the value of the error. The confidence level, also referred to as the degree of reliability or confidence level, pertains to the uncertainty associated with an overall estimate derived from a random sample. In the field of mathematical statistics, the interval estimation method is employed to establish an error range that accounts for potential discrepancies between the estimate and the overall parameter. The confidence level refers to the probability that the true population parameter lies within the specified interval. The study has established a confidence level of 95%, with a corresponding Z statistic of 1.96. The probability value,

denoted as P, exhibits a maximum value when P(1-P) is equal to 0.5. The determination of the sample size is typically approached with a conservative perspective, aiming to utilize the maximum variance. This study set the permissible error is set at 5%, i.e., E is 5%. Bringing the data into the equation calculates the sample size for this study to be 384, considering the presence of invalid samples, i.e., around 400 questionnaires are required. The data for this study was gathered using meticulously crafted questionnaires. These questionnaires were mainly in the form of links and QR codes on the web. The survey was completed via email and online social networking software such as QQ and WeChat groups (the leading social networking software in China). The study investigated whether digital-related capabilities in companies can ultimately improve organizational performance through PMS using questionnaires completed mainly by executives of companies and organizations.

To ensure the validity of the sample, the researcher randomly selected a sample of 500 Internet companies from different types of first-tier cities in China. There are two reasons why Chinese medium and large enterprises (in the IT industry) were chosen. One reason is that China is transforming into a digital economy, and Internet companies and their digital-related capabilities solutions play an essential role in the digital transformation of the industry. Therefore, its study population and sample are representative. In addition, the following criteria had to be met when selecting the sample of companies: (a) they had to be large and medium-sized enterprises in the IT industry, and (b) Companies with more than 100 employees or with annual revenues meeting selection criteria as selection criteria. Information on these companies was

sourced from the Internet Society of China in order of overall Internet power ranking in 2021. Suitable companies were then identified through the Enterprise Search website, and suitable respondents (Department manager, HRBP Leader, CFO) were identified from the companies, and their contact details were obtained. Next, the contact information and email addresses of these key individuals are recorded. A questionnaire with a link to the online survey and a description of the purpose of the survey (reviewed by the UM Institute) is then distributed to potential respondents via the Sojump software. With questionnaires using the Sojump software tool, the results of the questionnaire are easily quantifiable, saving time, money, and workforce quickly and economically. Moreover, as the survey was expanded, respondents could gradually forward the questionnaire to other contacts. Finally, the data results were systematically analyzed using Smart-PLS 3.3.3 software for reliability, descriptive statistics, correlation, and regression analysis.

3.3 Research Instrument

As this study adopts a quantitative research method, the researcher will use a questionnaire survey for data collection in this study. The questionnaire design in this study was based on well-established foreign scales and used variables previously published in the literature. To ensure the reliability and validity of the questionnaire, the English scales were carefully and rigorously translated and back-translated to ensure that Chinese respondents could understand the true meaning of the questions. Before translating the question items, an editorial committee was comprised of five PhDs, professors, or other academics with expertise in management accounting and

management control systems. Three international students, including Malaysian Chinese and Indonesian students, were invited to participate in the study. They were all native English speakers, and the Malaysian Chinese students were fluent in English. All the invited members were masters in accounting from the University of Malaya, and their participation was very beneficial in the translation and revision of the questionnaire. The three students were first asked to translate the English questions into Mandarin. Their translations were then scrutinized and revised by the committee of editors, who discussed and proofread any inconsistencies. All these questions were supported by previously published literature to support their validity. In addition, the final version of the questionnaire was improved and updated by professional translators and experts to make the information more reliable. Before the formal distribution of the questionnaire, 69 companies of different types were first selected for pre-research, and the content was refined and modified based on the feedback received from the respondents during the pre-research process. To increase the generalizability of the results, 400 medium and large enterprises (IT industry) from Shaanxi, Jiangsu, Sichuan, Shandong, and other parts of China were included in the formal research. The questionnaires were completed by top managers or other senior executives appointed by them, who had a holistic view of the company's long-term strategic planning, cultural traditions, dynamic resource management systems and effectiveness, and the state of its employees, and the questionnaires completed by them primarily reflected the actual situation of the company.

The questionnaire consists of four sections: Section A is about the four dimensions of

digital-related capabilities. Section B covers sales, net profit and cash flow, customer satisfaction and employee turnover related to organizational performance. Section C contains the indicators used by companies to design their PMS. Section D covers general information, including basic information and details of the respondents' work experience, nature of work, and size of the organization.

The questionnaire was administered using a Likert scale score of 1 to 5, each giving a clear meaning and representing a specific measure of the research question. Based on the established hypothesis, questionnaires were collected from the management of medium and large companies in the IT industry and analyzed by them. The study is a quantitative study using the questionnaire method.

3.4 Measurement of Variables

3.4.1 Dependent Variable – Organizational Performance

The study utilized the metrics developed by Khin and Ho (2018) to assess organizational performance. This assessment encompassed both financial performance and non-financial indicators, as indicated in Table 3.1. The financial metrics evaluate the level of managerial contentment with the organization based on indicators such as sales performance, net profit, and cash flow. On the other hand, the non-financial metrics evaluate factors such as customer satisfaction and employee turnover. In this study, a 5-point Likert-type scale ranging from [1] ‘very dissatisfied with performance’ to [5] ‘satisfied with performance’ was employed to assess and rate the questions.

3.4.2 Independent Variables – Digital-Related Capabilities

The measurement instrument utilized in this study was developed by drawing upon the existing body of literature, specifically the works of Nasiri et al. (2020), Rantanen (2020), and Yoo et al. (2010). In order to evaluate digital-related capabilities, a set of four dimensions of digital-related capabilities were identified as independent variables. These dimensions include human capabilities (El Sawy et al., 2016; Lerch & Gotsch, 2015), innovation capabilities (Parida et al., 2015; Xue, 2014), technical capabilities (El Sawy et al., 2016; Parida et al., 2015; Xue, 2014), and collaboration capabilities (Amit & Han, 2017; Chuang & Lin, 2015; El Sawy et al., 2016). The concept of digital-related human capabilities can be broken down into three key elements. Firstly, it involves the support provided by organizations in enhancing employees' digital competencies. Secondly, it encompasses the extent of training offered to employees in utilizing digital tools. Lastly, it encompasses the degree of digitalization present in the operational environment. These components have been discussed by El Sawy et al. (2016) and Lerch & Gotsch (2015). To assess the capabilities of collaboration in the digital realm, three specific items were formulated. These items were designed to inquire about the existence or lack thereof of digital collaboration with other firms, the utilization of digital channels for sharing information with other firms, and the degree to which digitalization has influenced the structure of their social relationships in the business context (Amit & Han, 2017; Chuang & Lin, 2015; ElSawy et al., 2016). To assess the technical capabilities related to digital technology, four distinct dimensions are taken into account. These dimensions include the capacity of digital technology to augment the value of enterprise products and services, facilitate the integration of products and

services, surpass limitations related to time, space, or activity, and offer current and unrestricted services (El Sawy et al., 2016; Parida et al., 2015; Xue, 2014). To evaluate the capabilities of digital-related innovation, three discrete projects were formulated. The aforementioned studies by Parida et al. (2015), Sia et al. (2016), and Xue (2014) examine the ways in which digitalization fosters innovation and the generation of novel ideas, facilitates the emergence of innovative solutions, and aids in the creation of new products and services. The assessment of these four distinct capabilities is conducted through the utilization of a five-point Likert scale, encompassing a range from [1] "Strongly Disagree" to [5] "Strongly Agree."

3.4.3 Mediating Variable – PMS Design

For the measurement of PMS design, this research adopts the tool proposed by Speckbacher et al. (2003), which includes four performance measurement items, namely financial, and non-financial performance measurement; the degree of clearly describing the strategy through causality, target value Adoption of action plans, linking management performance to reward systems. A continuous multidimensional measure based on the suggestion of Speckbacher et al. (2003) was used in this study. PMS design is divided into four dimensions to measure; that is to say, respondents are asked to rate the degree of each measure used by the organization from five angles, from [1] "not at all" to [5] "very large". Table 3.1 includes a breakdown of the PMS design dimensions with their associated measures and reference sources.

Table 3.1 Measurement of Variables

Independent Variables: Digital-related capabilities		
Construct	Item	Source
Human capabilities	The employees have support from the enterprise. in terms of developing their digital skill.	Khin, S., & Ho, T. C. (2019).; Nasiri, M., Ukko, J., Saunila, M., Rantala, T., & Rantanen, H. (2020).
	Employees are well trained in the use of digital tools (ie: Internet, Cloud storage software).	
	The employees can find it easy to use digital functions to operate in their business environment.	
Innovation capabilities.	The enterprises can come up with new ideas for the organization through digital innovation.	Nasiri, M., Saunila, M., Ukko, J., Rantala, T., & Rantanen, H. (2020).
	The enterprises are able to come up with new solutions through digital innovation.	
	The enterprises are able to produce new products and services through digital innovation (i.e., Online).	
Technical capabilities	By using the digital tools (i.e., virtual reality and social media platforms), enterprises are able to increase the value of products and services.	Yoo, Y., Boland Jr, R. J., Lyytinen, K., & Majchrzak, A. (2012); Nasiri, M., Ukko, J., Saunila, M., Rantala, T., & Rantanen, H. (2020).
	By using digital tools, the enterprise can integrate products and services.	
	By using digital tools, the enterprise can provide customers with up-to-date, geographically.	
	By using digital tools, enterprise operations can cross the boundaries of time, place, or activity.	
Collaboration capabilities	The enterprises are able to cooperate with other business partners through the use of digital tools.	Nasiri,M., Saunila, M., Ukko, J., Rantala, T., & Rantanen,H.(2020)；Amit and Han(2017).
	The enterprises are able to share knowledge with other companies by using digital channels.	
	Through the use of digital tools, enterprise social relationships (i.e., customers and suppliers) have changed.	
Dependent variable: organizational performance		
Construct	Item	Source
Satisfaction of Performance	How satisfied are you with the sales of your company?	Khin and Ho (2019).
	Your satisfaction with the net profit of your company is?	
	How satisfied are you with the cash flow of your business?	

Table 3.1 Measurement of variables (Continued)

Dependent variable: organizational performance		
Construct	Item	Source
Satisfaction of Performance	Your company's customer satisfaction level is	Khin and Ho (2019).
	How satisfied are you with your company's market share?	
	How satisfied are you with your company's employee turnover rate?	
Mediating variable: PMS (performance measurement systems)		
Construct	Item	Source
Performance Measurement System	Does a company adopt a multidimensional performance measurement system, combining financial and non-financial performance measurement?	Speckbacher et al. (2003)
	Does a company adopt a multidimensional performance measurement system that additionally describes strategy by using cause and effect relationships?	
	Does a company adopt a multi-dimensional performance measurement system that allows to define target values and action plans?	
	Does a company adopt a multi-dimensional performance measurement system that relates to incentives for management compensation?	

3.5 Data Analysis Technique

SPSS 26.0 and Smart-PLS 3.3.3 were used for the statistical analysis of the data. After collecting, collating, and retrieving the underlying data, the data were statistically processed and analyzed using SPSS 26.0 for frequency analysis, Smart-PLS for reliability and validity analysis, descriptive analysis, correlation analysis, structural equation modelling (SEM) analysis, and appropriate tests to transform them into useful economic information and valuable results. SEM is rooted in the general framework of regression analysis and factor analysis. It combines these techniques to estimate both the measurement model (relationships between observed variables and latent constructs) and the structural model (relationships among latent constructs). By incorporating

measurement error and modelling latent variables, SEM allows for a more comprehensive understanding of complex relationships in data. Smart-PLS is a popular software tool for performing structural equation modelling (SEM) based on PLS. Compared to traditional covariance-based SEM methods, PLS-SEM is more suitable for small sample studies, non-normal data, and the analysis of complex models. Smart-PLS offers a wealth of features including path coefficient estimation, fit indices, bootstrap testing, multi-group comparisons, and model modification. These functions allow us to assess model fit, test the significance of path coefficients, perform model comparisons and modifications, and obtain comprehensive analysis results. Moreover, Partial Least Squares Structural Equation Modeling (PLS-SEM) exhibits the capability to effectively handle measurement models that are both formative and reflective in nature. The reflective indicators are subject to the influence of the underlying construct, and any modifications in the underlying construct are reflected in the observable variables, also known as manifest variables (Hair et al., 2011). The reflective indicators in Partial Least Squares Structural Equation Modeling (PLS-SEM) are denoted by unidirectional arrows that point from the latent construct to the indicator variables. The coefficients associated with these relationships are commonly known as external loadings. In contrast, it is widely believed that formative indicators have an impact on the underlying construct, and any alterations in these indicators directly correspond to changes in the value of the latent construct (Diamantopoulos & Winklhofer, 2001; Hair et al., 2011). Formative indicators in Partial Least Squares Structural Equation Modeling (PLS-SEM) are represented by unidirectional arrows pointing towards the latent construct from the indicator variable. The coefficients corresponding to these relationships are known as

external weights. This study operationalized both exogenous and endogenous formations for all items as reflective formations, drawing upon previous empirical research.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.0 Overview

This chapter is the most critical in the study and presents the results of each research question. Section 4.1 explains the pilot study results that confirm the research's feasibility. Its results can guide subsequent large-scale research studies. Section 4.2 describes re-examining and calibrating the data to remove incorrect information and provide consistency. Section 4.3 describes the demographic data in the formal survey study, including gender, position, education level, business size, and industry type. Section 4.4 conducts a reliability and validity analysis, indicating that this study's data are reliable enough to continue with in-depth analysis. Section 4.5 provides an overall picture of the available data set using descriptive statistical analysis to demonstrate the validity of the data using median, standard deviation, skewness, and kurtosis. Section 4.6 will provide insight into the relationship between digital-related capabilities, PMS, and organizational Performance using correlation analysis. Section 4.7 first uses SRMR to test the model's fit, followed by PLS to test all hypothesized relationships between the variables.

4.1 Pre-Test and Pilot Study

4.1.1 Pre-Test

To ensure that the respondents understood the questionnaire and avoided some non-specialist questions, experts from multiple disciplines reviewed the questionnaire used

in this study. Experts from various fields were invited to assess the potential problems of the questionnaire and suggest solutions based on their knowledge and experience in management accounting. Firstly, relevant experts in the field of management accounting were invited for this study. It was submitted via email to three experts in the field at the University of Malaya for review, primarily to assess whether the questionnaire accurately expressed the professional concepts and measurement dimensions. Based on the feedback from the three university academics, initial adjustments were made to the overall structure and format of the questionnaire, followed by revisions to the incorrect items. The revised questionnaire was finally sent to the expert reviewers again for validation. In addition, a pilot test and a small-scale pilot survey were conducted in which five managers working in medium to large companies in the Chinese Internet industry with experience in performance-related design and management were identified and asked to participate in the survey to answer the questionnaire. They were also asked to assess the scientific validity and feasibility of the questionnaire, such as accuracy, fluency, sound data structure, and other issues.

4.1.2 Pilot-Study Results

Descriptive Analysis—Frequency Analysis

The sample size of respondents in the pilot study was 53. Profiles of respondents are included in the demographic study (Gender, Designation, Education level, Size of company). Respondent demographics were categorized based on the frequency and proportion of each group, as indicated in Table 4.1, to provide a description of the study sample.

Table 4.1: Summary of Demographic Profile of Respondents

Demographic Item	Categories	Frequency	Percentage
Gender	Male	35	66%
	Female	18	34%
Total		**53**	**100%**
Designation	HRBP Leader	42	27.8%
	Department manager	48	31.8%
	CFO	34	22.5%
Total		**53**	**100%**
Education Level	Primary or secondary	4	7.5%
	Diploma	6	11.3%
	Degree	22	41.5%
	Master	16	30.2%
	Ph.D.	5	9.4%
Total		**53**	**100%**
Size of company	Medium enterprise	27	50.9%
	large companies- Public listed	5	9.4%
	large companies- Non listed	21	39.6%
Total		**53**	**100%**

Table 4.1 shows that 66% of those who answered the survey's demographic questions were male, and 34% were female. The majority of the sample are department managers (31.8%), followed by HRBP Leaders (27.8%) and chief financial officers (22.5%). Regarding educational attainment, the proportion of respondents who have only completed primary or secondary education is 7.5%, a very tiny proportion of the overall

population. A lower proportion of degree holders (11.3%) than bachelor's degree holders can be seen in this group. The percentage of individuals with a bachelor's degree was 41.5%, showing a rise in the educational attainment of those who participated in the study sample. The proportion of respondents with a master's degree was 30.2%, indicating that the respondents to the research sample possessed a high level of scientific competency. Furthermore, 9.4% of the sample respondents held a PhD in their field. The overall survey results suggest that most managers have a bachelor's degree or higher, and the high level of education is primarily due to the nature of the role.

The results in Table 4.1 also show that 50.9% of respondents work for medium-sized businesses, 9.4% for publicly traded corporations, and 39.6% for large corporations. The diverse sizes of the company can broaden the pool of potential respondents, allowing for the collection of opinions from respondents from a variety of different sizes of companies.

Reliability Analysis

Reliability analysis, often referred to as reliability testing, is frequently used to determine the reliability or stability of sample findings and the presence of real answers. It is a measure of the degree of consistency between pre- and post-results. The Cronbach's α coefficient, the most often used internal consistency coefficient, was utilized to determine the scale's reliability in this investigation. A greater Cronbach's coefficient suggests that the scale items measure the same construct, trait, or dimension. SPSS 26.0 software was utilized in this research to analyze the final scale's reliability,

and the findings are summarized in Table 4.2.

Cronbach's α coefficient values greater than 0.8 indicate high data reliability, between 0.7 and 0.8 indicate good data reliability, between 0.60 and 0.70 indicate acceptable data reliability, and less than 0.6 indicate that the scale's data reliability is unacceptable and should be reworked or compiled until it meets satisfactory requirements. Table 4.2 presents Cronbach's α values for the variables, which range from 0.823 to 0.947. Meanwhile, the range of Corrected Item-Total Correlation (CITC) values extended from 0.304 to 0.829, with all values exceeding the established threshold of 0.3. These findings suggest that the correlation coefficients between the observed variables and their corresponding latent variables all exceeded 0.5. Hence, the latent variables corresponding to each question item were suitably established, and the questionnaire exhibited satisfactory reliability. Additionally, it was found that when the observed variables for each variable were eliminated, specifically by removing items once, the dependability index for each variable did not exhibit a significantly greater magnitude compared to its counterpart after any item was removed. Therefore, it can be inferred that the reliability of the measurements for each variable is deemed acceptable, all measurement inquiries meet the criteria set by the study and can be retained, the survey data exhibit a high level of reliability, and the measurements demonstrate a strong level of internal consistency reliability.

Table 4.2: Item-Total Statistic

Item-Total Statistics					
	Construct	**Corrected Item-Total Correlation**	**Squared Multiple Correlation**	**Cronbach's Alpha if Item Deleted**	**Cronbach's Alpha**
OP	OP1	0.711	0.697	0.876	0.909
	OP2	0.581	0.682	0.88	
	OP3	0.579	0.779	0.88	
	OP4	0.519	0.668	0.882	
	OP5	0.564	0.738	0.881	
	OP6	0.625	0.631	0.878	
TC	TC1	0.829	0.879	0.871	0.823
	TC2	0.361	0.625	0.888	
	TC3	0.593	0.709	0.879	
	TC4	0.473	0.653	0.884	
PMS	PMS1	0.775	0.898	0.876	0.939
	PMS2	0.657	0.808	0.878	
	PMS3	0.657	0.803	0.877	
	PMS4	0.674	0.76	0.877	
HC	HC1	0.497	0.815	0.883	0.869
	HC2	0.348	0.806	0.887	
	HC3	0.343	0.679	0.89	
CC	CC1	0.342	0.503	0.891	0.927
	CC2	0.538	0.583	0.895	
	CC3	0.304	0.666	0.892	
IC	IC1	0.514	0.897	0.892	0.947
	IC2	0.412	0.848	0.894	
	IC3	0.506	0.9	0.892	

Validity Analysis

Validity analysis is the process of determining the validity of a questionnaire's findings, the validity, rationality, and correctness of the questions' design, and the verification that the administered questionnaire is an objective representation of reality. The more closely the measured findings reflect the material being studied, the more valid the test.

Generally, validity tests are classified into two categories: content validity and construct validity.

Content validity refers to the degree to which the question items represent the variable's dimensions and is often examined using theory. International scales relevant to the investigation were consulted and changed in this study to create measurement items for the latent variables. This was done based on a broad body of literature research and considering the distinctive character of digital-related capabilities and organizational performance. Simultaneously, instructors and specialists in this research area were engaged in developing further and refining the question items to get the final scale, ensuring the questionnaire's content validity.

Additionally, it refers to the connection between the measurement items and the dimensions. It reflects the consistency between the theoretical assumptions and the measurement findings for structural validity. Structural validity, the primary component of scale analysis, encompasses both convergent and discriminant validity. Two widely used techniques for determining structural validity are exploratory component analysis and validation factor analysis.

Exploratory Factor Analysis

Exploratory factor analysis is a more popular method for determining the consistency and structure of measurement variables across latent variables. It is a more often used indication for selecting a scale's validity. The KMO value must be more significant than

0.7, and Bartlett's test of sphericity must be less than 0.05 to use factor analysis for validity analysis. If these two criteria are satisfied, the observed variables are highly linked and acceptable for factor analysis. In this case, the KMO value is between 0 and 1. When the KMO is more than 0.9, and Bartlett's sphericity test has a significance of p 0.05, it is acceptable for component analysis and has a high degree of structural validity. This research did an exploratory factor analysis using SPSS 26.0 software. The following Table 4.3 summarizes the findings. As a result, the null hypothesis of Bartlett's sphericity test was rejected, and the scale was determined to be eligible for component analysis due to its sound structure.

Table 4.3: KMO and Bartlett's Test

KMO and Bartlett's Test						
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.						0.783
Bartlett's Test of Sphericity					Approx. Chi-Square	732.051
					df	190
					Sig.	0
Rotated Component Matrixa						
Component	1	2	3	4	5	6
OP4	0.846					
OP2	0.839					
OP3	0.829					
OP5	0.791					
OP6	0.725					
OP1	0.701					
PMS1		0.826				
PMS2		0.885				
PMS3		0.880				
PMS4		0.841				
IC1			0.860			

Table 4.3: KMO and Bartlett's Test (Continued)

KMO and Bartlett's Test						
IC2			0.908			
IC3			0.910			
HC1				0.760		
HC2				0.894		
HC3				0.858		
TC1					0.645	
TC2					0.831	
TC3					0.800	
TC4					0.758	
CC1						0.778
CC2						0.776
CC3						0.888
Extraction Method: Principal Component Analysis.						
Rotation Method: Varimax with Kaiser Normalization.						
Rotation converged in 6 iterations.						

Principal component analysis and factor rotation with maximum variance orthogonal rotation were used to extract nine common factors with eigenvalues more prominent than one throughout the factor analysis procedure. The total variance explained was 79.079%, more significant than 60%, suggesting that the scale had high validity. Table 4.4 below illustrates the rotated component matrix. The items in this study were classified into six-factor categories, and their factor loading was all greater than 0.5 when aggregated according to the theoretical distribution, with no instances of the high double factor loading, indicating that the questionnaire scale has a high level of validity.

Table 4.4: Total Variance Explained

Total Variance Explained								
Component	Initial Eigenvalues			Extraction Sums of Squared Loading		Rotation Sums of Squared Loading		
	Total	Variance	Cumulative	Variance	Cumulative	Total	Variance	Cumulative
1	7.905	34.37	34.37	34.37	34.37	4.334	18.843	18.843
2	3.564	15.497	49.867	15.497	49.867	3.965	17.24	36.083
3	2.044	8.889	58.756	8.889	58.756	2.875	12.499	48.583
4	1.831	7.962	66.718	7.962	66.718	2.45	10.653	59.235
5	1.573	6.837	73.555	6.837	73.555	2.423	10.537	69.772
6	1.27	5.523	79.079	5.523	79.079	2.141	9.307	79.079
Extraction Method: Principal Component Analysis.								

Confirmatory Factor Analysis

In this study, the validity of the final scale was determined using the Smart-PLS 3.3.3, and the results are given in Table 4.5. Convergent validity is a term that refers to the degree of correlation between measurements of the same notion. The greater the correlation, the stronger the convergent validity, i.e., the extent to which all measurements of each latent variable consistently describe the variable. The validated factor analysis's convergent validity findings in Table 4.5 indicate that each Item's standardized factor loadings are more than 0.7, suggesting that each Item adequately explains its dimension. Additionally, the composite reliability CR (Composite Reliability) value is better than 0.7, and the average variance extracted AVE (Average Variance Extracted) value is more significant than 0.5, showing that the variables have a

high degree of convergent validity (Schumacker & Lomax, 2016).

Table 4.5: Convergent Validity

Convergent Validity				
Construct	**item**	**loading**	**CR**	**AVE**
CC	CC1	0.958	0.949	0.86
	CC2	0.895		
	CC3	0.928		
HC	HC1	0.942	0.911	0.775
	HC2	0.92		
	HC3	0.77		
IC	IC1	0.955	0.966	0.904
	IC2	0.927		
	IC3	0.969		
PMS	PMS1	0.925	0.956	0.846
	PMS2	0.928		
	PMS3	0.921		
	PMS4	0.905		
OP	OP1	0.826	0.929	0.685
	OP2	0.847		
	OP3	0.863		
	OP4	0.813		
	OP5	0.807		
	OP6	0.809		
TC	TC1	0.887	0.874	0.637
	TC2	0.633		
	TC3	0.858		
	TC4	0.79		

Discriminant validity refers to the ability to distinguish between the values of the measured items in different variables or constructs. The discriminant validity of this research was determined by comparing the size of the square root of each latent variable's Average Variance Extracted (AVE) to the value of the correlation coefficient between the other variables. Suppose the square root of a latent variable's AVE is larger

than the correlation coefficient between the latent variable and other latent variables. In that case, the scale has a high degree of discriminant validity (Anderson & Gerbing, 1988). According to the findings in Table 4.6, the square root of the Average Variance Extracted (AVE) for each latent variable on the diagonal is more significant than 0.5, and all of them are greater than the correlation coefficient between the variables, indicating that the scale has good discriminant validity between the latent variables.

Table 4.6: Discriminant Validity

Discriminant Validity						
	CC	HC	IC	PMS	OP	TC
CC	0.928					
HC	0.038	0.881				
IC	0.119	0.528	0.951			
PMS	-0.011	0.381	0.362	0.92		
OP	0.146	0.17	0.206	0.524	0.828	
TC	-0.045	0.282	0.28	0.654	0.571	0.798

4.2 Results Based on the Actual Data Collection

4.2.1 Data Cleaning and Analysis

Four hundred fifty questionnaires were distributed in this study, and 411 questionnaires were received. After excluding five questionnaires with the same answers to all questions, five with incomplete answers, and seven with too short or too long answers, the number of valid samples recovered was 394 parts, and the effective rate reached 87.5%.

4.2.2 Frequency Analysis

Profiles of respondents are included in the demographic study (Gender, Designation,

Education level, size of company). Respondent demographics were categorized based on the frequency and proportion of each group, as indicated in Table 4.7, to describe the study sample.

Table 4.7: Summary of Demographic Profile of Respondents

Demographic Item	Categories	Frequency	percentage
Gender	Male	275	69.8
	Female	119	30.2
Age	20-25 years	28	7.1
	25-35 years	167	42.4
	35-45 years	150	38.1
	45-55 years	38	9.6
	55-65 years	10	2.5
	More than 65 years	1	0.3
Educational Level	Primary or secondary	18	4.6
	Diploma	16	4.1
	Degree	253	64.2
	Masters	86	21.8
	Phd	13	3.3
	Others (Please specify) ------	8	2
Designation	HRBP Leader	196	49.7
	Department manager	187	47.5
	CEO	5	1.3
	CFO	6	1.5
Size of company	medium enterprise	168	42.6
	large companies-Public listed	41	10.4
	large companies-Non listed	185	47
Establishment of Company	1-5 years	80	20.3
	5-10 years	215	54.6
	10-15 years	42	10.7
	15-20 years	39	9.9
	More than 20 years	18	4.6

Table 4.7: Summary of Demographic Profile of Respondents (Continued)

Demographic Item	Categories	Frequency	percentage
Working experience	1-5 years	157	39.8
	5-10 years	237	60.2
Nature of Industry	IT	356	90.4
	Garments & Textile	14	3.6
	Business of properties	11	2.8
	Financial Institution	13	3.3
The number of employees	100-200	14	3.6
	300-500	142	36
	500-1000	129	32.7
	More than 1000	109	27.7
The organization's annual sales for the most recent years	<CNY 10 million	98	24.9
	CNY 20 million to 40 million	131	33.2
	CNY 50 million-100 million	134	34
	>=CNY 100 million	31	7.9

As can be seen from the above table, in terms of gender, men accounted for 69.8%, and women accounted for 30.2%. The focus was on people aged 25-35 and 35-45, with those aged 25-35 accounting for 42.4% and those aged 35-45 accounting for 38.1%. In terms of education, mainly Degrees accounted for 64.2%. Regarding Designation, HRBP Leader and Department manager mainly accounted for 49.7% and Department manager for 47.5%. In terms of size of the company, medium enterprise, and large companies - non-listed were the main categories. In terms of the company's size, large and medium enterprises- non-listed are the main categories. Regarding the Nature of

Industry, IT is the main category, accounting for 90.4% of the total.

4.2.2.1 Gender

This study showed that 69.8% of respondents were male and 30.2% were female, with a clear imbalance between males and females. The focus was on the 25-35 and 35-45 age groups, with 42.4% of 25–35-year-olds and 38.1% of 35–45-year old's, with the other age groups accounting for almost negligible percentages. The survey results show that most managers in large and medium enterprises (Internet industry) are men, and the proportion of women is only half that of men, indicating that men dominate in medium and large enterprises (Internet industry). Most managers are between 25 and 45 years old, indicating that managers in the ever-changing Internet industry tend to be young and have enough experience while still having room for upward mobility. According to the poll results, all respondents were allowed to express their opinions.

4.2.2.2 Designation

In terms of Designation, only the managers of large and medium enterprises (Internet industry) can express their ideas due to the limitation of the position. Hence, the target of this study is mainly HRBP Leader and Department manager, in which HRBP Leader accounts for 49.7% and the Department manager accounts for 47.5%. The remaining positions were divided into CEO and CFO, with an overall percentage of at most 3%, which is negligible. This study is mainly associated with PMS, Performance. In most Internet industries, one of the job duties of an HRBP Leader and Department manager is to be responsible for performance target setting and performance appraisal. From the side, it can be mapped that this data collection's results align with expectations.

4.2.2.3 Education Level

In terms of educational attainment, most managers in the companies surveyed so far are mainly degree-holders accounting for 64.2% of the total population, which is a massive proportion of the total population, indicating an increase in the educational attainment of the participants in the study sample. Within this group, 21.8% of the respondents were Masters, indicating a high level of scientific literacy in the study sample. In addition, 3.3% of the sample respondents had a PhD in their field of study. The overall findings indicate that most managers have a bachelor's degree or higher, with a high level of education, mainly due to the nature of the role.

4.2.2.4 Size of company

According to the size of the companies surveyed, the respondents were mainly from large and medium enterprises- non-listed, accounting for 42.6% and 47%, respectively. By surveying companies of different sizes in the same industry, it is possible to broaden the range of potential respondents and thus collect respondents' views from companies of different sizes.

4.2.2.5 Nature of Industry

Regarding the nature of their work, the respondents are mainly from the Internet industry, accounting for 90.4% of the respondents. This ensures that the fields of survey and research are largely aligned and to some extent the quality of the data.

4.3 Reliability Analysis and Validity Analysis

The initial phase of testing the measurement scale encompassed assessments of convergent reliability, discriminant validity, and composite reliability. Based on the

studies conducted by Yunarsih et al. (2020), Naushad (2021), Wanasida et al. (2021), Al-zam et al. (2021), Amri et al. (2021), and Asbari et al. (2021), it is suggested that when all the indicators on the scale satisfy the criteria of convergent validity, discriminant validity, and reliability tests, the outcomes of the Partial Least Squares (PLS) analysis can be employed to evaluate the research hypotheses.

4.3.1 Reliability and Convergent Validity Analysis

Reliability analysis is a statistical technique employed to assess the consistency and dependability of a measurement scale. The assessment of convergent validity involves examining the loading factor values associated with each indicator on the constructs. According to Purwanto (2021), factor weights that are equal to or greater than 0.5 are generally regarded as possessing sufficient validation to elucidate the fundamental constructs in a majority of mid-reference literature. According to Asbari (2021), in the present study, it was assumed that each construct had an average variance extracted (AVE) value greater than 0.5. Furthermore, a minimum loading factor of 0.5 was deemed acceptable. The assessment of convergent validity was conducted by examining the Average Variance Extracted (AVE) values for each construct, as outlined by Purwanto et al. (2020), along with the loading factor values for each metric. The average variance extracted (AVE) values for each construct in this study exhibited statistical significance exceeding 0.5. Convergent validity pertains to the extent of similarity observed in measurement outcomes when multiple measures are employed to assess a common attribute. In other words, different measures should align and yield consistent results when assessing the same attribute. The scales in this study

demonstrated satisfactory convergent validity, as they met the necessary requirements. Table 4.8 presents the loadings, Cronbach values, Composite Reliability values, and AVE values for each complete construct.:

Table 4.8: Dimension Reliability and Validity

Construct	Cronbach's Alpha	Rho_A	Composite reliability	AVE
CC	0.895	0.908	0.934	0.826
HC	0.808	0.831	0.886	0.722
IC	0.847	0.849	0.907	0.765
OP	0.896	0.904	0.921	0.661
PMS	0.836	0.853	0.89	0.67
TC	0.84	0.848	0.893	0.676

The assessment of construct reliability can be conducted through the utilization of Cronbach's Alpha value and the Composite Reliability (CR) of each construct. The alpha coefficients, as proposed by Cronbach (1951), are utilized to assess the internal consistency of questionnaire items. A Cronbach's alpha coefficient value exceeding 0.8 signifies a high level of data reliability, while a value ranging from 0.7 to 0.8 indicates good data reliability. Additionally, a value between 0.60 and 0.70 is considered acceptable in terms of data reliability. A value below 0.6 signifies that the scale exhibits inadequate data reliability, necessitating its revision or redevelopment until it satisfies the acceptable criteria. Hence, when the alpha coefficient exceeds 0.7, it indicates a higher level of internal consistency among the items within the questionnaire, thereby suggesting greater reliability of the questionnaire. According to Ghozali (2014), it is suggested that the critical ratio (CR) and Cronbach's alpha values should exceed 0.7 in

order to demonstrate a substantial level of convergent validity for the variables. This implies that the variables under investigation exhibit a strong degree of consistency and reliability (Schumacker & Lomax, 2016). According to Fornell (1981), there is a contention among researchers regarding the superiority of composite reliability (CR) over Cronbach's alpha as a measure of internal consistency. The argument is based on the assertion that CR preserves the standardized loadings of the observed variables in the questionnaire. The reliability test results presented in Table 4.8 above indicate that Cronbach's alpha coefficient for each variable within this scale surpasses the threshold of 0.7, thus demonstrating a high level of reliability. The Cronbach's alpha coefficient for the entire scale falls within the range of 0.808 to 0.896, suggesting a favourable level of internal consistency in the measurement of the potential variables and a strong reliability, in accordance with Devellis' established criteria for reliability. The Composite Reliability (CR) for each construct in Table 4.8 exhibited a statistically significant value greater than 0.7, indicating a high level of internal consistency. Similarly, the Average Variance Extracted (AVE) for each construct surpassed the threshold of 0.5, indicating a satisfactory level of convergent validity. All constructs exhibited composite reliability, and all constructs demonstrated satisfactory levels of reliability as per the established criteria. Hence, this research provides empirical evidence in favour of assessing the reliability and convergent validity of the test.

4.3.2 Discriminant Validity

Further measurements were related to the differential validity of the latent variables. Some researchers used tests like the Fornell and Larcker criterion, cross-loadings, and

HTMT to measure the discriminant validity (Fornell, 1981).

Table 4.9.1: Fornell-Larcker Criterion

Construct	CC	HC	IC	OP	PMS	TC
CC	0.909					
HC	0.72	0.850				
IC	0.708	0.596	0.875			
OP	0.763	0.718	0.72	0.813		
PMS	0.727	0.669	0.64	0.738	0.818	
TC	0.698	0.649	0.572	0.694	0.675	0.822

Discriminant validity refers to the ability to distinguish between the values of items being measured in different variables or constructs. Discriminant validity for this study was determined by comparing the magnitude of the square root of the Average Variance Extracted (AVE) for each latent variable with the correlation coefficient value between the other variables. A scale has high discriminant validity if the square root of the AVE for a latent variable is greater than the correlation coefficient between that latent variable and the other latent variables (Anderson & Gerbing, 1988). Table 4.9.1 depicts the Fornell and Larcker criterion test for the scale, where the squared correlations are compared with those of the other latent variables. The square root of the Average Variance Extracted (AVE) for each latent variable on the diagonal is more significant than 0.5. It is higher than the correlation coefficient for each variable, indicating that the scale has good discriminant validity between latent variables.

Table 4.9.2: Cross Loading

	CC	HC	IC	OP	PMS	TC
Collaboration capabilities1	0.914					
Collaboration capabilities2	0.945					
Collaboration capabilities3	0.865					
Human capabilities1		0.808				
Human capabilities2		0.895				
Human capabilities3		0.843				
Innovation capabilities1			0.88			
Innovation capabilities2			0.867			
Innovation capabilities3			0.877			
PMS1					0.869	
PMS2					0.769	
PMS3					0.804	
PMS4					0.828	
Satisfaction of Performance1				0.874		
Satisfaction of Performance2				0.704		
Satisfaction of Performance3				0.842		
Satisfaction of Performance4				0.882		
Satisfaction of Performance5				0.77		
Satisfaction of Performance6				0.791		
Technical capabilities1						0.847
Technical capabilities2						0.756
Technical capabilities3						0.821

Table 4.9.2: Cross Loading (Continued)

	CC	HC	IC	OP	PMS	TC
Technical capabilities4						0.861

Cross loadings are correlations of other potential variables with indicator variables. Under the single-configuration criterion, each indicator variable can only belong to a particular factor and, therefore, will have a high relationship with one factor and a low relationship with the others. Cross loadings <0.4 are generally considered low and can be ignored, and some suggest <0.3 as a guideline for removing topics. Ideally, the factor loadings of each variable corresponding to the question items are more significant than 0.6. In this study, as shown in Table 4.9.2, the Cross loadings of all observed variables are more significant than the loadings of their associated variable indicators, which indicates that the dimensional divisions are discriminatory and that the question items under the same dimension are consistent, so they meet the requirements and indicate that the data has good validity.

Table 4.9.3: HTMT

	CC	HC	IC	OP	PMS	TC
CC						
HC	0.832					
IC	0.808	0.711				
OP	0.844	0.830	0.822			
PMS	0.823	0.798	0.749	0.838		
TC	0.798	0.780	0.672	0.793	0.796	

The above table shows that the HTMT between the two constructs between each

variable is less than 0.85, which is distinguishable and meets the requirement.

The Heterotrait-Monotrait Ratio (HTMT) is the ratio of between-trait to within-trait correlations, i.e., the ratio between the mean of Heterotrait-Monotrait correlations, and the ratio of the mean of between-trait correlations to the mean of within-trait correlations. It is the ratio of the mean of the correlation between indicators of different profiles to the mean of the correlation between indicators of the same profile. It measures confidence in the differentiation of variables by using confidence intervals. The threshold value is 0. 85, the HTMT between two constructs cannot be greater than 0. 85, and the Bootstrap confidence interval of the HTMT in all combinations of constructs cannot contain 1. As seen from the above table, the HTMT values between the latent variables in this study are all less than 0. 85, which meets the threshold judgment criteria and indicates good discriminant validity, which can lay the data foundation for the following study.

4.4 Descriptive Statistic

Table 4.10: Descriptive Statistics

	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Human capabilities1	1	5	2.939	1.127	-0.446	-0.008
Human capabilities2	1	5	2.952	1.508	-1.426	0.051
Human capabilities3	1	5	2.967	1.149	-0.597	0.024
Innovation capabilities1	1	5	2.896	1.189	-0.924	0.093
Innovation capabilities2	1	5	2.929	1.16	-0.882	0.041

Table 4.10: Descriptive Statistics (Continued)

	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Innovation capabilities3	1	5	2.924	1.151	-0.815	0.089
Technical capabilities1	1	5	2.977	1.367	-1.116	-0.001
Technical capabilities2	1	5	3.018	1.021	0.017	0.007
Technical capabilities3	1	5	3.01	1.129	-0.612	-0.031
Technical capabilities4	1	5	3	1.155	-0.88	0.02
Collaboration capabilities1	1	5	3.071	1.155	-1.147	-0.05
Collaboration capabilities2	1	5	3.081	1.124	-1.294	-0.02
Collaboration capabilities3	1	5	2.977	1.136	-0.63	0.014
Satisfaction of Performance1	1	5	3.046	1.438	-1.344	-0.044
Satisfaction of Performance2	1	5	3.071	0.825	0.44	0.167
Satisfaction of Performance3	1	5	2.997	1.293	-1.05	0.019
Satisfaction of Performance4	1	5	3.033	1.404	-1.297	-0.092
Satisfaction of Performance5	1	5	3.038	1.104	-0.538	-0.007
Satisfaction of Performance6	1	5	3.02	1.117	-0.548	-0.04
PMS1	1	5	2.985	1.335	-1.22	0.022
PMS2	1	5	2.98	1.066	-0.146	0.078
PMS3	1	5	3.013	1.098	-0.271	-0.048
PMS4	1	5	2.985	1.16	-0.664	0.069

As seen from Table 4.10, the total number of questions in the total table for this study was 23, and the means ranged from 2.924 to 3.081, indicating that the 394 sample respondents were mainly at the average level. The standard deviations ranged between 0.825 and 1.508, and the data comparisons were relatively well spread out. Indicating

that these questions were designed to be well differentiated, and the correlations had the statistical prerequisites of a normal distribution of data. If the data are severely skewed, the variables are non-linear or pseudo-correlated, and the conclusions drawn are invalid. Therefore, normality tests should be performed prior to regression model analysis. The skewness and kurtosis coefficients should be close to 0 for a normal distribution. The distribution is abnormal when the skewness coefficient is more remarkable than three, and the kurtosis coefficient is greater than 8. As shown in Table 4.10, the skewness of the questions ranged from -1.426 to 0.440, with an absolute value of less than 3, and the kurtosis ranged from -0.092 to 0.093, with a value of less than 3. This demonstrates that the data for the 23 questions are customarily distributed and can be used directly for statistical analyses such as reliability and validity.

4.5 Correlation Analysis

Table 4.11: Correlation Analysis

Variables	CC	HC	IC	OP	PMS	TC
CC	1					
HC	0.720**	1				
IC	0.708**	0.596**	1			
OP	0.763**	0.718**	0.720**	1		
PMS	0.727**	0.669**	0.640**	0.738**	1	
TC	0.698**	0.649**	0.572**	0.694**	0.675**	1

Note：**represents P＜0.01

The Pearson correlation coefficient method was used for the correlation analysis. This method was used to measure the correlation coefficients between collaboration capabilities, human capabilities, innovation capabilities, technical capabilities, organizational performance, and performance measurement systems. The results are shown in Table 4.11.

The Pearson correlation coefficient is a widely used measure for quantifying the magnitude of the relationship between two variables. The correlation coefficient is a precise metric that quantifies the magnitude of the linear relationship between two variables in correlation analysis. In correlation reports, the coefficient is commonly represented by the symbol R, and the Pearson correlation coefficient is used to indicate the level of statistical significance. A higher R-value indicates a stronger linear relationship, while a lower p-value signifies a more significant correlation. An illustration of this would be a p-value that is lower than 0.05, which signifies a statistically significant level. A correlation matrix was derived to assess the degree of relationship between the relative motion of each pair of variables. The relationship between digital-related capabilities, organizational performance, and Performance Measurement Systems is depicted in Table 4.11. Based on the data presented in the table above, it is evident that there exist statistically significant correlations ($p < 0.01$) among all the variables. This finding provides evidence supporting the existence of a robust correlation between PMS (Performance Measurement Systems) and various aspects such as collaboration capabilities, human capabilities, innovation capabilities, technical capabilities, and organizational performance. This outcome aligns with the

initial hypothesis posited in the present study. The enhancement of organizational performance can be achieved through the improvement of human capabilities, innovation capabilities, and technical capabilities.

4.6 Hypotheses Tests

Following previous research (Henseler et al., 2015), the researcher chose to apply Standardized Root Mean Square Residuals (SRMR) as a pointer to assess the overall model fit.

Table 4.12: Root Mean Square Residual（SRMR）

	Initial sample	**Sample Mean**	**95%**	**99%**
Saturation Model	0.055	0.036	0.039	0.041
Estimation Model	0.055	0.036	0.039	0.040

SRMR values range between 0 and 1, with values closer to 0 indicating better model fit, which must generally be less than 0.05.

The Standardized Root Mean Square Residual (SRMR) serves as an estimation of the fitness of a specific model by quantifying the disparity between the observed correlation matrix and the correlation matrix derived from the implied model (referred to as the model-implied correlation matrix). Put differently, the standardized root mean square residual (SRMR) serves as a measure of the average magnitude of the discrepancy, and a smaller SRMR value indicates a more favorable fit. According to the convention established by Hu and Bentler (1998), a model is well-fitting when the Standardized

Root Mean Square Residual (SRMR) is less than 0.08. According to the findings presented in Table 4.12, the Structural Equation Model (SEM) demonstrates a Standardized Root Mean Square Residual (SRMR) value of 0.055. This value falls below the established threshold of 0.080, suggesting that the model exhibits a satisfactory level of fit. Consequently, it can be inferred that the model is deemed to be a suitable fit for the observed data.

In the context of structural equation modeling analysis, the partial least squares (PLS) method is employed to examine and evaluate the hypothesized relationships among variables. The path coefficients indicate both the direction and magnitude of the influence between variables under consideration. To evaluate the model and hypotheses put forth in this study, the researchers employed the visualization tool Smart PLS 3.3.3 to conduct Partial Least Squares (PLS) analysis. Additionally, Bootstrapping resampling methods were utilized to determine the significance of the path coefficients within the constructed model.

Figure 4.1 Study Framework Applied in Smart PLS

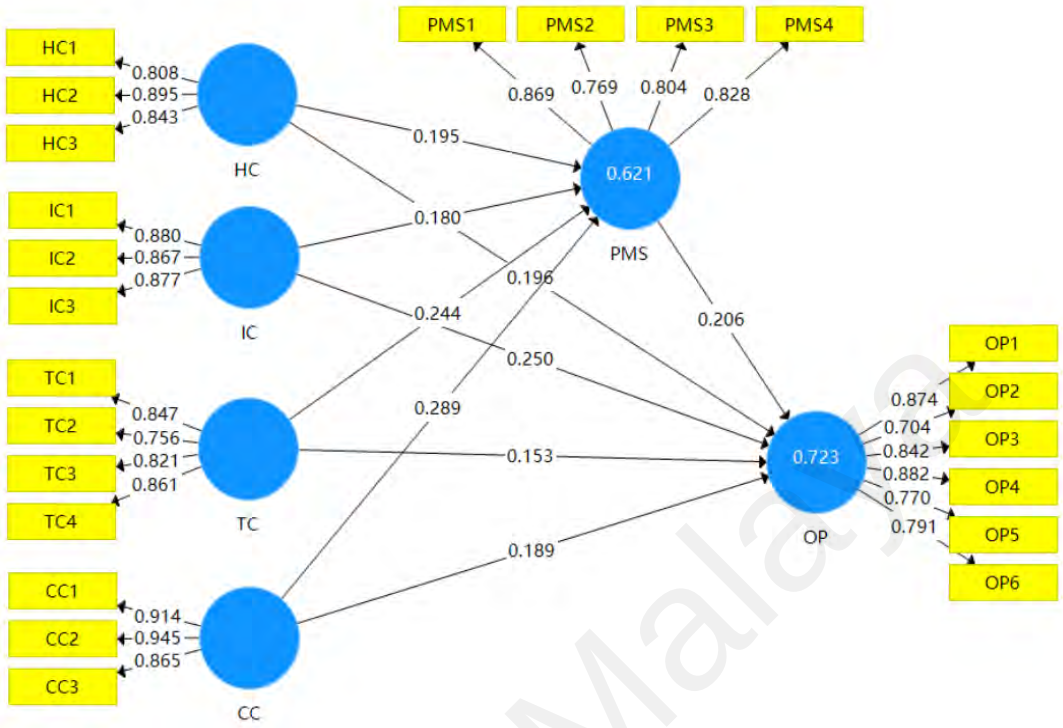


Table 4.13: Path Coefficient

	Initial Sample (O)	Sample Mean (M)	STDEV	T (|O/STDEV|)	P	Result
H1a: HC -> OP	0.196	0.194	0.047	4.151	0.000	Supported
H1b: CC -> OP	0.189	0.188	0.07	2.69	0.007	Supported
H1c: TC -> OP	0.153	0.158	0.065	2.366	0.018	Supported
H1d: IC -> OP	0.25	0.249	0.051	4.927	0.000	Supported
H2a: HC -> PMS	0.195	0.197	0.064	3.052	0.002	Supported
H2b: CC -> PMS	0.289	0.288	0.065	4.455	0.000	Supported
H2c: TC -> PMS	0.244	0.244	0.062	3.96	0.000	Supported
H2d: IC -> PMS	0.18	0.182	0.069	2.594	0.010	Supported
H3: PMS -> OP	0.206	0.206	0.053	3.862	0.000	Supported

The path coefficient is the relationship between the constructs in the model and has a value between -1 and +1. If it is closer to +1, it indicates a highly positive relationship; closer to -1, a highly antagonistic relationship; and closer to 0, a weaker relationship and usually less likely to reach a significant level.

Table 4.13 shows the results of the hypothesis tests. The hypothesis is accepted if the p-value for the independent and dependent variables is less than 0.05. The results indicate that CC (collaboration capabilities) (p = 0.007), HC (human capabilities) (p = 0), IC (innovation capabilities) (p = 0), and TC (technical capabilities) (p = 0.018) all had a positive effect on OP (organizational Performance). Therefore, the results support H1(H1a, H1b, H1c, H1d).

The results reveal that collaboration capabilities (p=0), human capabilities (p=0.002), innovation capabilities (p=0.01), and technical capabilities (p=0) were all significant for PMS (Performance et al.). Therefore, the results support H2 (H2a, H2b, H2c, H2d). Finally, the PMS (Performance et al.) has a significant effect on OP (Organizational Performance) (p = 0). Therefore, the result supports H3.

Table 4.14: The Mediation Effect

	Initial sample (O)	**Sample mean（M）**	**STDEV**	**T（|O/STDEV|）**	**P**	**Result**
H4a: HC -> PMS -> OP	0.04	0.041	0.019	2.128	0.034	Supported
H4b: CC -> PMS -> OP	0.059	0.059	0.018	3.243	0.001	Supported

Table 4.14: The Mediation Effect (Continued)

H4c: TC -> PMS -> OP	0.05	0.05	0.018	2.797	0.005	Supported
H4d: IC -> PMS -> OP	0.037	0.038	0.018	2.04	0.042	Supported

According to the data presented in Table 4.14, the mediating effect value of PMS (Performance Measurement System) between IC (Innovation Capabilities) and OP (Organizational Performance) is 0.037. The associated p-value is below the threshold of 0.05, suggesting a statistically significant mediated effect of PMS between IC and OP. The mediating effect value of PMS between TC and OP is 0.050, indicating statistical significance ($p < 0.05$) and suggesting a significant mediating effect of PMS between TC and OP. Furthermore, the observed mediating effect coefficient of PMS in the relationship between CC and OP is 0.059, indicating a statistically significant mediation effect of PMS in the relationship between CC and OP. The mediating effect value of Performance Measurement Systems (PMS) between human capabilities (HC) and organizational performance (OP) is 0.040, with a p-value below 0.05. This suggests a statistically significant mediating effect of PMS between HC and OP.

This study used the Bootstrap method in Smart-PLS 3.3.3 software to conduct a mediation effect test. The empirical sampling distribution was used as the overall distribution for parameter estimation, and iterative samples were repeated 2000 times to calculate 95% confidence interval estimates, with the results shown in Table 4.13. If the confidence interval does not contain 0, the mediation effect is significant; if it contains 0, it is insignificant (Preacher & Hayes, 2008).

The findings presented in Table 4.14 and Figure 4.1 indicate that hypothesis H4 (4a, 4b, 4c, 4d) was examined in this study using an indirect effect model. Firstly, Hypothesis 4a (H4a) posits that the design of Performance Measurement Systems (PMS) serves as a mediator in the connection between human capabilities and organizational performance. The findings derived from the analysis of the data revealed a significant correlation between digital-related human competencies and the design of Performance Measurement Systems (PMS), as well as the overall organizational performance. The p-value for the path coefficient is 0.034, which is lower than the critical value of 0.05. The t-score is 2.128, the standard deviation is 0.019, and the observed value is 0.040. A statistically significant positive correlation exists. The findings of this study provide support for H4b, which posits that the relationship between collaboration capabilities and organizational performance is mediated by PMS design. Specifically, the results indicate a significant relationship between digital-related collaboration capabilities and both organizational performance and PMS design. The p-value for the path coefficient is 0.001, indicating statistical significance. The t-score associated with this coefficient is 3.243, suggesting a strong relationship. The standardized value for the coefficient is 0.018, and the observed value is -0.059. These results collectively demonstrate a statistically significant positive relationship at the 0.05 level of significance.

The findings of the data analysis provide evidence that there is a notable and favorable correlation between digital-related technical capabilities and the design of Performance Measurement Systems (PMS), as well as the overall organizational performance. This supports hypothesis H4c, which suggests that the relationship between technical

capabilities and organizational performance is mediated by the design of PMS. The p-value for the path coefficient is 0.005, the t-score is 2.797, the standard value is 0.018, the O value is 0.050, and the significance level is 0.05. As postulated, there was a significant correlation between PMS design and digital-related innovation capabilities as well as organizational performance (p=0.042, t=2.040, Std=0.018, O=0.037). This finding provides support for H4d, which suggests that PMS design acts as a mediator in the relationship between innovation capabilities and organizational performance. Hence, the PMS design operates under the assumption that the mediation effect has been established. Upon conducting tests on the research hypotheses, it was found that all four hypotheses put forth were substantiated by the data.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.0 Overview

The final chapter begins with a discussion of the results of the research questions obtained through the data analysis process of this study and a rough summary of the results of each research question round. A conceptual model of the empirical evidence supported by the research findings is presented, and all hypotheses are supported. Section 5.1 provides an interpretation of the study results. Section 5.2 discusses the theoretical and practical implications of this study. Section 5.3 explains the limitations of this study with recommendations for future research. The final section concludes the whole chapter.

5.1 Discussion of the Key Findings

The primary purpose of this study is to achieve four distinct objectives. The primary objective of this study is to examine the relationships between the four dimensions of digital-related capabilities and organizational performance. Additionally, the objective of this study is to investigate the correlations among the four dimensions of digital-related capabilities and the design of Performance Measurement Systems (PMS). Additionally, the objective of this study is to analyze the correlation between the design of Performance Measurement Systems (PMS) and the overall organizational performance. Finally, the objective of this study is to examine the mediating effect of Performance Measurement Systems (PMS) on the relationship between organizational

performance and the four dimensions of digital-related capabilities. The study focuses on Chinese IT firms as a specific case study. To accomplish the research objectives and effectively address the research questions, the proposed research model was subjected to testing. The findings of the study provided empirical support for the theoretical framework, as all the proposed hypotheses were validated. Therefore, this study effectively achieved the research objectives and responded to the research questions. The results of this study offer empirical evidence that aligns with the resource orchestration theory. This theory posits a relationship between digital-related capabilities, organizational performance, and PMS.

5.1.1 Research Objective 1: To Examine the Relationship Between the Four Dimensions of Digital-related Capabilities and Organizational Performance

According to the information presented in Table 6.1, which offers a concise overview of the research findings, it is postulated that there exists a positive correlation between the four dimensions of digital-related capabilities and organizational performance (Hypotheses 1). The findings demonstrate a noteworthy and strong relationship between organizational performance and the four distinct dimensions of digital-related capabilities, specifically human, collaboration, technical, and innovation capabilities. The findings provide support for hypotheses H2a, H2b, H2c, and H2d, with statistical significance being upheld at the $p<0.05$ threshold. It is important to acknowledge that prior studies have produced inconclusive results concerning the correlation between digital capabilities and organizational performance (Martínez-Caro et al., 2020). Research has indicated that the presence of digital-related capabilities can have a

beneficial effect on organizations, leading to cost reduction and enhanced flexibility (Drnevich & Croson, 2013). However, previous research has indicated that establishing a clear relationship between digital-related capabilities and organizational performance is challenging to substantiate (Tan et al., 2010). This research addresses a notable void in the existing literature and aims to establish a clear relationship between digital-related capabilities and the overall effectiveness of organizations. The significance of digital-related capabilities in enhancing organizational performance is evident. It is logical to assert that the numerical abilities of individuals can have an influence on the overall effectiveness of organizations. Furthermore, it is important to recognize that human beings possess a malleable nature, allowing them to adapt and adjust in response to varying circumstances. In the contemporary era of digitalization, the capacity of an individual to acquire knowledge and adjust to a perpetually evolving professional milieu assumes paramount significance. According to Nasiri et al. (2020), Egan et al. (2004) found evidence of a positive relationship between the proficiency of employees in acquiring knowledge in the field of information technology and the overall performance of the organization. In addition, with respect to collaboration capabilities in the digital realm, workplace collaboration has the potential to enhance team productivity and generate cost savings. An instance of the collaboration between Sears and Michelin, as previously mentioned, employing the Collaborative Planning, Forecasting, and Replenishment (CPFR) approach, led to a noteworthy decrease of 25% in the inventory levels for both organizations (Steerman, 2003). Similarly, the establishment of a fresh collaboration between General Motors and its suppliers resulted in a reduction of the vehicle development timeline from a span of 4 years to a mere 18 months (Gutman,

2003). The results of this study align with prior research, specifically, the notion that digital-related technical capabilities have a positive impact on organizational integration, leading to enhanced organizational performance (Vickery et al., 2003). In a study conducted by Griliches (1998), a noteworthy relationship was discovered between technical capabilities and organizational performance indicators. This research examined the influence of technological innovation capabilities on the performance of Chinese corporations, as reported by Yam et al. (2004). Furthermore, it has been highlighted in certain studies that there exists a positive relationship between the effective utilization of technical capabilities and the economic performance of a company (Ehie & Olibe, 2010). According to Agarwal and Dev (2003), it has been widely recognized that innovation plays a crucial role in the survival and growth of enterprises, particularly in relation to their digital-related innovation capabilities. An illustrative instance can be observed in the study conducted by Westerman et al. (2011), wherein it was discovered that companies exhibiting digital innovation value surpassing the average demonstrated superior levels of profitability and revenue generation. The study conducted by Wang and Hu (2014) aimed to examine the relationship between market orientation, service innovation, and innovation performance within Taiwan's high-tech industry. The findings indicate that innovation serves as a comprehensive mediator in the enhancement of innovation performance. Additionally, the research emphasized the importance of technology-driven product quality in facilitating companies to attain enhanced organizational performance. Consequently, the research findings offer increased credibility in substantiating the existence of a positive relationship between technical capabilities and organizational performance.

Table 5.1: Summary of Research Findings (Objective One)

Research Question	Research Objective	Hypotheses		Result
RQ1. What are the relationships between the four dimensions of digital-related capabilities and organizational performance?	RO1. To examine the relationships between the four dimensions of digital-related capabilities and organizational performance.	**H1a**	There is a relationship between human capabilities and organizational performance.	**Supported**
		H1b	There is a relationship between collaboration capabilities and organizational performance.	**Supported**
		H1c	There is a relationship between technical capabilities and organizational performance.	**Supported**
		H1d	There is a relationship between innovation capabilities and organizational performance.	**Supported**

5.1.2 Research Objective 2: To Examine the Relationship Between the Four Dimensions of Digital-related Capabilities and PMS Design

Hypotheses 2 and its corresponding sub-hypotheses (H2a, H2b, H2c, H2d) were developed and empirically examined to address Research Objective 2. The results indicate that the four dimensions of digital-related capabilities have a significant influence on the design of PMS, as presented in Table 5.2. According to El Sawy et al. (2016), in the digital era, it is crucial for employees to possess an adaptive mindset, skills, and digital knowledge to effectively leverage the potential of the Performance

Measurement Systems (PMS). The implementation of Performance Measurement Systems (PMS) offers employees access to diagnostic and real-time data regarding digital processes. Hence, the digital-related capabilities of employees have the potential to affect the advancement and utilization of the Performance Measurement Systems (PMS), as indicated by the findings of this study, which demonstrate that digital-related human capabilities can have a positive influence on the design of the PMS. The findings suggest that the inclusion of digital-related collaboration capabilities has a substantial impact on the development of performance measurement systems. Over the course of time, inter-company collaboration has been developed, which involves various aspects such as processes, infrastructure, and relationship management. Furthermore, these capabilities and mechanisms play a significant role in facilitating the integration of digital-related collaboration practices. The utilization of digital collaboration capabilities facilitates the incorporation of performance measurement systems (PMS) into decision-making procedures. This includes activities such as determining the optimal timing for implementing product or process innovations from suppliers and engaging suppliers in product innovation endeavors (Bals et al., 2018). Additionally, digital collaboration capabilities are also beneficial in determining when it is appropriate to outsource digital services (Goo et al., 2007). Driven by the advancements in big data technologies, corporations are compelled to undertake a reconfiguration of their Performance Measurement Systems. While the incorporation of innovation into Performance Measurement Systems is widely acknowledged as a challenging endeavor, it is of utmost importance to integrate it into the design of PMS. In the current landscape of the COVID-19 pandemic, companies are faced with the formidable task of navigating

innovation. According to Neely et al. (1995), the adoption of innovation within firms can enhance their competitiveness, particularly through the implementation of innovative Performance Measurement Systems (Gorton, 2000; McAdam & Keogh, 2004). In the broader context, the incorporation of innovation is imperative to enhance the design of Performance Measurement Systems (PMS). The findings of the H2c study indicate that the utilization of digital-related technical capabilities has the potential to confer a competitive advantage by means of the intricate design of Performance Measurement Systems. Furthermore, digital technologies present significant opportunities for enterprises to generate fresh market value, foster fundamental business competencies, and enhance overall organizational efficiency. The adoption of digital technology transformation has emerged as a fundamental strategic approach for numerous organizations (Chen, 2017).

Table 5.2: Summary of Research Findings (Objective Two)

Research Question	**Research Objective**	**Hypotheses**		**Result**
RQ2: What are the relationships between the four dimensions of digital-related capabilities and PMS design?	RO2: To examine the relationships between the four dimensions of digital-related capabilities and PMS design.	**H2a**	There is a relationship between human capabilities and PMS design.	**Supported**
		H2b	There is a relationship between collaboration capabilities and PMS design.	**Supported**
		H2c	There is a relationship between technical capabilities and PMS design.	**Supported**

Table 5.2: Summary of Research Findings (Objective Two Continued)

Research Question	Research Objective	Hypotheses		Result
		H2d	There is a relationship between innovation capabilities and PMS design.	**Supported**

5.1.3 Research Objective 3: To Investigate the Relationship Between PMS Design and Organizational Performance

A third set of hypotheses examines whether PMS design positively relates to organizational performance (see Table 5.3). In this regard, the statistical data of this study proves that PMS design significantly impacts organizational performance ($p<0.05$). Thus, the results demonstrate that PMS design can improve organizational performance. The results corroborate the existing literature that supports the notion of PMS design playing a significant role in enhancing organizational performance. Many previous significant studies have argued that PMS design improves organizational performance. For example, Tuomela (2005) showed that through Performance Measurement Systems that are aligned with organizational goals and strategies, fair, impartial, informative and provide meaningful feedback, organizations can promote employee performance and thus improve organizational performance. Like this study, Armstrong (1990) argued that designing an effective performance measurement can help improve performance by understanding employees' strengths and weaknesses.

In a similar vein, Zhang and Li (2008) conducted a study utilizing samples from Chinese pharmaceutical companies to examine the impact of corporate strategy implementation ability, as proposed by Becker and Huselid (2006), on the relationship between Performance Measurement Systems (PMS) and organizational performance. One of the findings suggests that Performance Measurement Systems (PMS) have a significant influence on the performance of organizations. Furthermore, Cheng and Zhao (2006) incorporated the concept of employee human capital specificity as an intermediary variable and the dynamics of environmental changes as an adjustment variable in their study, building upon prior research on PMS. Their findings confirmed the previous conclusions that PMS has a positive influence on organizational performance. The findings of the study indicate that the design of a proficient PMS plays a crucial role in enhancing the overall performance of an organization. However, it has been noted in previous research that certain studies have indicated that the Performance Measurement Systems (PMS) implemented by Western companies do not have a significant correlation with the organizational performance of Chinese companies (Tsai, 2006; Jiang & Zhao, 2004; Liu et al., 2005; Zhang & Zhao, 2006; Zhang, 2006). However, it should be noted that this finding may not be applicable to certain industries within China. The researcher's area of focus is the Internet industry, thus indicating a lack of pertinent issues. As stated earlier, the research outcomes of this study offer evidence for the significant relationship between PMS design and organizational performance.

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Table 5.3: Summary of Research Findings (Objective Three)

Research Question	Research Objective	Hypotheses		Result
RQ3: Does PMS design influence organizational performance?	RO3: To examine the relationship between the PMS design and organizational performance.	**H3**	There is a relationship between the PMS design and organizational performance.	**Supported**

5.1.4 Research Objective 4: To Examine the Mediating Effect of PMS in the Digital-Related Capabilities and Organizational Performance Relationship

Hypothesis 4 and its sub-hypotheses (H4a, H4b, H4c, H4d) were developed and tested to address research objective 4. This study observed that PMS design has a robust mediating effect relationship between the four dimensions of digital-related capabilities (i.e., human capabilities, collaboration capabilities, technical capabilities, and innovation capabilities) and organizational performance (see Table 5.4). Hypothesis H4a ($p < 0.05$ level), H4b ($p<0.05$ level), H4c ($p<0.05$), and H4d ($p<0.05$) provided support. The four digital-related capabilities may indirectly affect organizational performance through PMS design. For example, an organization adopts a reasonable and practical PMS to manage the four digital-related capabilities, provides valuable feedback and information on essential resources, and finally utilizes the resources brought about by the four digital-related capabilities, thereby improving organizational performance. This means that some advantages derived from digital-related capabilities indirectly affect firm performance by emphasizing using PMS. Employees' digital-related capabilities affect PMS design, enabling companies to improve organizational

performance. This is because individuals adapt their behaviour and learning abilities in response to changes in the work environment and their understanding of organizational performance and causal relationships between performance measures (Bauters et al., 2018; Henri, 2006). Nudurupati et al. (2016) examined PMS in the digital economy and propose that businesses should assess their performance in collaboration and social networking, in addition to social media, rather than measuring performance only internally. Digital business (Nudurupati et al., 2016) requires collaboration capabilities and PMS (Maestrini et al., 2017). To achieve higher performance through collaboration, PMS should incorporate intercompany performance metrics, which pose challenges for intercompany data integration and sharing. The findings of this study on the mediating effect of PMS suggest that a commitment to collaborative communication between firms can co-create benefits that lead to improved organizational performance. Breaking down barriers between organizations is conducive to communication and collaboration between enterprises.

In contrast, frequent and long-term communication between business partners is conducive to improving technology development and innovation capabilities. Especially in the IT industry, where technology is changing rapidly, it is necessary to develop collaboration skills to respond to technological developments. Barton and Court (2012) suggest that creative thinking and approaches are required when creating the infrastructure to analyze, store, and capture data.

Hypothesis 4, along with its corresponding sub-hypotheses (H4a, H4b, H4c, H4d), were

formulated and empirically examined to address the fourth research objective. The present study examined the mediating effect of PMS design on the relationship between the four dimensions of digital-related capabilities (namely, human capabilities, collaboration capabilities, technical capabilities, and innovation capabilities) and organizational performance, as depicted in Table 5.4. The results of Hypotheses H4a, H4b, H4c, and H4d, which were tested at a significance level of $p<0.05$, were found to be supportive. The impact of the four digital-related capabilities on organizational performance can be observed through their influence on the design of Performance Measurement Systems (PMS). For instance, an organization implements a rational and pragmatic PMS to effectively oversee the four digital-related capabilities. This system facilitates the provision of valuable feedback and information regarding crucial resources. Consequently, the organization can leverage these resources to enhance its overall performance. This implies that certain benefits arising from digital capabilities have an indirect impact on firm performance through the prioritization of Performance Measurement Systems (PMS). The digital-related capabilities of employees have a significant impact on the design of Performance Measurement Systems (PMS), thereby facilitating companies in enhancing their organizational performance. The phenomenon can be attributed to the tendency of individuals to modify their behavior and enhance their learning capabilities in reaction to alterations within the work environment, as well as their comprehension of organizational performance and the causal connections between performance indicators (Bauters et al., 2018; Henri, 2006). The study conducted by Nudurupati et al. (2016) investigates the phenomenon of Performance Measurement Systems (PMS) within the context of the digital economy. The author put

forth the argument that organizations should broaden their evaluation of performance by incorporating assessments of collaboration and social networking, in addition to the traditional focus on internal performance metrics. The successful operation of digital business necessitates the presence of collaborative capabilities and project management systems (Nudurupati et al., 2016; Maestrini et al., 2017). To enhance performance through collaborative efforts, it is recommended that Performance Measurement Systems (PMS) integrate intercompany performance metrics. However, this integration may present difficulties in terms of inter-company data integration and sharing. The results of this research regarding the mediating impact of PMS indicate that fostering a commitment to collaborative communication among firms can generate advantages that contribute to enhanced organizational performance. Facilitating the dismantling of barriers between organizations promotes effective communication and fosters collaborative efforts among enterprises.

The findings suggest that the implementation of Performance Measurement Systems (PMS) can enhance organizational performance within the framework of digital-related technical capabilities. The findings indicate a notable inclination towards statistical significance, implying that organizations have the potential to leverage their digital capabilities by efficiently implementing PMS. The innovation capabilities enhance the core competitiveness of a company, thereby providing it with a strategic edge in a dynamic market landscape and bolstering its overall performance. Previous studies have also underscored the regulatory function of PMS. Joiner et al. (2009) discovered that Performance Measurement Systems (PMS) have the potential to act as a mediator in the

connection between flexible manufacturing strategy and both the financial and non-financial performance of an organization. According to Baines and Langfield-Smith (2003), organizational design modifications and the implementation of advanced manufacturing practices have been found to have a favorable impact on a company's performance through alterations in non-financial management accounting information. Hence, the development of Performance Measurement Systems (PMS) by organizations enables the provision of crucial insights to senior management concerning the organization's resources and capabilities (Simons, 2000). Consequently, this has a positive impact on performance (Kaplan & Norton, 1996; Lev, 2001).

Table 5.4: Summary of Research Findings (Objective Four)

Research Question	Research Objective	Hypotheses		Result
RQ4: Does PMS design mediate the relationship between the four dimensions of digital-related capabilities and organizational performance?	RO4. To determine whether PMS design mediates the relationship between the four dimensions of digital-related capabilities and organizational performance.	**H4a**	PMS design mediates the relationship between human capabilities and organizational performance.	**Supported**
		H4b	PMS design mediates the relationship between collaboration capabilities and organizational performance.	**Supported**
		H4c	PMS design mediates the relationship between technical capabilities and organizational performance.	**Supported**
		H4d	PMS design mediates the relationship between innovation capabilities and organizational performance.	**Supported**

5.2 Implications of the study

5.2.1 Theoretical Implications

This study contributes to the existing research on the relationship between number-related capabilities and performance. It synthesizes a robust framework for designing PMSs from the perspective of resource orchestration theory. This theoretical model provides insights into the mediating role of PMS design in the relationship between four digital-related capabilities (human capabilities, collaboration capabilities, technological capabilities, and innovation capabilities) and organizational performance. In the past decade, the resource-based theory has received extensive attention as one of the fundamental theories to explain the sources of competitive advantage and differences in firm performance over time. Previous studies have suggested ambiguous and mixed results linking PMS design and organizational performance. While many studies focusing on PMS and performance have demonstrated that PMS design has a positive impact on firm performance (Werther & Davis, 1996; Sin, 1996; Armstrong, 1990; James et al., 2004), some also support a negative association (Tsai, 2006; Jiang & Zhao, 2004; Liu et al., 2005; Zhang & Zhao, 2006; Zhang, 2006). These results showed that PMS design is only sometimes suitable but depends on multiple factors. This prompts us to use the resource orchestration theory to apply the four digital-related capabilities to the organization. PMS design rarely directly and immediately affects organizational performance.

In contrast, the design of PMS can serve as an intermediary variable that establishes a connection between the two, functioning as a bridge. Within the context of this research, the impact of digital-related capabilities on organizational performance is observed to

be mediated by the design of the Performance Measurement System. Based on the preceding literature review, prior empirical investigations have not directly examined the mediating role of Performance Measurement Systems (PMS) design in the relationship between digital-related capabilities and organizational performance. Therefore, an additional noteworthy contribution of this study lies in its status as an initial endeavor to establish a relationship between digital-related capabilities and management accounting and control systems. This study contributes to the existing body of literature in managerial accounting, with a particular focus on general accounting.

Secondly, this study offers additional elucidation on the significance of prioritizing PMS design within organizations. This is achieved by investigating the relationship between PMS design and performance, considering two distinct yet interrelated aspects. The existing body of research on the relationship between Performance Measurement Systems (PMS) and organizational performance yields inconclusive findings (Widener, 2006; Wouters et al., 1999). The lack of ability to establish a structured and all-encompassing Performance Measurement Systems (PMS) have been identified as a significant barrier to achieving organizational success, as stated in the literature (Usoff et al., 2002). Hence, the concurrent analysis of the Performance Measurement Systems from two separate yet interrelated viewpoints can yield a more methodical approach to performance measurement, thereby potentially enhancing organizational outcomes.

Finally, the researcher attempts to apply the emerging resource orchestration theory to

large and medium enterprises in China, delving into these enterprises' better realization of resource value through resource management behaviors, effective mobilization, and coordination of resources with heterogeneity, and improved organizational performance. The ability to rationally coordinate digital resources is critical to corporate value creation (Sirmon, 2007). The bundling and utilization of digital resources directly affect the organizational performance of enterprises, and the rational arrangement of digital resources is the process of enterprise value creation. Therefore, in the context of the resource orchestration theory, with the changes in the international and domestic environments, the country's large and medium-sized enterprises have been able to demonstrate their ability to adapt to the development environment after the impact of the Covid-19, which indirectly proves that: To develop in the era, enterprises need to have the ability to relate to numbers.

5.2.2 Practical Implications

This study offers an alternative perspective on organizational management. Organizations can enhance their comprehension of the establishment and administration of the four dimensions of digital-related capabilities, as well as determine the appropriate control system to develop, particularly the Performance Measurement Systems (PMS). By doing so, organizations can effectively facilitate and advance the management of their potential strategic resources, ultimately leading to an enhancement in the organization's performance contribution in the realm of digital-related capabilities. This study offers valuable insights for organizational managers regarding the adoption of suitable managerial accounting practices, specifically in relation to the design of

Performance Measurement Systems, with a focus on digital-related capabilities within organizations. This statement supports the argument made by Widener (2006) that after an organization has obtained strategic resources and capabilities, it is necessary to design a suitable Performance Measurement Systems (PMS) to facilitate the development and effective management of these critical resources. One significant implication of this observation is that organizations that prioritize information flow and knowledge-related resources may adopt different approaches to designing and implementing Performance Measurement Systems compared to organizations that prioritize the identification of such resources. Consequently, it is imperative for the management to assess and implement suitable measures to enhance the operational efficiency of the organization.

This study examines the strategies and timing employed by managers of large and medium-sized enterprises in China's Internet industry to cultivate their capabilities in the context of the digital age. Not all functions within the digital environment possess equal levels of significance, and their impact on organizational performance varies. In this study, it was observed that human capabilities related to digital technology exhibited the lowest levels of proficiency. However, it was also noted that these capabilities had significant effects. Therefore, it is possible for managers to enhance the overall performance of an organization through the implementation of well-designed Performance Measurement Systems (PMS) that focuses on the development of human capabilities related to digital technologies. Considering the constrained resources typically available to large and medium-sized enterprises, the selection of appropriate

Performance Measurement Systems (PMS) assumes paramount importance. Hence, it is imperative to concentrate on the necessary capabilities needed to facilitate Performance Measurement Systems (PMS) within a digital context to enhance organizational effectiveness.

In conclusion, the interplay between digital-related capabilities, design of Performance Measurement Systems (PMS), and organizational performance can offer the organization insights into the extent of its digital-related capabilities development, facilitate the establishment of Performance Measurement Systems that align with design requirements, and ultimately lead to the attainment of competitive advantage. Given the importance of industry type as an ancillary factor in the process of digitalization, the research findings suggest that it is advantageous for large and medium-sized enterprises to capitalize on the emerging technological capabilities and industry-wide digitalization trends. By doing so, these businesses can enhance their organizational performance through the implementation of Performance Measurement Systems (PMS) in the digital landscape.

5.3 Limitations and Suggestions for Further Research

Reflecting on the limitations of this study presents opportunities for future research. Firstly, the data collected only pertains to large and medium-sized companies in China, potentially restricting the generalizability of the findings to other countries. Secondly, this study solely focused on organizational performance as the dependent variable, leaving room for exploration of alternative performance measures in future studies.

Thirdly, the digital capabilities examined were limited to human, collaboration, technology, and innovation capabilities, all of which were functional in nature. Consequently, future research could explore strategic capabilities within the context of digitalization. Considering these limitations, there is potential for future research to expand upon these areas. Fourth, this study on digital-related capabilities, PMS, and organizational performance was measured using proven foreign scales, and how to revise them to fit the Chinese context, considering the domestic industrial environment and cultural characteristics is bound to be an important topic worthy of future research.

5.4 Conclusion

The PMS is a tool for linking corporate, departmental, and individual objectives at all levels. Performance management is an extensive system that requires the participation of all employees, so the effective implementation of the PMS requires supporting information technology and intelligent analysis of the relevant means. In the future digital economy, the Internet of Things, big data, cloud computing, and artificial intelligence will significantly simplify PMS. Through standardization of actions, standardization of capabilities, and standardization of performance results, the PMS will be made into an intelligent management system to achieve standardization, modularization, and projectization, ultimately relying on technical means.

This study learned that four dimensions of digital-related capabilities (collaboration, innovation, technical, and human capabilities) combined with PMS design positively impact organizational performance, which is very important for the IT industry.

Because digital-related capabilities are the primary provider of digital solutions that can accelerate the digital transformation of enterprises. In the future, performance management will pay more attention to lean management, strengthen input-output analysis, optimize resource allocation, use data to manage, and promote the improvement of production and operation efficiency. During big data, cloud computing, the Internet of things, and artificial intelligence technologies, the application of the means makes the organization's operation more digital and intelligent.

The main aim of this study was to investigate the role of PMS as a mediator in the relationship between digital-related capabilities and organizational performance. Prior studies have indicated a relationship between digital capabilities and organizational performance. However, there is a lack of comprehensive knowledge regarding the specific function of PMS as a mediator in this relationship. To address this existing research void, a structural model known as Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized to examine the performance of organizations within the contemporary digital environment commonly known as the new normal. The research employed data collected from a sample of 394 large and medium enterprises that are active in the information technology (IT) sector within China. The results suggest that the design of PMS plays a crucial role in mediating the relationship between the four digital-related capabilities and organizational performance. During the rapid spread of the pandemic in emerging economies, there was a notable amplification of digital platforms and applications, particularly in the context of the odd job economy. This development facilitated companies in enhancing their overall performance.

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