

When Tech Fits Tasks: Unpacking the Mechanisms of Digital Transformation to Enhance Performance in Two Indonesian SMEs

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ABSTRACT

Digital transformation (DT) is increasingly recognised as essential for organisational growth; however, its implementation poses significant challenges for Small and Medium-sized Enterprises (SMEs), particularly those facing financial constraints, limited technological literacy, and resource scarcity. Despite these challenges, SMEs remain vital to economic development, particularly in developing countries such as Indonesia, where they significantly contribute to employment, local supply chains, and community resilience during periods of crisis. A nuanced understanding of how SMEs interpret, adapt, and integrate digital technologies is therefore critical for advancing both theoretical and practical perspectives on DT mechanisms in resource-constrained environments.

Most research on DT continues to focus on large firms, where transformation is facilitated by formal governance structures, dedicated IT departments, and stable digital strategies. Consequently, there is limited understanding of how DT processes unfold in SMEs, where change is often emergent and shaped by evolving needs and situational pressures. Existing literature also predominantly examines manufacturing firms, providing limited insight into SMEs operating in non-manufacturing sectors. This study adopts a theory elaboration approach to refine and expand existing theory through empirical investigation. Specifically, it engages with Task–Technology Fit (TTF) theory, which, despite its widespread use, has been criticised for conceptualising fit as a static condition and for oversimplifying the processes by which fit is enacted, adjusted, and sustained during organisational change.

To address these gaps, the present study investigates how SMEs navigate the DT mechanism across both manufacturing and non-manufacturing sectors, while refining the TTF theory to better capture the dynamic interactions among tasks, technologies, and organisational priorities. The research utilises a qualitative multiple case study design, focusing on two SMEs in Indonesia: Company Y (retail) and Company Z (manufacturing). Both organisations have implemented DT initiatives and achieved scaled revenue, making them suitable cases for examining the dynamics of transformation in practice. Data collection methods included interviews, observations, documentation, and informal dialogues.

The findings indicate that task–technology fit in SMEs is not a static condition but rather a dynamic and iterative process influenced by leadership, external technological disruptions, and evolving operational requirements. Both firms relied extensively on third-party digital platforms to facilitate their transitions, while also adapting their work practices to maintain operational coherence. The analysis identifies several mechanisms through which DT enhances organisational performance. In Company Y, these mechanisms include Leadership-Orchestrated Strategic Technology Selection, Tool Adaptation and Digital Disruption, Hybrid Synchronisation, and Digital Fusion Agility. Company Z exhibits similar mechanisms, in addition to production versatility and a robust, client-centred operational structure. Collectively, these mechanisms demonstrate how SMEs develop digital agility by flexibly coordinating human, technological, and relational resources.

This study advances the Task–Technology Fit framework by conceptualising fit as a dynamic, people-driven process that is continuously shaped by adaptation, tool negotiation, and environmental turbulence. Rather than viewing fit as a static alignment, the findings highlight how SMEs actively construct and sustain fit in response to changing circumstances. This reconceptualisation renders TTF more applicable to the realities faced by SMEs in developing economies. It underscores that DT success relies less on achieving stable alignment and more on fostering ongoing adaptability. From a practical perspective, the study suggests that SMEs benefit from leadership that emphasises strategic flexibility, selective digital adoption, and iterative learning, supported by enabling policy environments.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS ..... **ii**
ABSTRACT ..... **iv**
TABLE OF CONTENTS ..... **vi**
LIST OF FIGURES ..... **x**
LIST OF TABLES ..... **xi**
CHAPTER 1: INTRODUCTION **1**
1.1 Research Background 1
1.2 Research Questions 4
1.3 Theoretical Gaps 4
1.4 Research Objectives 5
1.5 Significance of the Study 6
1.6 Overview of the Thesis 7
CHAPTER 2: LITERATURE REVIEW **9**
2.1 Digital Transformation (DT) 9
2.1.1 Understanding DT 9
2.1.2 Key Characteristics of DT 13
2.1.3 Enhancing Performance through DT 15
2.2 Small and Medium-sized Enterprises (SMEs) 17
2.2.1 General Overview of SMEs 17
2.2.2 SMEs in Developing Countries: The Case of Indonesia 18
2.2.3 DT in SMEs 22
2.3 Task-Technology Fit (TTF) Theory 24
2.3.1 Theoretical Foundation 24
2.3.2 TTF in the Context of DT 27
2.3.3 TTF in the Context of SMEs 30
2.3.4 Theoretical Limitations of Task-Technology Fit 31
CHAPTER 3: METHODOLOGY **34**
3.1 Research Design 34
3.1.1 The Philosophical Underpinnings of The Study 34

3.1.2 Qualitative Research 37
3.1.3 Case Study 38
3.2 Research Strategy 43
3.2.1 Country Selection 44
3.2.2 Sector Selection 45
3.2.3 SMEs Selection 48
3.3 Data Collection 49
3.3.1 Methodological Choices 49
3.3.2 Ethical Consideration 52
3.3.3 Data Sources 53
3.3.4 Trustworthiness in Qualitative Research 57
3.4 Data Analysis 59
CHAPTER 4: FINDINGS 63
4.2 Comparison of Scaling Patterns: Company Y and Company Z 63
4.2 Distinctive Transformations in Company Y and Company Z 65
4.2.1 Company Y's Transformation 65
4.2.1.1 Process 65
4.2.1.2 Structure 69
4.2.1.3 Culture 71
4.2.1.4 Resources 74
4.2.1.5 The Extent of Change at Company Y 77
4.2.2 Company Z's Transformation 79
4.2.2.1 Process 79
4.2.2.2 Structure 83
4.2.2.3 Culture 86
4.2.2.4 Resources 89
4.2.2.5 The Extent of Change at Company Z 92
4.2.3 Task and Technology Characteristics in Company Y and Company Z 94
4.2.4 Emergence and Transformation of Fit in Company Y and Company Z 98
4.2.4.1 Fit in Company Y 98
4.2.4.2 Fit in Company Z 101
4.3 Mechanism of Enhancing SMEs Performance: A Thematic Analysis 104
4.3.1 Themes Identified in Company Y 107

4.3.1.1 Theme 1: Leadership-Orchestrated Strategic Tech Selection 108
4.3.1.2 Theme 2: Tool Adaptation and Digital Disruption 109
4.3.1.3 Theme 3: Hybrid Synchronisation 110
4.3.1.4 Theme 4: Fusion Digital Agility 112
4.3.2 Themes Identified in Company Z 114
4.3.2.1 Theme 1: Leadership-Orchestrated Strategic Tech Selection 114
4.3.2.2 Theme 2: Tool Adaptation and Digital Disruption 116
4.3.2.3 Theme 3: Hybrid Synchronisation 117
4.3.2.4 Theme 4: Versatility in Production 118
4.3.2.5 Theme 5: Client-Centric 119
CHAPTER 5: DISCUSSION 122
5.1 The Mechanism of Company Y 122
5.2 The Mechanism of Company Z 126
5.3 Cross-Case Analysis of Company Y and Company Z 130
5.3.1 Leadership-Orchestrated Strategic Tech Selection 132
5.3.2 Tool Adaptation and Digital Disruption 132
5.3.3 Hybrid Synchronisation 133
5.3.4 Versatile Production Capability and Fusion Digital Agility 135
5.3.5 Client-Centric Adaptation 136
5.4 Theory Elaboration: Extending the TTF Framework 138
5.4.1 Task Characteristics 140
5.4.2 Technology Characteristics 141
5.4.3 Task–Technology Fit 143
5.4.4 Utilization 145
5.4.5 Performance Impacts 146
5.5 Organisational and Managerial Reflections 150
CHAPTER 6: CONCLUSION 154
6.1 Summary of the Study Context 154
6.2 Summary of findings 156
6.3 Theoretical Contribution 159
6.4 Practical and Policy Contribution 163
6.5 Limitations 166
6.6 Future Research 167

REFERENCES **168**

APPENDICES **186**

i. Appendix A. Research Ethics Approval Letter 186

ii. Appendix B. Research Participant Information Sheet 188

iii. Appendix C. Research Participant Privacy Notice 192

iv. Appendix D. Research Participant Consent Form 193

v. Appendix E. Interview Guideline 194

vi. Appendix F. Empirical Evidence of Company Y 196

F.1 Thematic Analysis Process of Company Y 196

F.2 Rich Participant Data: Company Y 198

F.3 Documentation: Company Y 200

vii. Appendix G. Empirical Evidence of Company Z 201

G.1 Thematic Analysis Process of Company Z 201

G.2 Rich Participant Data: Company Z 203

G.3 Documentation: Company Z 205

LIST OF FIGURES

Figure 1. The Original of TTF Theory 25
Figure 2. A Typology of Case Study 39
Figure 3. Three ways of conducting case research 41
Figure 4. Case Research Decision Tree 42
Figure 5. The Five Sectors with the Highest Number of SMEs 46
Figure 6. Comparison of Revenue Growth Patterns 63
Figure 7. Extension of the TTF Model in Company Y (Retail) 139
Figure 8. Extension of the TTF Model in Company Z (Manufacturing) 139
Figure 9. Warehouse 200
Figure 10. Digital Marketing Studio 200
Figure 11. Cutting Machine 205
Figure 12. Woven Machine 205
Figure 13. Printing Machine 206

LIST OF TABLES

Table 1. Understanding DT 12
Table 2. Characteristics of DT 15
Table 3. Criteria for SMEs in Indonesia 20
Table 4. Summary of Gaps in SME DT Research 24
Table 5. Key Dimensions of the Original TTF Model 27
Table 6. Key Dimensions of TTF in DT 29
Table 7. Company Profiles 53
Table 8. Data Collection 54
Table 9. Participant Description – Company Y 56
Table 10. Participant Description – Company Z 56
Table 11. Stage of Data Analysis 59
Table 12. Task Characteristics – Company Y 94
Table 13. Task Characteristics – Company Z 95
Table 14. Technology Characteristics – Company Y 96
Table 15. Technology Characteristics – Company Z 97
Table 16. Thematic Analysis of Company Y 104
Table 17. Thematic Analysis of Company Z 105
Table 18. Themes of Company Y 107
Table 19. Themes of Company Z 114
Table 20. Mechanism of Company Y 122
Table 21. Mechanism of Company Z 126
Table 22. Comparative Mechanisms of DT in Company Y and Company Z 130
Table 23. Summary of the Extended TTF Framework 149
Table 24. Thematic Analysis Process of Company Y 196
Table 25. Rich Participant Data: Company Y 198
Table 26. Thematic Analysis Process of Company Z 201
Table 27. Rich Participant Data: Company Z 203

CHAPTER 1: INTRODUCTION

The first chapter introduces the study by presenting the research background, explaining the research problem and the gap in existing studies that motivates the research. It outlines the rationale for investigating digital transformation (DT) within small and medium-sized enterprises (SMEs), particularly in a developing country context. The chapter then outlines the research aims and objectives, along with the specific questions the study seeks to address. It also highlights the study's significance, both in its theoretical contributions to the Task-Technology Fit (TTF) framework and in its practical relevance for SME practitioners navigating DT. Finally, the chapter concludes by outlining the thesis's overall structure and providing a brief summary of the content and purpose of each subsequent chapter.

1.1 Research Background

During the Covid-19 pandemic, approximately 85% of businesses accelerated their digital transformation (DT) initiatives (Deloitte, 2021). Despite this urgency, studies estimate that between 66% and 84% of DT projects fail to achieve their intended outcomes (Correani et al., 2020). Although many companies develop ambitious DT strategies, a significant gap often exists between planning and successful execution. This gap highlights the complexity of DT, which disrupts established activities, processes, and capabilities, often resulting in organisational resistance and an increased risk of failure (Correani et al., 2020). As a result, understanding the implementation and management of DT within real business contexts has become a critical concern for both academics and practitioners. There is a clear need to examine how DT unfolds within organisations, with particular attention to the mechanisms that enable successful transformation.

DT has emerged as a critical research area within Operations Management and Information Systems, attracting substantial scholarly attention (Hovorka and Mueller, 2025; Müller et al., 2024; Vial, 2019; Kraus et al., 2021; Hanelt et al., 2021). However, despite the expanding literature, DT remains a concept lacking a clear or universally accepted explanation of its organisational unfolding (Piccoli, Grover, and Rodriguez, 2024). Scholars have struggled to establish a consistent definition or framework, largely due to the complex, ongoing changes DT entails across multiple organisational

dimensions (Hovorka and Mueller 2025; Mühlburger and Krumay, 2024). The literature, though extensive, still lacks a shared understanding of DT's meaning and scope (Hovorka and Mueller 2025; Piccoli, Grover, and Rodriguez, 2024; Warner and Wäger, 2019; Hanelt et al., 2021; Nadkarni and Prügl, 2021). This disconnects between academic abstraction and practical understanding continues to hinder the effective implementation of DT in real-world settings. Notably, there is limited insight into the mechanisms by which organisations negotiate, adjust, and sustain digital changes over time.

DT is widely recognised as a multi-level phenomenon, manifesting at individual, organisational, industry, and societal levels (Dąbrowska et al., 2022; Markus and Rowe, 2021; Trenerry et al., 2021; Vial, 2019). This study concentrates on the organisational level, with a specific focus on Small and Medium-sized Enterprises (SMEs) in Indonesia, a developing country context. The selection of SMEs is driven by both theoretical and practical considerations. Existing DT literature at the organisational level predominantly examines large firms, resulting in a significant gap in understanding how SMEs, especially in developing countries, address the complexities of DT (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018).

Despite facing financial constraints, limited digital skills, and restricted technological awareness (Masood and Sonntag, 2020), SMEs play a crucial role in the backbone of global economies, making substantial contributions to GDP and employment (Eggers, 2020). In Indonesia, SMEs play a particularly vital role, having demonstrated resilience during crises such as the 1998 and 2008 economic downturns and the Covid-19 pandemic (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2021; Sulastri, 2022; Junaidi, 2024). These enterprises sustain livelihoods and support national economic stability. Nevertheless, SMEs are frequently overlooked in DT research and discourse, which often prioritises large corporations with greater technological and financial resources. However, national digitalisation data suggest that digital adoption among SMEs in Indonesia remains limited, with only around a quarter of the country’s 64 million SMEs reported to be using digital platforms by 2024, leaving the majority still reliant on conventional manual operations (Ministry of Communication and Informatics of Indonesia, 2024). This suggests that even the early stages of digital adoption pose a substantial challenge for most SMEs, well before more advanced forms of transformation can be achieved.

Although SMEs are constrained by limited resources (Masood and Sonntag, 2020), they are not incapable of pursuing DT. Their adaptability and entrepreneurial agility often facilitate the adoption of creative, context-specific solutions. However, the mechanisms by which SMEs implement DT remain underexplored. Research indicates that DT mechanims in SMEs differ significantly from those in larger firms, yet there is limited empirical insight into how these differences manifest in practice (Ghobakhloo et al., 2022). Additionally, most SME-focused DT studies concentrate on the manufacturing sector (Mittal et al., 2018; Ghobakhloo et al., 2022), neglecting how SMEs in non-manufacturing sectors interpret and operationalise DT. Given the unique constraints SMEs face, there is a need for a more diverse and context-sensitive understanding of DT design, implementation, and execution (Garzoni et al., 2020).

Although existing research often addresses what DT is and why it is important, less attention has been devoted to understanding how DT unfolds within organisations and the mechanisms that enable practical implementation. This includes examining how organisations continuously align digital tools with task demands, workflows, and operational priorities. Addressing this gap necessitates an in-depth exploration of the mechanisms by which SMEs integrate digital tools into their operations and strategies. Notably, frameworks such as Task–Technology Fit (Goodhue and Thompson, 1995) typically conceptualise fit as a static alignment, whereas SMEs frequently experience fit as dynamic, evolving, and negotiated over time. Thus, there is a need for clearer articulation of the mechanisms that construct task–technology fit during DT. Without such understanding, SMEs risk adopting digital tools that do not effectively support their operational context, potentially resulting in fragmented workflows, resource inefficiencies, and abandoned transformation initiatives. For example, many DT projects fail to achieve their intended outcomes (Correani et al., 2020).

Consequently, DT research remains open for further exploration, particularly from diverse organisational and sectoral perspectives, which may yield new conceptual insights and practical implications (Nadkarni and Prügl, 2021). Indonesia offers a compelling empirical context for such an investigation. As a developing economy with a rapidly digitalising market, Indonesia provides a dynamic environment to examine how SMEs navigate DT pressures and opportunities despite resource limitations. Understanding these dynamics is academically relevant and essential for policymakers,

industry practitioners, and technology enablers aiming to enhance SME competitiveness in the digital era.

Accordingly, this study explores how SMEs in developing countries navigate DT amid resource constraints and sectoral diversity. Focusing on the Indonesian context, it aims to uncover the mechanisms through which SMEs construct task–technology fit during digital technology implementation. This refined understanding of DT mechanisms provides insight into how SMEs can enhance organisational performance. The following section presents the research objectives and questions.

1.2 Research Questions

Building on the issues discussed in the research background, this study addresses the empirical and contextual gaps in DT research in SMEs. Despite extensive research on DT, prior studies have predominantly focused on large firms and manufacturing sectors (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018; Ghobakhloo et al., 2022), leaving a limited understanding of how SMEs in developing economies navigate their transformation journey. Moreover, existing studies rarely examine how DT translates into improved performance outcomes within SMEs, particularly in non-manufacturing contexts.

Accordingly, this research aims to explore how SMEs in developing countries leverage DT to enhance performance, focusing on Indonesia as an empirical setting. The study specifically investigates the mechanisms that enable SMEs to adopt and adapt DT under resource constraints, organisational differences, and sectoral diversity.

From these considerations, the study is guided by the following central research question: *"What are the mechanisms through which SMEs leverage DT to enhance performance?"*

1.3 Theoretical Gaps

While the previous section identified the empirical gaps surrounding DT in SMEs, this study also addresses a theoretical gap. To understand how SMEs leverage DT to enhance performance, it adopts the Task–Technology Fit (TTF) framework as its analytical lens. TTF has been widely applied across various contexts to explain how well a technology supports the tasks it is intended to facilitate (Furneaux, 2012).

However, despite its usefulness, several limitations in the existing TTF literature limit its ability to capture the complexity of DT processes, particularly in dynamic, resource-constrained environments such as SMEs.

The first limitation concerns the static nature of TTF, where it captures fit at a single point in time but lacks research on how fit evolves as tasks and technology change. It primarily evaluates how well a technology supports a task in the present, without considering how tasks may become more complex or demanding over time. Because TTF does not track these changes, it lacks long-term predictive power, making it unclear whether a technology will remain effective in the future (Vendramin, Nardelli, and Ipsen, 2021). The second limitation lies in the oversimplification of the TTF model, in which many studies focus only on direct effects, overlooking the factors that shape relationship strength and the underlying processes that connect them. As a result, this narrow approach creates an incomplete and potentially misleading understanding of TTF (Howard and Rose, 2019). This gap is particularly important in the context of SMEs, where it can alter how fit is realised and how it impacts performance.

To address these limitations, this research adopts a theory elaboration approach, which seeks to refine, expand, and adapt existing theoretical constructs based on empirical insights (Ketokivi and Choi, 2014). Through this approach, the study aims to contextualise TTF within the dynamic environment of SME DT, exploring how the fit between tasks and technologies evolves and what mechanisms underpin the relationship between digital tool utilisation and performance enhancement. By doing so, this research contributes to extending TTF beyond its traditional, static formulation and offers a more nuanced understanding of fit as a context-dependent and evolving phenomenon.

1.4 Research Objectives

Addressing previously identified empirical and theoretical gaps, this study advances the understanding of how SMEs in developing countries navigate DT to enhance their performance. The research investigates the mechanisms by which SMEs establish task–technology fit during the integration of digital technologies within their organisations. Here, mechanisms refer to the patterns of actions, adjustments, and interactions that determine how alignment between tasks and technologies is achieved and sustained over time. By examining the Indonesian context, characterized by

resource constraints and sectoral diversity, the study offers a contextualized perspective on the practical unfolding of DT.

This research adopts a theory elaboration approach, employing the TTF framework as its theoretical foundation. Through this approach, the study aims to refine and extend TTF by situating it within the dynamic, evolving context of SME DT. In doing so, it not only contributes empirically by exploring how SMEs in different sectors, both manufacturing and non-manufacturing, leverage DT to enhance performance but also contributes theoretically by expanding the applicability of TTF beyond its traditional, static interpretation. Furthermore, the study aims to generate practical insights for SME practitioners and policymakers, offering guidance on effectively implementing and sustaining DT initiatives in resource-limited environments.

1.5 Significance of the Study

This study makes three key contributions that highlight its theoretical, practical, and contextual significance. First, the study extends and refines the Task-Technology Fit (TTF) theory by incorporating empirical insights from SMEs undergoing DT. Using a theory elaboration approach (Ketokivi and Choi, 2014), it introduces new concepts grounded in the realities of SMEs DT, examines the relationships between existing constructs, and explores critical boundary conditions that shape TTF in practice. These contributions enhance the theoretical robustness of TTF by adapting it to the complexity and fluidity of DT within SMEs. In doing so, the study positions TTF as a more dynamic framework capable of explaining the implementation of DT beyond its original scope.

Second, the study offers practical value by developing a mechanism-based framework that maps how SMEs leverage DT to enhance performance. This framework systematically captures the interconnections between DT, SMEs, and the outcomes. It provides SMEs and practitioners with a structured lens for evaluating their DT readiness, understanding key enablers and obstacles, and navigating implementation effectively. In situations where SMEs are constrained not only in terms of resources (Masood and Sonntag, 2020) but also in terms of limited attention in the existing literature (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018), the framework developed in this study is intended to help guide them. It offers a practical, structured way for SMEs to plan and align their DT initiatives to drive enhanced performance.

Third, the study provides a comparative analysis of DT mechanisms across two distinct sectors, retail and manufacturing, within the SMEs landscape. This cross-case perspective not only highlights sector-specific challenges and adaptations but also uncovers shared mechanisms that transcend sector boundaries. Such comparative insight enriches the contextual understanding of DT processes by revealing how sectoral logics shape the fit and performance outcomes of technology. In doing so, the study contributes to the growing but still limited body of literature on DT in SMEs, particularly in developing country contexts where empirical evidence remains scarce (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018). Together, these contributions offer both theoretical advancement and actionable insights, equipping scholars and practitioners with a deeper understanding of how SMEs can strategically and effectively engage with DT.

1.6 Overview of the Thesis

The rest of this thesis is organised into the following chapters. Chapter 2 presents a literature review that provides a comprehensive examination of relevant studies. This chapter discusses four main topics: DT, SMEs, TTF, and enhanced performance. This chapter presents scholarly conversations across these topics and highlights the gaps in the literature, thereby identifying what this study can contribute. Chapter 3 provides a detailed outline of the research methodology. It begins with the research design, which explains the study's philosophical underpinnings, the qualitative approach, and the case study method. This is followed by the research strategy, which explains the rationale for selecting the country, sectors, and SMEs. The data collection section presents the methodological choices, ethical considerations, data sources, and the data analysis process. Overall, this chapter presents the methodology from a broader perspective.

Chapter 4 presents the study's findings, including a comparison of the scaling patterns of the two SMEs and the distinctive transformation processes observed in each company. The data collected are analysed comprehensively in this section to demonstrate how DT mechanisms operate within each case. Chapter 5 is the discussion chapter, which explores the findings in depth and is supported by relevant literature. This chapter includes a cross-case analysis of the two SMEs to identify the similarities and differences in their transformation mechanisms. It also presents the extension of the TTF framework, leading to the development of the mechanism-based framework

proposed in this study. Chapter 6 is the conclusion, summarising the research's key findings and discussing both the theoretical and practical implications. It also outlines the study's limitations and offers suggestions for future research.

CHAPTER 2: LITERATURE REVIEW

The purpose of this chapter is to critically examine the existing literature on DT in SMEs, with a particular focus on the mechanisms SMEs use to enhance performance. This review explores the conceptual foundations of DT, provides a comprehensive explanation of SMEs, and discusses the theoretical perspectives that explain their interaction through the TTF framework. The chapter will identify trends, contradictions, and gaps in the literature. This establishes a foundation for this study's analytical framework and positions the research within the broader academic conversation.

2.1 Digital Transformation (DT)

In this section, the researcher explores DT discourse comprehensively. The discussion begins with the definition, concept, and implementation of DT to develop a deeper understanding of the phenomenon. It then examines the key characteristics of DT that help explain how it operates across different settings. Finally, the section discusses the impact of DT, focusing on how its implementation enhances performance.

2.1.1 Understanding DT

DT has emerged as a key research focus in both Operations Management and Information Systems, attracting growing academic interest (Hovorka and Mueller, 2025; Müller et al., 2024; Vial, 2019; Kraus et al., 2021; Hanelt et al., 2021). This growing attention is reflected in the impact of Vial's (2019) study, which had accumulated 8,955 citations on Google Scholar by July 2025. Despite being widely recognised as essential, DT remains a concept without a clear, universally accepted explanation of how it occurs within an entity (Piccoli, Grover, and Rodriguez, 2024; Warner and Wäger, 2019). Many scholars have defined DT in various ways, but there remains a lack of consensus on its precise meaning (Hovorka and Mueller, 2025; Mühlburger and Krumay, 2024; Vial, 2019). In practice, 85% of businesses accelerated their DT efforts during the pandemic (Deloitte, 2021). However, despite this rapid adoption, studies estimate that 66% to 84% of DT projects still fail (Correani et al., 2020). Many organisations design strong DT strategies but often struggle to translate them into successful implementation. DT is not a straightforward process; it disrupts existing operations, processes, and capabilities, thereby increasing the risk of failure (Correani et al., 2020). This complexity indicates that DT cannot be fully understood

by merely identifying the technologies implemented or the outcomes obtained. Rather, a comprehensive understanding of DT necessitates examining the mechanisms by which organisations implement digital technologies changes over time.

This disconnect between the growing academic interest and the high failure rate in practice highlights a clear gap in understanding how DT is defined, conceptualised, and implemented. Vial (2019) supports this observation through a review of 28 sources, finding that many definitions of DT mix the concept with its outcomes or rely on unclear terms. The study found four common problems in existing definitions of DT. First, many definitions confuse the concept of DT with its outcomes. Instead of clearly explaining what DT is, they describe what DT is expected to achieve, such as better performance, a better customer experience, or new business models. For example, Westerman et al. (2011) define DT as "the use of technology to radically improve performance," while Piccinini et al. (2015) refer to "major business improvements." This approach conflates the definition with its impact, thereby reducing conceptual clarity. Second, many definitions use unclear terms, such as "digital technologies," "digitalisation," or "digital capabilities." These terms are often not clearly defined or explained only through examples. For instance, Fitzgerald et al. (2014) and Liere-Netheler et al. (2018) mention technologies such as mobile or social media, but do not define what "digital technologies" actually mean. Berghaus and Back (2016) also use terms like "digital capabilities" without further clarification. This lack of precision renders the definitions ambiguous and makes them difficult to compare. Third, some definitions exhibit circular reasoning, particularly when employing the term "transformation" to describe DT. For example, Matt, Hess, and Benlian (2015) describe DT as "transformations that arise owing to the integration of digital technologies," which is circular and uninformative. This kind of reasoning does not help to explain the core meaning of DT. Finally, many definitions lack parsimony and consistency. Some are too long and include too many elements, which makes the concept unclear. For example, Haffke, Kalgovas, and Benlian (2016) encompass various aspects, including digitisation, customer channels, physical products, and business models, in a single definition. Similarly, Horlach et al. (2017) and Li et al. (2017) offer complex, layered explanations. These problems diminish the utility of the definitions in both academic research and practical applications (Vial, 2019).

To address this issue, Vial (2019) identified four key characteristics of DT: the target entity, the extent of change, the technology use, and the expected outcomes. Based on these elements, Vial defines DT as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies (Vial, 2019, p. 118)." This definition avoids vague terms, thereby improving clarity and consistency in the study of DT.

Further, DT is a gradual, evolving process that builds on digitalisation over time. Instead of occurring as a one-time change, DT accumulates and emerges dynamically as digital technologies are continuously integrated and refined within an organisation (Tan, 2023; Sandberg, Holmström, & Lyytinen, 2019). While digitalisation contributes to this process, it alone does not constitute full transformation. The digitalisation of a target entity's properties is a necessary but insufficient condition for achieving DT (Dąbrowska et al., 2022; Wessel et al., 2021). When digital tools are implemented in isolation, they do not lead to transformation; rather, DT requires coordinated, organisation-wide integration of digital initiatives.

To further clarify this distinction, it is important to differentiate between digitisation, digitalisation, and DT, as these terms are often used interchangeably in both academic and practical contexts. Although related, they represent different levels of technological integration and organisational change.

Digitisation refers to the process of converting analog information into digital form, such as scanning paper-based documents into digital files. It is primarily a technical process that improves data accessibility, storage, and processing capabilities (Legner et al., 2017; Brynjolfsson & McAfee, 2014). As such, digitisation is typically narrow in scope and limited to specific tasks or data sets, focusing on data conversion rather than broader organisational change.

Building on this, digitalisation refers to the use of digital technologies to improve, automate, or redesign existing business processes. It enhances operational efficiency, coordination, and customer interaction through technologies such as cloud systems, mobile platforms, and digital supply chains. However, digitalisation often remains functionally bounded and does not necessarily lead to organisation-wide

transformation, as it focuses primarily on process-level improvements within existing business models (Sting, Tarakci, & Recker, 2024).

In contrast, DT represents a broader and more profound organisational change. It involves leveraging digital technologies to fundamentally reshape an organisation's processes, structures, culture, and resources (Vial, 2019). Unlike digitisation and digitalisation, DT operates at the entity level and requires coordinated, organisation-wide change rather than isolated technological implementation. This transformation is often driven by strategic intent, involving top management and cross-functional integration, and may result in new business models, services, or revenue streams (Zimmer, Baiyere, & Salmela, 2023).

Accordingly, DT should be understood as a cumulative and dynamic process in which digital technologies are continuously integrated and aligned across the organisation. While digitalisation plays an important role, transformation only occurs when these initiatives are coordinated and embedded across organisational processes, structures, and practices. This process may also introduce tensions and require adjustments to organisational identity, further highlighting the depth of change involved (Poláková-Kersten et al., 2023).

In this study, DT is conceptualised as a dynamic and evolving process that extends beyond the adoption of digital tools. It involves coordinated changes across organisational processes, structures, culture, and resources, enabling firms to adapt, innovate, and achieve sustained performance improvements. This distinction is particularly important in the context of SMEs, where digital initiatives may initially appear as digitalisation or technological upgrades, but only constitute DT when they lead to integrated, organisation-wide transformation.

Table 1. Understanding DT

Aspect	Summary
Growing academic interest in DT	DT has become a significant focus of Operations Management and IS research. Studies by Hovorka and Mueller (2025), Müller et al. (2024), Vial (2019), Kraus et al. (2021), and Hanelt et al. (2021) demonstrate a growing interest; Vial (2019) alone has garnered nearly 9,000 citations by mid-2025.
Lack of a clear definition	Despite its importance, DT lacks a universal definition or a clear explanation of its occurrence (Warner & Wäger, 2019), leading to conceptual ambiguity.
Pandemic-driven acceleration	COVID-19 forced 85% of organisations to accelerate digital initiatives, showing how external pressures can rapidly drive digital change.
High failure rate of DT projects	Around 66–84% of DT projects fail due to poor execution (Correani et al., 2020).

The gap between research and practice		Despite academic interest, high failure rates show a gap between theory and practice. Vial (2019) notes confusion in defining and conceptualising DT.
Common problems in defining DT	Confusing the concept with its outcomes	Many definitions equate DT with its results (e.g., "improving performance"), rather than describing the process itself (Westerman et al., 2011; Piccinini et al., 2015).
	Use of vague terms	DT definitions often employ unclear terms, such as "digital technologies" or "digital capabilities," without a precise definition, making comparisons difficult (Fitzgerald et al., 2014; Berghaus & Back, 2016).
	Circular definitions	Some definitions are circular, as they use "transformation" to define DT itself (Matt et al., 2015), offering little conceptual clarity.
	Lack of parsimony and consistency	Overly complex definitions include too many elements (e.g., business models, channels), reducing clarity and consistency (Haffke et al., 2016; Li et al., 2017).
Unified definition by Vial (2019)		Vial (2019) proposes a clear definition: *"DT is a process that improves an entity by triggering major changes through information, computing, communication, and connectivity technologies".*
DT is a gradual, evolving process		DT is an ongoing, cumulative process in which digital innovations are gradually integrated and refined.
Distinction between Digitisation, Digitalisation, and DT		Digitisation involves converting analog data into digital form, digitalisation focuses on improving processes using digital technologies, while DT represents organisation-wide, strategic change that reshapes processes, structures, culture, and resources (Legner et al., 2017; Vial, 2019; Dąbrowska et al., 2022).

2.1.2 Key Characteristics of DT

Based on the previous understanding, four main characteristics of DT (Vial, 2019) will be explored in more depth. The first is the target entity, which refers to the unit of analysis influenced by DT (Lanamäki et al., 2020). DT takes place across multiple levels (Dąbrowska et al., 2022; Markus and Rowe, 2021; Trenerry et al., 2021; Vial, 2019). At the individual level, it reshapes aspects such as employees' occupational identities (Vaast and Pinsonneault, 2021). At the organisational level, it drives change within specific firms, as shown in the case of a sports fashion company (Hansen and Sia, 2015). At the industry level, DT has a significant impact on entire sectors, such as the K-pop industry (Tan et al., 2020). Finally, at the socio-national level, its effect can be observed in public institutions, including local governments in China (Gong et al., 2020). The second is the extent of change, which refers to the degree to which the target entity's properties are transformed (Lanamäki et al., 2020). The Properties of the target entity refer to the specific attributes of the entity that experience change (Lanamäki et al., 2020; Vial, 2019). These properties include process (Correani et al., 2020), structure (Matt, Hess, and Benlian, 2015), culture (Steiber and Alvarez, 2025), and resources (Vial, 2019).

As noted by Correani et al. (2020), DT significantly changes the processes through which value is produced and delivered. Rather than merely digitising existing workflows, DT encourages entities to rethink how processes are designed, implemented, and continuously improved. Successful DT initiatives often require moving away from rigid, linear procedures and adopting more flexible and responsive approaches. This includes the use of agile methods, fostering cross-functional collaboration, and enabling faster decision-making through real-time data and feedback loops (Correani et al., 2020). Then, Matt, Hess, and Benlian (2015) stated that structure refers to how a company organises its internal setup to support DT. When digital activities begin to impact not only processes and technologies but also roles, teams, and workflows, structural changes become necessary. Companies can place digital projects within their existing departments. Structural change is one of the core dimensions of DT strategy. Aligning structure with the digital agenda helps firms coordinate change more effectively and ensures that digital initiatives are properly supported (Matt, Hess, and Benlian, 2015).

Further, Steiber and Alvarez (2025) argue that culture refers to the underlying assumptions, values, and behavioural norms that guide how people work, collaborate, and respond to change within an entity. In the context of DT, culture is not a passive background element; it becomes an active enabler or barrier that shapes the evolution of transformation. Firms with high digital maturity tend to foster cultural attributes such as agility, openness, innovation, trust, and a digital-first mindset, all of which support adaptability and continuous renewal. Successful DT requires changes not only in technical systems but also across social and macro-cultural layers, emphasising that transformation is sustained when a firm's culture evolves to support decentralisation, user centricity, and entrepreneurial behaviour. Ultimately, cultural transformation is what sustains technological transformation (Steiber and Alvarez, 2025). Moreover, Vial (2019) emphasises that resources play a crucial role in DT, as entities require both tangible and intangible assets to support the profound shifts involved in DT processes. These resources include digital infrastructure and human expertise, which together determine an organisation's readiness and resilience in the face of digital disruptions. Firms must effectively mobilise and align these resources to unlock the potential of DT. Notably, the availability and configuration of resources influence not only the speed and scope of the transformation but also the organisation's ability to sustain digital

innovation and maintain competitive advantage. Thus, DT is not only about adopting new technologies but also about strategically deploying resources to support continuous adaptation and experimentation in dynamic environments (Vial, 2019).

The third characteristic of DT is technology use, which refers to the technological tools that support transformation within the entity. These may include Big Data and Analytics (BDA), Autonomous Robots, Simulation, Horizontal and Vertical System Integration, the Internet of Things (IoT), Cybersecurity, Cloud Computing, Additive Manufacturing, and Augmented Reality (Rüßmann et al., 2015). The fourth is the expected outcomes, which refer to the results intended from DT (Vial, 2019), and will be discussed further in the next section.

Table 2. Characteristics of DT

Characteristics	Definition
Target Entity	• The unit of analysis affected by DT (Lanamäki et al., 2020). • DT occurs across multiple levels (Dąbrowska et al., 2022; Markus and Rowe, 2021; Trenerry et al., 2021; Vial, 2019).
Extent of change	• The degree to which the target entity's properties are transformed (Lanamäki et al., 2020). • The Properties of the target entity, referring to the specific attributes of the entity that experience change (Lanamäki et al., 2020; Vial, 2019). • These properties include process (Correani et al., 2020), structure (Matt, Hess, and Benlian, 2015), culture (Steiber and Alvarez, 2025), and resources (Vial, 2019).
Technology use	• The technological tools that enable transformation within the entity. • For example: BDA, Autonomous Robots, Simulation, Horizontal and Vertical System Integration, IoT, Cybersecurity, Cloud Computing, Additive Manufacturing, and Augmented Reality (Rüßmann et al., 2015).
Expected outcomes	• The intended results from DT (Vial, 2019)

2.1.3 Enhancing Performance through DT

One of the key expected outcomes of DT is enhanced company performance (Vial, 2019). To understand how DT contributes to this enhancement, it is essential to examine how performance is measured and enhanced within organisational contexts. According to Neely et al. (2000), the paper explains the performance measurement approach developed by Fitzgerald et al. (1991), which divided performance measures into two main types: results and determinants. Results are the outcomes of past actions and encompass areas such as competitiveness and financial performance, while determinants are the factors that lead to these outcomes. These include quality, flexibility, resource use, and innovation. The framework is helpful because it

demonstrates that a company's achievements depend on its past actions. In this view, results are seen as lagging indicators, while determinants are leading indicators that can influence future results (Neely et al., 2000).

Building on this, from an operations management perspective, performance enhancement is often defined in terms of key operational performance objectives. Five fundamental performance objectives apply to all operations: quality, speed, dependability, flexibility, and cost (Slack, Chambers, and Johnston, 2010; Slack and Lewis, 2002). Further, Slack and Lewis (2002) stated that excelling in each performance objective provides both internal and external benefits for operations. Internally, focusing on quality leads to fewer errors, less disruption, more reliable processes, and reduced costs. Speed improves throughput times, reduces queuing and inventory, lowers overheads, and decreases processing costs. Dependability brings greater confidence in operations, requires fewer contingency plans, ensures stability, and helps reduce costs. Flexibility enables the better handling of unexpected events and a wider range of tasks, ultimately contributing to lower processing costs. Cost efficiency is achieved through productive processes that result in higher margins. Externally, high quality meets the need for reliable, high-specification, and error-free products and services. Speed aligns with customer demands for short delivery times and fast responses. Dependability supports on-time deliveries and provides clear delivery information. Flexibility meets market demands for a range of products or services, as well as for volume and delivery adjustments. Finally, excelling in cost supports competitive pricing by offering low prices to customers (Slack and Lewis, 2002).

In this context, DT can be viewed as a strategic enabler that drives enhancement in these key performance objectives. Vial (2019) stated that DT can impact key performance areas such as quality, speed, dependability, flexibility, cost, resource utilisation, and innovation, all of which contribute to improved organisational performance. These areas align with the concept of determinants in the performance measurement framework by Fitzgerald et al. (1991), which highlights the factors that drive results. They are also consistent with the performance objectives outlined by Slack and Lewis (2002), reinforcing the link between operational improvements and overall business outcomes.

One of the most visible outcomes of such improvements is the ability to achieve scaling revenue. Scaling, unlike general growth, reflects a pattern of sustained, often exponential increases in key outputs, such as revenue, over time, which requires coordinated organisational change and efficiency (Bohan et al., 2024). In this sense, scaling revenue can be viewed as a tangible result within the Fitzgerald et al. (1991) framework, emerging from strengthened determinants such as innovation, flexibility, and resource utilisation enabled by DT. As noted by Nielsen and Lund (2018), scalability is essentially about achieving profitable growth, reinforcing the idea that digital capabilities not only enhance operational performance but also enable firms to expand in ways that are financially sustainable and strategically significant.

Overall, this discussion has clarified the understanding of DT, especially by addressing gaps in both the academic literature and practical settings. By reflecting on the discussion, the researcher aligns with the earlier explanations of DT. One important point to highlight is that DT can be applied to all types of entities (Dąbrowska et al., 2022; Markus and Rowe, 2021; Trenerry et al., 2021; Vial, 2019). In this study, the researcher focuses on the DT process within the context of small and medium-sized enterprises (SMEs). A more detailed discussion of the literature on SMEs will be presented in the next section.

2.2 Small and Medium-sized Enterprises (SMEs)

This section provides a comprehensive discussion on SMEs. It starts by outlining the general criteria, characteristics, strengths, and challenges of SMEs. The focus then shifts to SMEs in developing countries, with particular attention to Indonesia, examining their specific characteristics, benefits, and obstacles. The section concludes by exploring how these SMEs respond to DT.

2.2.1 General Overview of SMEs

The number of employees is commonly used to define small and Medium-sized Enterprises (SMEs), though definitions may vary across countries. The most widely used criterion is employment, with a typical threshold of 250 employees or fewer (Ayyagari et al., 2007). SMEs are usually formal enterprises, meaning they are registered and regulated, unlike informal businesses. Some countries also use other criteria, such as total assets, annual sales, or investment level, but the number of employees remains the most consistent and comparable measure across countries

(Ayyagari et al., 2007). In terms of characteristics, according to Beck et al. (2005), SMEs are typically more labour-intensive, more flexible, and more locally focused than large firms. They operate across different sectors, with many found in manufacturing, services, and trade. SMEs are often regarded as crucial contributors to entrepreneurship, market competition, and economic diversification, particularly in developing countries. However, due to their smaller size and limited resources, SMEs are often more vulnerable to external shocks and weak institutional environments (Beck et al., 2005).

SMEs offer several advantages to the economy. They are known for encouraging innovation and entrepreneurship, particularly in high-technology industries (Ayyagari et al., 2007), and for creating employment opportunities (Eggers, 2020), especially in low-income or rural areas (Beck et al., 2005). In many countries, SMEs account for more than 50% of formal employment (Ayyagari et al., 2007). They also promote competition and efficiency in the market (Beck et al., 2005) and contribute significantly to national GDP, as SMEs remain the backbone of global economies (Eggers, 2020). Despite their potential, SMEs face several structural and institutional challenges. One major issue is limited access to finance (Masood and Sonntag, 2020). Additionally, regulatory burdens, such as high entry and exit costs, can hinder SMEs' ability to grow or transition into formal businesses (Ayyagari et al., 2007). SMEs also tend to offer fewer stable jobs compared to large firms (Beck et al., 2005). Moreover, many SMEs lack knowledge and awareness of technology, leading to lower innovation in capital-intensive industries, particularly in countries with weak research and development systems (Masood and Sonntag, 2020). Finally, they are often more vulnerable to corruption and weak legal systems, which makes it harder to enforce contracts and protect their business rights (Beck et al., 2005).

2.2.2 SMEs in Developing Countries: The Case of Indonesia

As this study focuses on SMEs in developing countries, it is vital to highlight the significant differences between SMEs in developed and developing nations. In developed countries, SMEs benefit from stronger technology infrastructure and play a more advanced strategic role. They are more efficient, export-driven, and focused on productivity and international trade. In contrast, SMEs in developing countries often lack the necessary infrastructure and are still in the early stages of development. Their role is more centred on social equity, local empowerment, income generation, and support for marginalised communities (Fajarika et al., 2024). Therefore, in general,

there is a noticeable gap between the progress of SMEs in developed and developing countries.

To better understand the specific context of SMEs in a developing country, it is essential to consider how they are formally defined within national legal frameworks. As this research focuses on Indonesia as the primary case, examining the country's official definition, criteria, characteristics, advantages, and challenges of SMEs provides important contextual grounding for the analysis.

The definition of SMEs in Indonesia, as outlined in Article 1 of Law No. 20 of 2008 on Micro, Small, and Medium Enterprises, classifies small and medium enterprises based on their level of independence and ownership structure. A Small Enterprise is defined as a productive economic business that stands independently and is conducted by an individual or business entity that is not a subsidiary or branch of a company owned, controlled, or forming part of, either directly or indirectly, a medium or large enterprise. A Medium Enterprise is similarly defined as a productive economic business that operates independently and is conducted by an individual or business entity that is not a subsidiary or branch of a company owned, controlled, or forming part of, either directly or indirectly, a small or large enterprise, and meets the criteria for net assets or annual sales as stipulated in the law (Indonesian Government, 2008).

Furthermore, the standard level of SMEs varies from one country to another (Ayyagari et al., 2007). There is a significant disparity in standards between SMEs in developed and developing countries (Beck et al., 2005). In Indonesia, according to Chapter 3, Article 35 of Government Regulation Number 7 of 2021 (Government of Indonesia, 2021) on the Facilitation, Protection, and Empowerment of Cooperatives and Micro, Small, and Medium Enterprises, SMEs are classified based on two criteria: annual turnover and venture capital, excluding land and buildings. It is shown in Table 3:

Table 3. Criteria for SMEs in Indonesia

Category	Criteria	Range
Small	Annual Turnover	Rp 2 billion – Rp 15 billion
	Venture Capital	Rp 1 billion – Rp 5 billion
Medium	Annual Turnover	Rp 15 billion – Rp 50 billion
	Venture Capital	Rp 5 billion – Rp 10 billion

A small enterprise is defined as a business with an annual turnover between Rp 2 billion and Rp 15 billion and venture capital between Rp 1 billion and Rp 5 billion. Meanwhile, a medium enterprise has an annual turnover between Rp 15 billion and Rp 50 billion, with venture capital between Rp 5 billion and Rp 10 billion. The government establishes these classifications to help identify and support SMEs through various facilitation, protection, and empowerment programs (Indonesian Government, 2021).

Hence, based on the two main legal sources, Law Number 20 of 2008 (Indonesian Government, 2008) and Government Regulation Number 7 of 2021 (Government of Indonesia, 2021), there is no mention of the minimum or maximum number of employees to define SMEs. This differs from many other countries, where the number of employees is often used as the primary criterion for defining SMEs (Ayyagari et al., 2007).

The presence of SMEs in Indonesia brings many benefits to the country. From a macroeconomic perspective, Indonesia's position as one of the G20 countries is primarily supported by its sizable GDP. In 2022, Indonesia's GDP reached USD 1.3 trillion, placing it among the top 20 economies globally (Government of Indonesia, 2023). The country's role in the G20, especially during its presidency, contributed to stronger national economic performance. For example, in 2022, GDP grew by 5.4 per cent over the January–September period, exceeding initial projections (Ministry of Maritime Affairs and Investment of the Republic of Indonesia, 2022). Unlike countries such as Japan, Germany, the United States, China, and Taiwan, whose economic strength is underpinned by robust manufacturing industries (Sahoo and Lo, 2022), Indonesia presents a distinct economic profile. According to Statista (2023), the five largest exporting countries in the world are China, the United States, Germany, the Netherlands, and Japan, clearly reflecting the dominance of export-oriented and

industrialised economies. In contrast, Indonesia does not rely heavily on exports and large-scale manufacturing as its primary sources of growth. Instead, Indonesia's economy is predominantly driven by consumption, which accounts for around 54 to 60 per cent of total GDP, making it the single most significant component of economic activity. As noted in the World Bank (2024), Indonesia's economic performance is underpinned by private consumption, with a projected growth of 5.0 per cent in 2023. Wicaksono, Nugroho, and Woroutami (2020) further note that from 2010 to 2017, household final expenditure accounted for an average of 54.37% of GDP. This pattern indicates that Indonesia's economic strength lies in domestic spending rather than exports or manufacturing.

This consumption-based economy, supported by SMEs, helped Indonesia remain resilient during the major global crises, including the 1998 and 2008 economic downturns and the Covid-19 pandemic (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2021; Sulastri, 2022; Junaidi, 2024). While global supply chains were disrupted and international trade slowed, Indonesia sustained its economy through internal demand. In contrast, countries that depend heavily on manufacturing and exports are more vulnerable. Ministry of Finance of Indonesia (2023) noted that Indonesia maintained growth above 5 per cent for seven consecutive quarters, showing its resilience amid global instability. However, in more stable, non-crisis periods, Indonesia tends to fall behind more industrialised countries. For instance, the national currency, the Rupiah, recently depreciated significantly, reaching Rp16,820 per US dollar in April 2025 (Bank Indonesia, 2025). Additionally, the country is currently experiencing a decline in manufacturing performance. Indonesia's Manufacturing Purchasing Managers' Index (PMI) has fallen below 50 since mid-2024, indicating contraction in the industrial sector (House of Representatives of the Republic of Indonesia, 2024). Given this context, it is clear why consumption remains the central pillar of economic stability in Indonesia (Government of Indonesia, 2024). This significant contribution is closely linked to the large number of SMEs operating across the country, as the Coordinating Ministry for Economic Affairs of the Republic of Indonesia (2025) stated that the number of SMEs has exceeded 64 million business units. This clearly demonstrates the vital role SMEs play in Indonesia's economic growth.

2.2.3 DT in SMEs

Further, in the context of DT within SMEs, much of the existing DT literature focuses on large firms, leaving a gap in understanding how SMEs, particularly in developing countries, navigate DT (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018). The DT process in SMEs differs significantly from that in larger firms, yet the literature offers limited insight into how it unfolds in SMEs (Ghobakhloo et al., 2022). In the context of DT implementation among SMEs in Indonesia, it is evident that even reaching the stage of basic digitalisation remains a challenge for the majority, let alone achieving full-scale DT. This situation aligns with what many references have highlighted: despite Indonesia's rapid economic growth, most SMEs still lag in adopting digital technologies. The Ministry of Communication and Informatics reports that only 26% of the country's 64 million SMEs had shifted to digital platforms by 2024, leaving the remaining 74% still offline (Ministry of Communication and Informatics of Indonesia, 2024). These numbers confirm that more than half of Indonesian SMEs remain outside the digital economy.

Multiple recent surveys emphasise these low adoption levels. One 2023 study notes that "only 20% of Indonesia's 64 million enterprises have digitised for online business," meaning 80% still have not adopted online channels (60 Decibels, 2024). Similarly, a Kearney report finds that "less than 30%" of Indonesia's 64 million SMEs use digital solutions in their business operations, and just 47% of POS (point-of-sale) payments are cashless, indicating that cash remains the dominant transaction method (Kearney, 2022). In more specific digital activities, the gap is even more visible. An ERIA analysis reveals that during the pandemic, only 13% of Indonesian SMEs utilised the internet for marketing and delivery, indicating low e-commerce adoption (Wicaksono and Simangunsong, 2022). Anatan and Nur (2023) also found that early in the pandemic, just 17.1% of SMEs were considered "technology-literate" and engaged in e-commerce, leaving around 82% untouched by digitalisation. BPS (Statistics Indonesia) reported that ICT adoption among Indonesian SMEs remains low, at around 10% (Setiawan, Marzal, and Fitri, 2024). This confirms that only about one in ten SMEs has adopted ICTs in a meaningful way. Moreover, 70.2% of SMEs still face significant challenges in attempting DT (Suhayati, 2023), while digital literacy and digital tool usage among SME owners remain limited (Hidranto, 2024).

Compared to neighbouring countries, Indonesia also falls behind. The Economist Intelligence Unit ranks Indonesia's digital literacy at 61st out of 100 countries, far below Malaysia (33rd) and Singapore (22nd) (Boston Consulting Group, 2022). This correlates with the slower adoption of digital tools among its SMEs. It also partially explains why Indonesian SMEs contribute just 15% of total exports, far behind peers like Thailand and Vietnam, due to their limited digital integration (60 Decibels, 2024). In effect, many developing-country SMEs remain localised and offline, which weakens their competitiveness in a globalised economy. Further, this digital gap is not just about having a website or using email. A more exhaustive ASEAN study found that although 75% of Southeast Asian SMEs recognise the opportunities of digital integration, only 16% are using digital technologies to their full potential (ERIA, 2019). OECD data reflects a similar pattern: while having a website (73% of small firms) and using social media (48%-71%) are becoming more common, adoption of more advanced technologies, such as data analytics (10%-33%), remains low (Kergroach, 2021).

SMEs' digital adoption remains limited primarily to basic services, and the gap between SMEs and large firms grows wider as technologies become more advanced. Globally, this pattern reflects a broader 'digital divide,' which increasingly mirrors the wider development gap. According to the World Bank (2024), nations and businesses that embrace DT are surging ahead, while those that do not risk being left further behind. Larger firms in developed countries are already implementing advanced technologies, whereas SMEs in developing countries, such as Indonesia, struggle with basic integration (ERIA, 2019). The overall trend shows that Indonesian SMEs are significantly behind in DT, both relative to national targets and to larger firms. Government and research data affirm this gap. Addressing this digital divide will require targeted support measures. Tan (2023) suggests that SMEs often need access to government programs and sustained investment in digital technologies to catch up with global digitalisation trends, emphasizing that DT is not a one-off initiative but an ongoing journey of capability development.

Another critical gap lies in the lack of sectoral diversity in SMEs-focused DT research. Most studies concentrate on the manufacturing sector (Mittal et al., 2018; Ghobakhloo et al., 2022), overlooking how SMEs in non-manufacturing sectors implement DT. Moreover, SMEs face unique constraints that require tailored

approaches to the design, implementation, and execution of DT initiatives, further complicating their transformation journey (Garzoni et al., 2020). Therefore, DT research remains open for further exploration, particularly from diverse organisational and sectoral perspectives, potentially leading to the development of new conceptual insights (Nadkarni and Prügl, 2021).

Table 4. Summary of Gaps in SME DT Research

Identified Gap	Supporting Evidence
Literature Focus Imbalance	Research has heavily focused on large corporations, offering limited insight into SME DT, particularly in developing economies (Matt et al., 2020; Mittal et al., 2018). The process by which SMEs undergo DT remains poorly understood.
Low Digital Adoption among Indonesian SMEs	Only 20–26% of Indonesia's 64 million SMEs are online; fewer than 30% use digital tools. In 2024, BPS data showed ICT adoption at only ~10%. This shows a wide gap between the number of SMEs and those with basic digitalisation.
Digital Tools Usage Gap	Most SMEs utilise basic technology (websites/social media), while advanced tools such as analytics and cashless payments remain underutilised (10–33%). Approximately 47% of POS transactions are cashless, indicating a persistent reliance on cash and basic technology (Kergroach, 2021).
Digital Divide	Indonesia's overall digital literacy is low, ranking 61st globally in digital readiness, below Malaysia (33rd) and Singapore (22nd), reflecting a growing digital divide (World Bank, 2024).
Sectoral Research Gap	Most SME DT studies focus on the manufacturing sector (Ghobakhloo et al., 2022; Mittal et al., 2018), leaving non-manufacturing sectors understudied. Few works offer a comprehensive, cross-sectoral view.
SMEs' Unique Constraints	SMEs struggle with limited resources, skills, and infrastructure (Garzoni et al., 2020). Existing DT frameworks for large firms rarely fit the informal and resource-constrained contexts of SMEs.
Need for Further Research	Reviews (Nadkarni & Prügl, 2021) call for diverse, context-based SME DT research to build more inclusive, empirically grounded, and sectorally diverse models.

2.3 Task-Technology Fit (TTF) Theory

This section offers a comprehensive discussion on the TTF framework. It begins by explaining the theory's core concepts and key elements. It then discusses how TTF relates to the DT context, followed by an examination of its applicability in SMEs. Finally, the section addresses the theory's limitations.

2.3.1 Theoretical Foundation

As this study adopts a theory-elaboration approach, which utilises an existing theory as a starting point and then adapts, extends, or refines it based on insights from the empirical context (Ketokivi and Choi, 2014), the Task-Technology Fit (TTF) theory serves as the central framework for this study. Initially introduced by Goodhue and Thompson in 1995, TTF argues that an information technology's impact on

performance depends on the fit between technology characteristics and task characteristics (Goodhue and Thompson, 1995).

Furneaux (2012) stated that the original idea of TTF was rooted in organisational contingency theory, which holds that organisational effectiveness occurs when an organisation's characteristics align with the specific situations it faces. This foundational logic has been echoed in the field of information systems, with TTF emerging as one of the most prominent analogies. Widely adopted across information systems research and related disciplines, TTF has been used to understand both the adoption of information systems and the consequences of that adoption in various individual and professional contexts. The theory posits that the performance impact of a technology depends on its fit with the task and technology, either directly or indirectly through its influence on adoption decisions (Furneaux, 2012).

Significantly, TTF applies at both the individual and organisational levels, providing a theoretical framework that connects task-technology relationships to broader outcomes. It offers a way to quantify the effectiveness of technology in an organisation by assessing how well technology supports user performance (Spies, Grobbelaar, and Botha, 2020). Initially, TTF emphasised that performance benefits arise when technology is fitted to the tasks to be performed, an idea that remains central to its continued relevance (Furneaux, 2012).

As shown in Figure 1, there are five elements of TTF theory, including task characteristics, technology characteristics, task-technology fit, utilisation, and performance (Goodhue and Thompson, 1995). Each element will be explained in depth and clearly.

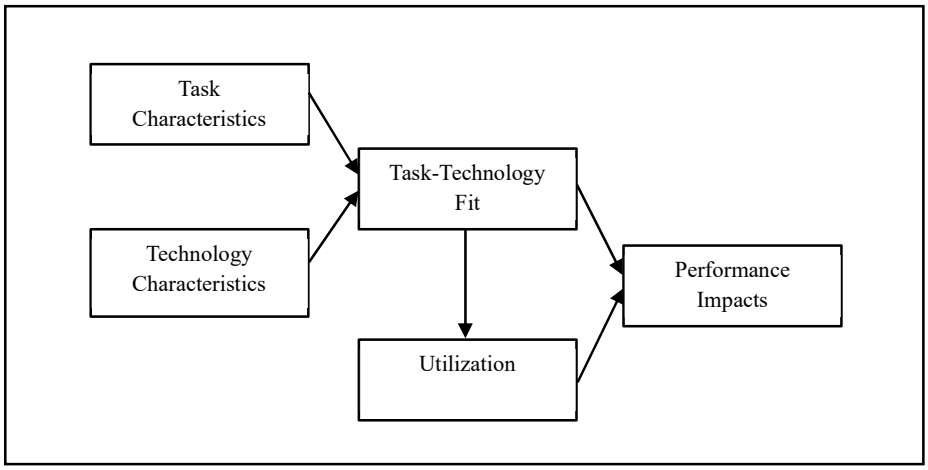


Figure 1. The Original of TTF Theory

Goodhue and Thompson (1995) stated that, firstly, task characteristics refer to the nature of the tasks performed within an organisation. This involves identifying the types of tasks present and categorising them into task groups and subgroups that relate to TTF. Three aspects are typically measured: non-routineness, which refers to the degree of task structure or unstructuredness; interdependence, which reflects the extent to which a task depends on input or coordination with other departments or roles; and job title, which indicates the managerial level or role of the user. Secondly, technology characteristics refer to the devices that users use to perform their tasks. Different technologies have different attributes depending on the organisation in which they are used and the tasks they are intended to support. Two common indicators of technology characteristics are the type of technology used and the department in which it is implemented (Goodhue and Thompson, 1995).

Furthermore, Goodhue and Thompson (1995) explained that, thirdly, task-technology fit (TTF) refers to the extent to which the fit between task and technology supports users in utilising systems and generating performance impacts. The connection between both task characteristics and technology characteristics influences the level of TTF. There are eight aspects measured: data quality, data locatability (how easily data can be found), authorisation to access data, data compatibility across systems, and ease of use and training. These five aspects are related to meeting task needs for utilising data in decision-making. The sixth and seventh aspects are production timeliness, which refers to the information system supporting the operating schedule, and system reliability, which relates to meeting day-to-day operational needs. The final aspect concerns the information system's relationship with users and how it responds to changing business needs (Goodhue and Thompson, 1995).

Fourthly, utilisation refers to the extent to which technologies have been integrated into each user's task routine, whether through personal choice or organisational authority. It reflects the user's or the organisation's decision to adopt and use the technologies. It also describes the degree of dependence on the technologies available within the organisation. Lastly, performance impact is measured by perceived performance. It shows that performance impact is a result of both task-technology fit and utilisation (Goodhue and Thompson, 1995; Spies, Grobbelaar, and Botha, 2020).

Table 5. Key Dimensions of the Original TTF Model

Variable	Description	Key Aspects
Task Characteristics	The nature and structure of tasks performed within an organisation identify how tasks are categorised and related to technology use.	• Non-routineness: Structured vs. unstructured tasks • Interdependence: Dependence on others or departments • Job title: User's role or managerial level
Technology Characteristics	The attributes of the technology used to perform tasks vary depending on the organisational context and task requirements.	• Type of technology used • Department of Implementation
Task-Technology Fit (TTF)	The degree to which technology supports task performance effectively. A good fit enhances utilisation and performance.	• Data quality • Data locatability • Authorisation • Data compatibility • Ease of use • timeliness • reliability • relationship
Utilisation	The extent to which users integrate and depend on technologies in their task routines, either by choice or organisational directive.	• Technology adoption level • Degree of dependence on technology
Performance Impacts	The perceived effect of technology use on performance outcomes, resulting from both TTF and utilisation.	• Perceived performance improvement

2.3.2 TTF in the Context of DT

With this conceptual understanding, it is essential to examine how TTF offers not only a theoretical perspective but also practical implications for understanding and guiding DT. This study identifies four key dimensions through which TTF directly impacts DT efforts. First, the TTF theory provides a valuable lens for evaluating the extent to which an organisation adopts the DT process. TTF posits that performance outcomes from technology depend on the degree to which the technology's functionalities fit task requirements (Goodhue and Thompson, 1995). In other words, simply adopting a new digital tool does not guarantee benefits, as it must fit users' tasks and workflows. TTF helps assess whether these tools genuinely enhance work processes rather than simply introducing technological change. In line with this, Vendramin, Nardelli, and Ipsen (2021) emphasise that performance improvements occur when users perceive technology as helpful in executing tasks, which then encourages adoption and actual use.

Second, the concept of fit itself is central; TTF posits that the quality of fit between task and technology characteristics significantly influences the success of DT initiatives. According to Howard and Rose (2019), TTF suggests that technologies produce positive performance outcomes when they are both well-fit to the task and actively utilised. In this sense, TTF can be used as a yardstick for measuring the success

of transformation initiatives. It emphasises the quality of the task-technology fit. Misalignment can occur in two forms: “too little,” where the technology lacks features and fails to support the task effectively, or “too much,” where the technology is overly complex and misaligned with the task, making it ineffective. Whether the fit is too low or too high indicates a misalignment (Howard and Rose, 2019). Fit is a critical factor for successful DT. This view is also echoed in other perspectives. For example, Liu, Chen, and Chou (2011) found that aligning internal and external resources and capabilities with digital demands is essential in determining the success of the DT process. Their study showed that without proper fit, even well-funded or technologically advanced projects may fail to deliver impact. This strengthens the central idea in TTF, which emphasises that the success of DT depends not only on having technology but also on how well it fits the organisation's actual needs. The importance of fit becomes particularly significant given that integration is central to the DT process. Matt, Hess, and Benlian (2015) emphasise that DT is not just about defining digital goals but about managing the organisational changes that arise from integrating digital technologies into core business processes. In this context, fit ensures that integration creates value by aligning technologies with actual tasks, workflows, and user needs. Without proper fit, integration efforts risk becoming disconnected from operational realities, reducing the overall impact of the transformation.

Third, TTF offers explanatory mechanisms by which technology-task fit leads to performance outcomes, providing theoretical clarity on how and why DT produce value. A mechanism within the organisational management perspective serves as the explanatory link between a cause and its effect, showing the interplay of components that lead to a particular result. Rather than simply stating that X causes Y, it helps explain why and how X causes Y. Mechanisms reveal deeper underlying processes. Understanding mechanisms clarifies theory, improves generalizability, and enhances explanatory power (Anderson et al., 2006). A mechanism is the underlying explanatory pathway. It drives or enables the process. A mechanism-based explanation shows why an outcome occurs by revealing the causal linkages (Pajunen, 2008). Based on this conceptual view, TTF is related to a mechanism. TTF itself is an explanatory factor for why technology use leads to certain outcomes. According to the Task–Technology Fit theory, TTF acts as an intermediate cause, mediating the effects of task characteristics and technology characteristics on performance (Howard and Rose, 2019). In other

words, TTF is the underlying reason why a given technology results in high or low performance. A good fit improves outcomes, while a misfit hinders them (Goodhue and Thompson, 1995). This positions TTF as a causal mechanism within the model, illustrating how the interaction between technology and task produces outcomes. Conceptually, TTF serves as the 'fit' mechanism that accounts for why specific technology–task alignments result in enhanced performance. Yet, while TTF identifies what the fit mechanism is, it offers limited insight into how organisations practically construct and maintain this fit during DT initiatives.

Fourth, TTF supports differentiation by helping organisations distinguish between full and partial transformations. As Mikalef and Parmiggiani (2022) argue, DT is not an all-or-nothing process. A company may undergo partial transformations or full transformations, which involve changing the entire business model. It is essential to distinguish between digitalisation and DT. Digitalisation refers to the gradual improvement of tasks through the use of digital tools. At the same time, DT represents a broader, more strategic shift that reshapes the core of the business and can impact the entire organisation, including its external environment. DT does not happen overnight; it unfolds gradually. In its early stages, a business might begin by converting paper records into digital formats or automating simple tasks. In more advanced stages, digital tools become fully integrated across the company, enabling deeper, more connected changes (Mikalef and Parmiggiani, 2022). In simple terms, partial transformation is limited to certain processes, while full transformation means that a company has holistically integrated digital tools and practices across all areas. As a result, organisations can differ in their DT stage, ranging from early to advanced. This further reinforces the need to understand how task–technology fit is shaped over time, particularly in contexts where transformation is gradual rather than immediate.

Table 6. Key Dimensions of TTF in DT

Dimension	Explanation
1. Evaluating Digital Adoption	TTF serves as a lens to assess how well technologies support users' tasks during DT. Adoption alone does not guarantee success, as benefits arise when digital tools align with actual work processes and user needs.
2. Ensuring Quality of Fit	The fit between task and technology characteristics determines DT success. Misalignment, whether too little (resulting in insufficient functionality) or too much (leading to overly complex systems), reduces effectiveness. Proper fit aligns technology integration with real operational needs.

3. Explaining Performance Mechanisms	TTF serves as a causal mechanism that explains why technology use leads to enhanced performance outcomes. It mediates the effects of task and technology characteristics, showing the link between fit and performance improvements.
4. Differentiating Transformation Stages	TTF helps distinguish between partial and full transformations by identifying how extensively technology fits and integrates with tasks across the organisation. This clarifies the difference between digitalisation (incremental) and full DT (strategic).

2.3.3 TTF in the Context of SMEs

Since its introduction, TTF has become a widely accepted theory in information systems research (Furneaux, 2012; Howard and Rose, 2019). Many studies have confirmed its main idea in different contexts (Spies, Grobbelaar, and Botha, 2020; Tam and Oliveira, 2016). However, first, most of these studies have focused on large firms. For instance, Kuo, Lai, and Lee (2011) studied 500 large companies in Taiwan, Im (2014) conducted research in ten large organisations across various industries in South Korea, and Warrier Shankar and Belal (2024) examined five levels of organisational hierarchy in a large company. Secondly, many researchers used quantitative methods, such as surveys and statistical models, to measure the fit between tasks and technology and its effect on performance (Furneaux, 2012). Even the founder, Goodhue, was also among those who applied quantitative methods when discussing and applying TTF theory (Cane and McCarthy, 2009). These studies typically employ structured questionnaires to evaluate task characteristics, technology characteristics, and the degree to which they fit. Then, they analyse how this fit relates to system use or performance outcomes (Spies, Grobbelaar, and Botha, 2020). However, this often overlooks important details about how the fit works in different settings or how it actually leads to better performance. That is why this study focuses on SMEs rather than large firms and employs qualitative rather than quantitative methods. SMEs differ significantly from large firms (Ghobakhloo et al., 2022), and these differences can affect how TTF theory is applied and interpreted.

Although most previous researchers have applied TTF in the context of large firms (Furneaux, 2012), the core principle of TTF remains relevant across various contexts (Goodhue and Thompson, 1995; Spies, Grobbelaar, and Botha, 2020; Tam and Oliveira, 2016), including SMEs. While a few previous studies have applied TTF within the SME context (Khazanchi, 2005; Alqatan et al., 2017), such research remains very limited. Therefore, this study seeks to address that gap by applying TTF specifically in

SMEs. Like large firms, SMEs also adopt technology to support their core tasks. However, there are important differences: SMEs typically have limited resources, more informal decision-making processes, and often rely on more flexible or lower-cost technologies (Beck et al., 2005; Desouza and Awazu, 2006). Therefore, while TTF remains suitable, the following characteristics of SMEs may affect various fit dimensions: looking at how technology fits with multiple roles, since SMEs employees often handle several tasks at once; considering informal decision-making processes, which are common in SMEs and may influence how technology is chosen and used; and including low-cost or basic technologies, which are more likely to be used in SMEs than in large firms (Desouza and Awazu, 2006).

Hence, any attempt to apply TTF in the SME context should consider these unique organisational traits to ensure a more accurate and meaningful assessment of fit. Given these characteristics, particularly the high level of flexibility typically found in SMEs (Beck et al., 2005), a qualitative study is well-suited, as it aims to produce comprehensive and contextual understandings by exploring phenomena in depth. The emphasis is placed on holistic approaches to analysis and explanation (Mason, 2002). Although most previous studies have applied TTF using quantitative methods (Cane and McCarthy, 2009; Furneaux, 2012), a few have adopted a qualitative approach to explore TTF theory (Weber et al., 2016; Mikalef and Torvatn, 2019). Prior research has heavily relied on quantitative methods, such as survey-based models (Furneaux, 2012), but qualitative investigations remain limited. Hence, this study addresses that gap by applying a purely qualitative approach to explore TTF in SMEs.

2.3.4 Theoretical Limitations of Task-Technology Fit

However, TTF has several limitations. Firstly, it is the static nature of TTF. It evaluates the fit between task characteristics and technology characteristics at a single point in time. Vendramin, Nardelli, and Ipsen (2021) describe this as TTF addressing only the present moment of fit, without accounting for future changes in either the task or the technology. In practice, tasks often evolve or become more complex and demanding, while technologies update or change; yet, prior theory (Goodhue and Thompson, 1995) assumes the fit remains constant. As a result, a technology that fits well today may no longer be suitable tomorrow if the task exceeds the technology's capabilities. This temporal rigidity means TTF lacks a mechanism to predict such evolution (Vendramin, Nardelli, and Ipsen, 2021). This critique aligns with Fuller and

Dennis (2009), who argue that TTF's predictive power is limited when conditions change. They advocate for continuous reassessment of fit over time to ensure alignment in dynamic environments. In other words, because TTF does not consider changes over time, its usefulness can decline as work processes continue to evolve and adapt (Fuller and Dennis, 2009). Vendramin, Nardelli, and Ipsen (2021) even emphasise this as the main limitation of TTF, stating that as tasks and technologies shift, a once-good fit can deteriorate, potentially leading to problems if the technology no longer supports the task well. In summary, TTF's static view of fit fails to capture the dynamic, ongoing nature of work and technology adaptation (Vendramin, Nardelli, and Ipsen, 2021; Fuller and Dennis, 2009).

Another important limitation is the oversimplification in many TTF studies, specifically an overemphasis on direct effects at the expense of more comprehensive explanatory factors. Many studies applying TTF have examined only the straightforward link between task–technology fit and performance or utilisation, while ignoring the processes and contingencies that underpin it. For example, Lin (2012) examined how TTF influences satisfaction and performance in web-based learning environments, modelling these effects as direct and linear. Similarly, Kim and Ammeter (2014) treated TTF as a direct predictor of personal information system adoption, without investigating the mechanisms or conditions under which fit drives usage. Shih and Chen (2013) also integrated TTF into a TAM (Technology Acceptance Model) framework to explain mobile commerce adoption, but, as before, relied on a direct-effect model. These studies are examples of what Howard and Rose (2019) criticised. As Howard and Rose (2019) identify, although TTF theory proposes specific moderating and mediating effects, researchers often limit their analyses to direct effects. In other words, many studies assume that a good fit between task and technology automatically leads to better performance, which oversimplifies by overlooking how and why fit translates into outcomes and what factors might influence this interpretation (Howard and Rose, 2019).

The original TTF theory clearly stated that the relationship between fit and performance is not linear and straightforward. For example, Goodhue and Thompson (1995) included a utilisation variable in the model, reasoning that even if a technology fits well with the task, it must still be appropriately used to improve performance. They emphasised that looking only at fit without considering utilisation misses an important

part of the story; technology has to be used before it can affect results. Likewise, focusing solely on use rather than fit would obscure how technological capabilities influence performance (Goodhue and Thompson, 1995). In other words, TTF was always intended to work in conjunction with factors such as contextual or boundary conditions. These factors can strengthen or weaken the relationship between task and technology, or between fit and performance. By ignoring these, many TTF applications offer an incomplete picture. The narrow focus of many studies, which emphasises direct effects while overlooking other influencing factors, can lead to an unclear or even misleading understanding of how fit contributes to outcomes (Howard and Rose, 2019). Thus, addressing this limitation requires extending TTF models to include intermediate steps and contextual factors (Goodhue and Thompson, 1995; Howard and Rose, 2019), rather than focusing only on direct effects.

Taken together, these limitations highlight a deeper conceptual gap: TTF identifies the importance of achieving task–technology fit, but provides a limited explanation of the mechanisms through which this fit is constructed over time, particularly in dynamic contexts such as DT. This gap becomes even more salient in SMEs, where tasks, technologies, and organisational priorities shift rapidly due to resource constraints and adaptive work practices. Therefore, further research is required to investigate the mechanisms that shape task–technology fit in real organisational settings. This study directly addresses this theoretical gap.

CHAPTER 3: METHODOLOGY

This chapter examines the methodology used in this study. The study begins by discussing the research design, which encompasses the philosophical underpinnings, the qualitative approach, and the case study method. Secondly, it outlines the research strategy, covering the rationale for country selection, SME selection, sector focus, and ethical considerations. Thirdly, it explains the data collection process, including methodological choices, data sources, and data analysis procedures. By doing so, this chapter establishes a transparent and rigorous foundation for the research, justifying the choices made throughout the study.

3.1 Research Design

This research study employs a qualitative case study approach. Some aspects should be highlighted to demonstrate how this approach relates to the study's research question. According to Harrison et al. (2017), when selecting a methodological perspective, it is essential to carefully evaluate the methodology to ensure a design that effectively addresses the research goals and aligns with the researcher's perspective. This alignment aims to ensure consistency in the philosophical stance of ontology and epistemology, the research question, and the chosen research method. Hence, a clear justification of how the research design links to the research question is provided throughout this section.

3.1.1 The Philosophical Underpinnings of The Study

The definition of ontology refers to "what is reality". It is about the existence and structure of reality. It reflects what people want to know in their research study. Ontology is the study of the existence and reality of different aspects of society and the relationships between them. It discusses the background and problems related to the study (Tsang, 2016). There are two types of ontological research, namely, idealist and realist. Idealists discuss what exists, and it originates from people's minds. Plato was an idealist philosopher, and it is known as "Platonic idealism". Idealists argue that the mind is the most fundamental thing, more than matter. Hence, the subject is more essential than the object. Idealists deny the natural and physical world as perceived by the human senses. The idealist concept most often explains ideas as transcendent (Bolton, 1982). In contrast, realism refers to the existence of the physical world, regardless of whether

people choose to examine it. Aristotle was a representative of realism. Realists attempt to portray the whole phenomenon of life as it is. It accepts and understands the world as it is. This understanding gives the basis for all researchers' ideas (Griffiths, 2021). Therefore, as this research observes reality within the scope of DT in SMEs, it is ontologically realistic rather than idealistic.

Further, ontologically, the study includes the variables SMEs and DT. Firstly, SMEs refer to small and medium-sized enterprises; they are tangible entities that physically exist in our lives. For instance, we can see their company's building, store, and product. The existence of SMEs can also be seen in the benefits they have provided to the country. SMEs are widely recognised as the backbone of global economies in numerous countries (Eggers, 2020). Secondly, DT is an ongoing process often discussed by researchers and practitioners, with various explanations and perspectives (Vial, 2019; Correani et al., 2020; Kraus et al., 2021; Hanelt et al., 2021).

Moreover, realism is divided into two main categories, namely, scientific realism and social constructivism. Scientific realism refers to objects that are independent of variables introduced by people. In other words, reality exists independently of the researcher. Scientific realism does not use human senses to mediate a study. It is more derived from experience and knowledge than from psychological instruments (Tsang, 2016; Scotland, 2012). In comparison, social construction is subjective and viewed differently by each individual. Realism exists when consciousness involves objects that already contain meaning. The world is meaningless without consciousness. Hence, human senses are essential to social construction (Tsang, 2016; Scotland, 2012). This study will conduct social construction by reflecting on the research questions and gaps. This is because the word "transformation" clearly indicates that the researcher needs to observe and identify the social phenomenon that occurs during DT within SMEs. The researcher will observe the phenomenon by examining how people and systems in SMEs perceive it. Each sector within SMEs might have a different perspective.

The definition of epistemology is “how can I know reality?” It relates to the nature and structures of knowledge. It is about how knowledge is created, gained, and communicated (Scotland, 2012). Epistemology refers to the study of the principles by which people can know what does and does not constitute knowledge and science.

Epistemology offers implicit responses to three points: Firstly, what is the origin, nature, and limitation of scientific knowledge? Secondly, what is meant by scientific practice? Thirdly, what are the methods through which scientific knowledge is acquired? (Johnson and Duberley, 2000).

There are two primary epistemological approaches: positivism and interpretivism. Positivism is commonly linked with objectivism. Scientists view the world objectively and discover knowledge about an objective reality. The researcher and those being studied are separate entities. This means that, instead of involving the researchers' conscience, the research focuses solely on objects. Data and facts are the scientific propositions of positivism. Thus, the arguments of positivism are factual and descriptive (Tsang, 2016; Scotland, 2012). In contrast, interpretivism is often associated with subjectivism. It views the world based on naturally existing phenomena. The reality does not occur independently of people's knowledge of it. Reality is structured from the interaction between the world and people's consciousness. Language and meaning are the essential variables of interpretivism. Rules govern language, and it has to be learned. Knowledge is derived from cultural and historical aspects. Reality and knowledge are structured within and outside the interactions between the world and humans, which are developed, expanded, and transmitted into a social perspective (Tsang, 2016; Scotland, 2012). Interpretivism involves detailed outlines and patterns in the subjective meanings that individuals use to understand their daily lives. Researchers within this approach then investigate the implications of these subjective interpretations for social interaction. Yet, in the realm of interpretive approaches, there exists an objective reality to explore. Researchers use objective criteria, such as company, size, geographical location, or specific characteristics, to guide their investigations (Johnson et al., 2006). Hence, this study will employ interpretivism as a continuation of the social constructionist approach in ontology.

Furthermore, exploring the ontology and epistemology that underpin this study provides insight into the perspectives shaping the examination of the current phenomenon within the research topic. In alignment with the research question and objectives, a qualitative methodological approach emerges as the most suitable, guiding the researcher to choose a method that captures the complexities of the subject matter.

3.1.2 Qualitative Research

Over many years, qualitative research has made significant contributions to various fields of management research. For instance, amount of qualitative research has concentrated on DT (Chung, Tan, and Yoshie, 2025; Li et al., 2017; Mergel, Edelmann, and Haug, 2019; Ponsignon, Kleinhans, and Bressolles, 2019; Datta, 2020), Industry 4.0 (Margherita and Braccini, 2020; Ciano et al., 2021; Margherita and Braccini, 2021), digital ventures (Huang et al., 2017; Huang, Henfridsson, and Liu, 2022), supply chain management (Tan, 2023; Tian, Wu, and Pawar, 2025), and SMEs (Forsman, 2008; Coyte, Ricceri, and Guthrie, 2012; Boiral, Baron, and Gunnlaugson, 2014). Initially, qualitative management research seems to serve as a broad umbrella term covering a diverse range of non-statistical methods for collecting and analysing data. It rejects the idea of methodological monism, which refers to the notion that there should be a mathematically formulated scientific approach applicable to all knowledge. Consequently, to some extent, qualitative management research is defined by what it is not (Johnson et al., 2006). The choice of method, whether quantitative or qualitative, for a study, depends on several factors, including the research questions, prior research, the research design, and potential contributions to the field. Qualitative research stands out for its focus on interpretation, description, and explanation. Exploring the deeper processes within individuals, teams, and organisations is essential. Qualitative research plays a role in four key aspects: theory generation, elaboration, testing, and critical analysis (Bluhm et al., 2011). Further explanation regarding the theory is provided in another section.

Qualitative research is based on an interpretive philosophy, emphasising the construction of knowledge through the interpretation of meanings. It derives from data generation methods that are flexible and sensitive to the social context in which the data is produced, rather than being rigidly standardised or entirely removed from real-life situations, and is built upon methods of analysing, explaining, and constructing arguments that encompass an understanding of context, complexity, and detail. Qualitative research seeks to produce comprehensive, contextually grounded understandings by exploring phenomena. The emphasis is placed on holistic approaches to analysis and explanation (Mason, 2002). Qualitative research is often associated with *verstehen*. This means that it focuses on capturing the subjective meanings and

interpretations that individuals give to phenomena. It involves exploring how people experience and share socially constructed everyday realities (Johnson et al., 2006).

There are four qualitative research characteristics in management. Firstly, a qualitative study is conducted in the natural setting of the company or organisation. Secondly, it comes originally from participants' perceptions and experiences. It may be from key informants or workers who have experienced the phenomenon. Thirdly, the research design is reflexive, evolving as the study progresses. Researchers enter with existing theory and knowledge, but let the data guide further collection and analysis rather than sticking rigidly to initial plans. Lastly, it is not standardised in terms of data collection and analysis. It offers flexibility in analytical techniques and various data collection options. Researchers apply methods that best explain the phenomenon being studied (Lee, 1999).

The role of the researcher in qualitative research is central. The study revolves around the active involvement of the researcher, who engages with and influences the process. Instead of aiming for neutrality, the researcher focuses on reflexivity. Proficiency, experience, and training are essential when employing qualitative methods (Mason, 2002). Qualitative research presents several challenges, including limited resources, time, and financial constraints. A significant obstacle is the researcher's personal involvement, which requires them to stand within the process as a neutral observer. Collecting, managing, and analysing diverse textual data, including interviews, field notes, and documents, is complex. Understanding data structure during analysis is a significant challenge; in addition to transitioning from describing information to developing theories, managing research ethics throughout the process is crucial (Mason, 2002).

3.1.3 Case Study

A case study is employed in this research. Conducting case study methodology remains one of science's most challenging endeavours (Yin, 2018). Case study research is commonly characterised as a form of qualitative analysis (Harrison et al., 2017). To understand what case study research is. It should begin by understanding the definition. According to Yin (2018), a case study has twofold definition features: scope and features. Firstly, a case study is an empirical approach that delves deeply into a current phenomenon within its real-world setting. It may not be evident at the boundaries

between the phenomenon and its context. In essence, choosing a case study implies a desire to comprehend a real-world scenario, assuming that a thorough understanding necessitates insight into the essential contextual conditions relevant to the case. Secondly, a case study involves unique situations with numerous variables, which contrasts with the limited number of available data points. To navigate this, the theoretical propositions guided the study's design, data collection, and analysis. In addition, using multiple sources of evidence, the data should align and converge, confirming findings through triangulation. This twofold definition indicates how case study methodology covers a comprehensive mode of inquiry (Yin, 2018).

To understand and analyse the case study, a typology of case studies formulated by Thomas (2011) guides the design of this research study (Figure 2). The typology consists of some layers, starting with the subject, object, purpose, approach, methodological choices, and research process. All the layers are incorporated sequentially. It clearly articulates the case study's uniqueness and essential nature. It is a means to justify the goal behind applying a case study and executing the process to accomplish the study (Thomas, 2011). While Thomas (2011) provides the overall case study typology, the “approach” dimension is further specified using the framework of Ketokivi and Choi (2014). This framework distinguishes between theory generation, theory testing, and theory elaboration.

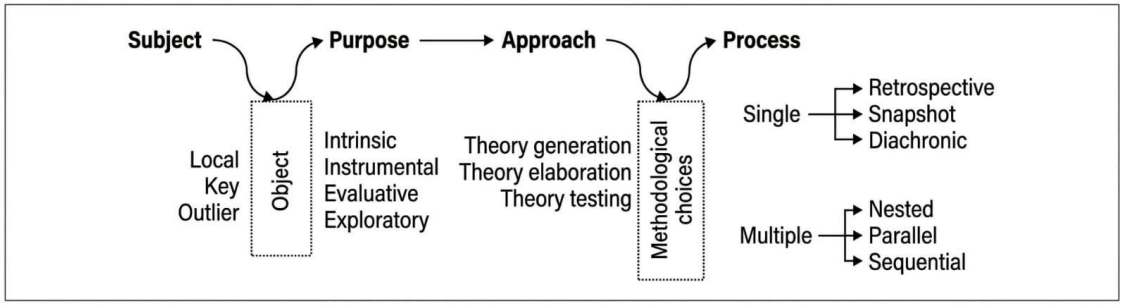


Figure 2. A Typology of Case Study

Thomas (2011) states that the subject is the case or phenomenon itself. There are three ways to select a subject: key case, local-knowledge case, and outlier case. As in this study, Company Y and Company Z have implemented DT to some extent, whereas the majority of SMEs in developing countries have not, and both companies

have experienced revenue scaling; hence, this study selects a key case, where the phenomenon has an inherent interest to be observed (Thomas, 2011), and also as an unusual case because it is rare and unique in some important way (Yin, 2018). Stake (1995) states that a case study is not a sample study. It does not observe a phenomenon primarily to comprehend other phenomena or cases. The primary goal is to understand this single phenomenon. It is encouraged to maximise what the researcher can learn by considering the objective and the phenomenon that is likely to lead to understanding. Furthermore, the object is the theory or analytical framework through which the phenomenon is observed and which explains the phenomenon. As discussed in the previous chapter, the object of this study is DT and SMEs.

A case study is different from other methodologies. It is uniquely versatile, with practical adaptability, as it maintains an approach that does not rigidly follow predetermined ontological and epistemological positions. It offers flexibility and is well-suited to research (Harrison et al., 2017; Yin, 2018). There are some primary purposes in case study research: exploratory, descriptive, and explanatory (Yin, 2018). In addition, intrinsic, instrumental, and collective factors can also be used in case studies (Stake, 1995). Exploratory is the purpose of this research study. In exploratory case studies, the researcher might start fieldwork and data collection before finalising the research questions. While this type of study is often viewed as an introduction to social research, it is essential to have a study framework in place from the beginning. Pilot projects are crucial for refining protocols and informing the selection of interview questions based on their outcomes. Choosing cases is a challenging task; however, the literature provides guidance. Exploratory emphasises the importance of maximising learning opportunities within a limited time, suggesting that selected cases should be cooperative and easy to work with. A solid instrumental case does not need to justify its typicality (Tellis, 1997).

According to Ketokivi and Choi (2014), there are three approaches to doing case research: theory generation, theory testing, and theory elaboration (Figure 3). In this study, the approach that is used is theory elaboration. It emphasises the contextual logic behind a general theory. It is like testing a theory, but instead of trying to prove it right or wrong, it is trying to elaborate on it. Sometimes, the context needs to be clearer to test a theory properly. Hence, the researcher uses empirical context or real-world data to explore and challenge it. Likewise, unlike generating a new theory from scratch, the

researcher already has a theory to work with in theory elaboration. There are various ways to elaborate theories by introducing new ideas or concepts, analysing how different concepts are connected, or exploring the limits of applicability (Ketokivi and Choi, 2014).

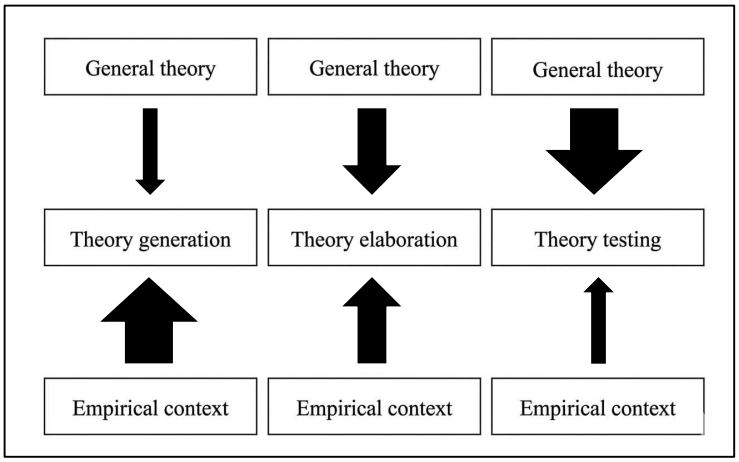


Figure 3. Three ways of conducting case research

Unlike other approaches, theory elaboration depends on the researcher's ability to analyse both the general theory and the empirical context equally. The goal is to reconcile the general idea with specific circumstances. In this approach, similar to theory testing, a general theory is used. However, unlike theory testing, researchers in theory elaboration do not predict findings. Instead, the researcher remains open to unexpected findings and the possibility that the general theory needs significant reformulation. This process often involves abductive reasoning (Ketokivi and Choi, 2014). It focuses on specific situations that deviate from general structures, helping distinguish between generalizable aspects and empirical specifics. It involves interpreting phenomena within a contextual framework, thereby creating new perspectives and knowledge. Abductive reasoning emphasises the matching of theory with empirical observations, involves an interactive loop between general theory and empirical context, and is found in case study research (Paul, 1993).

For example, adopting an abductive reasoning style in this study involves exploring the case in the context of SMEs undergoing DT. While drawing on TTF theory, the study aims to elaborate on it in the specific context of DT in SMEs. Rather than aiming for conclusive results at this stage, the study focuses on elaborating and refining the theoretical framework to fit the complexities of DT within SMEs better.

This process enables the exploration of potential additional concepts to enrich the understanding of DT dynamics.

Theory elaboration sits between theory testing and theory building regarding the role of general theory and empirical context (Figure 3). It aims for groundedness by applying a logic similar to grounded theory, but with greater theoretical abstraction. While concepts are based on data, this process has less emergence because existing theoretical aspects guide it (Ketokivi and Choi, 2014). Precisely, the reason this study employs this approach is that it uses the "case research decision tree" model (Figure 4) from Ketokivi and Choi (2014), which demonstrates that the theory elaboration is appropriate for this study.

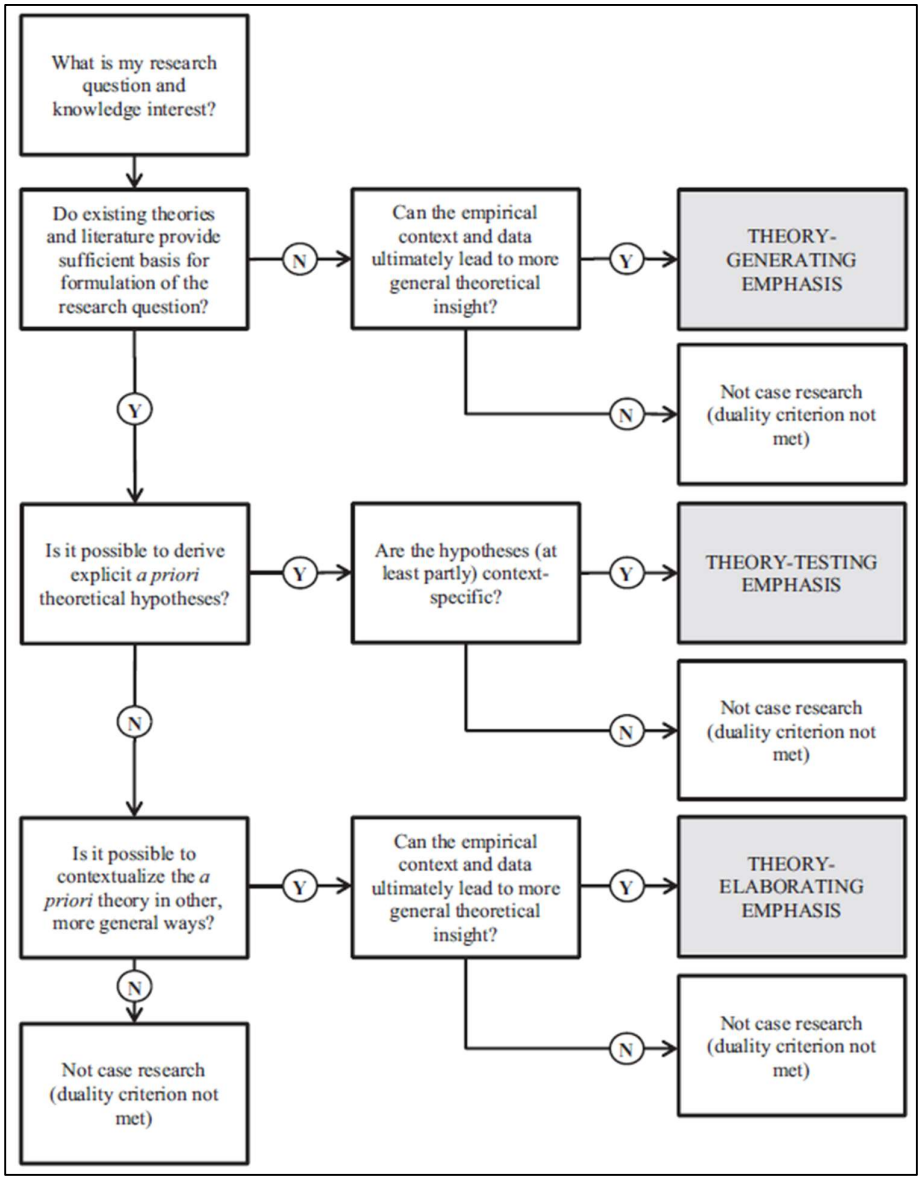


Figure 4. Case Research Decision Tree

Figure 4, adapted from Ketokivi and Choi (2014), presents a case research decision tree to help determine the theoretical emphasis of a case study: theory-generating, theory-testing, or theory-elaborating. The model begins by assessing whether existing theories provide a sufficient basis for formulating the research question. If so, and explicit a priori hypotheses cannot be derived, the model then asks whether the a priori theory can be contextualised in a more general way. If the answer is yes and the empirical data can yield broader theoretical insights, the appropriate approach is theory elaboration. This study follows that exact path: it starts from an established theory (TTF), does not formulate formal hypotheses, but seeks to refine and contextualise the theory using empirical evidence from two SME cases. Thus, the decision tree's logic confirms the suitability of a theory-elaboration approach for this research.

Yin (2018) argued that the case study cannot be started as a true tabula rasa; the researcher should have an implicit theoretical perspective in choosing whom to communicate with within the organisation, in the researcher's opening viewpoint regarding what is going on in the organisation, and in deciding what to investigate and how to interact with participants. Without these preferences, navigating through the initial research in the field becomes challenging. Additionally, failing to account for this can lead to bias in a case study (Yin, 2018). In the absence of a theoretical framework, a case study might present exciting details about life within a specific organisation, but without any broader implications. Without a theoretical framework, it can quickly devolve into a narrative. While it may include a thorough description and a step-by-step overview of phenomena, problems, and decisions, these details might not engage those outside the action if they do not convey insights into fundamental organisational processes (Hartley, 2004). Hence, the researcher acknowledges the TTF theory. However, despite this acknowledgement, the study remains open to uncovering new and specific insights that may extend or refine existing frameworks grounded in the empirical phenomenon.

3.2 Research Strategy

Before discussing methodological choices and processes based on Thomas's (2011) typology, this section will first outline the research strategy for case selection in this study. Specifically, this study focuses on two Indonesian SMEs: one from the retail

sector (a non-manufacturing enterprise) and the other from the manufacturing sector. A solid justification regarding subject or case selection is explicated throughout this section.

3.2.1 Country Selection

This study aims to investigate SMEs in developing countries, specifically Indonesia. There are several justifications for selecting Indonesia as the focus of this study. The first is population size. According to Statistics Indonesia (BPS, 2025), the total population is 284,4 million, making it the fourth most populous country after the United States. This large population represents a substantial customer base for SMEs, serving as a major driver of business opportunities and growth. It offers a vast domestic market where SMEs play a central role (Elfaki, Handoyo, and Ibrahim, 2021). With such high demand, the number of SMEs is also significant, with around 64 million SMEs operating in Indonesia (Ministry of Communication and Informatics of Indonesia, 2024). The second is economic growth. Over the years, Indonesia has consistently developed its economy. The Ministry of Finance of Indonesia (2023) stated that, for seven consecutive quarters, Indonesia's economic growth remained above 5%, surpassing market expectations, even compared with the strong growth of the same period in the previous year. This demonstrates the resilience of Indonesia's economy amid the global slowdown caused by the Ukraine-Russia conflict and the post-Covid-19 recovery. Furthermore, Indonesia's G20 Presidency in 2022 shaped global perceptions, reinforcing the view that Indonesia's economy is stable and has recovered strongly (Ministry of Finance of Indonesia, 2023). This consistent economic performance makes Indonesia an attractive market for SMEs aiming to grow and benefit from a steadily expanding economy. Although, as mentioned in the literature, unlike countries that rely on exports or large-scale manufacturing, Indonesia's economic growth is primarily driven by domestic consumption. Consumption contributes approximately 54 to 60 per cent of the country's total GDP, making it the most significant component of economic activity (World Bank, 2024).

The third is the low level of digital maturity among SMEs in Indonesia. As noted in the literature, many SMEs in the country still face difficulties even adopting basic digital tools, making the adoption of DT challenging. According to the Ministry of Communication and Informatics of Indonesia (2024), only 26% of Indonesia's 64 million SMEs had adopted digital platforms by 2024, while the remaining 74% were

still operating offline. This suggests that a large proportion of Indonesian SMEs have yet to engage in the digital economy. This gap creates a meaningful research opportunity to explore barriers, enablers, and context-specific mechanisms. The fourth is policy relevance and the national digital Push. The Indonesian government has introduced four key measures to support SMEs: infrastructure development, financing programs, SME digitalisation, and strengthening coordination across institutions (Ministry of Finance of Indonesia, 2023). The Ministry of Trade has also aimed to accelerate the digitalisation of one million SME traders across the country (Ministry of Trade of Indonesia, 2022). However, challenges in implementation continue. Despite policy support, the digital maturity of SMEs remains low (Ministry of Communication and Informatics of Indonesia, 2024). This presents a relevant opportunity to examine how SMEs engage with and respond to DT in practice. The last is Underrepresented in academic literature. Most studies on DT focus on large firms, resulting in a limited understanding of how SMEs, especially those in developing countries, undergo this process (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018). The way SMEs experience DT is often quite different from that of larger firms (Beck et al., 2005), yet current research offers little explanation of how this takes place within SME contexts (Ghobakhloo et al., 2022). As a result, DT in SMEs remains an area that requires further investigation, particularly from varied organisational and sectoral viewpoints, with the potential to generate new conceptual contributions (Nadkarni and Prügl, 2021).

3.2.2 Sector Selection

The SME sector is highly diverse (Lukács, 2005), including in Indonesia (Kadin, 2024). However, this study focuses specifically on two sectors: retail (non-manufacturing) and manufacturing. This section provides a clear justification for this focus. To begin, it presents an overview of the sectoral composition of Indonesian SMEs using recent national data, before highlighting the distinctive features and contextual gaps that justify the study's focus on the two selected sectors.

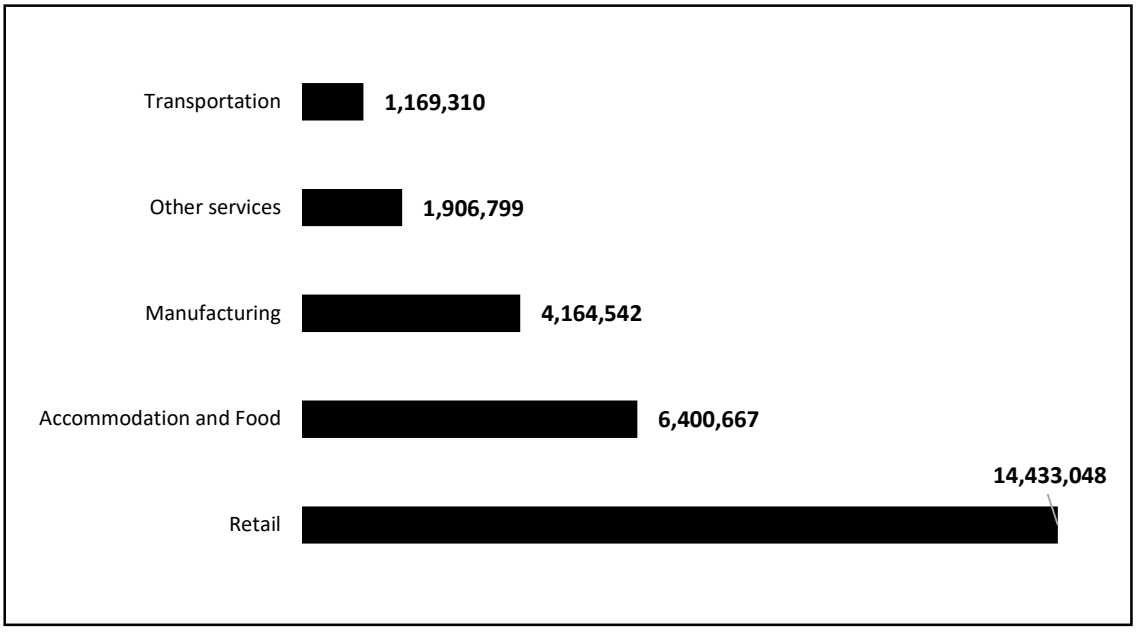


Figure 5. The Five Sectors with the Highest Number of SMEs

Figure 5 presents the five sectors in Indonesia with the highest number of SMEs as of 31 December 2024, based on data from the Ministry of Micro, Small, and Medium Enterprises (Kadin, 2024). The retail sector accounts for the largest number, with 14,433,048 SMEs, significantly surpassing the second-ranked sector, accommodation and food, and nearly quadrupling the number in manufacturing. This highlights the structural dominance of consumption-driven activities in the Indonesian economy, aligning with the World Bank's (2024) observation that Indonesia's economic growth is largely fuelled by domestic consumption. Manufacturing ranks third, with 4,164,542 SMEs. Notably, four of the five leading sectors, retail, accommodation and food, other services, and transportation, are service-oriented or non-manufacturing. Although retail is often associated with the sale of physical goods, it increasingly incorporates service-based elements. For instance, online stores and e-commerce platforms not only involve product transactions but also provide services such as customer support, logistics, user experience design, and multi-channel engagement. This shift reflects broader transformations in retail practices that integrate digital technologies and service components (Souiden, Ladhari, and Chiadmi, 2019).

This composition underscores a broader orientation of SME development towards non-manufacturing activities. Consequently, this research focuses on manufacturing and non-manufacturing SMEs, deliberately excluding the

accommodation and food sector, not to diminish its relevance, but to sharpen the analytical contrast between manufacturing-based and non-manufacturing-driven enterprises. In this context, the retail sector serves as a representation of non-manufacturing SMEs, while the manufacturing sector represents its own category. Therefore, the study's findings and implications may be considered relevant and applicable across both manufacturing and non-manufacturing sectors.

Given the national context in which Indonesia's economy is predominantly driven by consumption (World Bank, 2024) and most SMEs remain offline (Ministry of Communication and Informatics of Indonesia, 2024), it is essential to understand how different sectors within the SME landscape respond to DT. Moreover, these two sectors are unique at the SME level. First, the retail sector plays a significant role in the economy, with retail businesses accounting for the highest number of SMEs, totalling 14,433,048 SMEs (Kadin, 2024). Globally, retail SMEs dominate business landscapes, representing 99% of enterprises in the EU and employing 66% of the workforce (Lorente-Martínez, Navío-Marco, and Rodrigo-Moya, 2020). Similarly, in developing economies such as South Asia, retail SMEs hold a strong market presence (Reardon et al., 2021). However, despite their wide presence, research on DT has largely focused on the manufacturing sector (Mittal et al., 2018; Masood and Sonntag, 2020; Ghobakhloo and Iranmanesh, 2021; Ghobakhloo et al., 2022), leaving retail SMEs underexplored. Given their scale and diversity of retail SMEs (Tolstoy et al., 2021), it presents a compelling case for examining DT adoption.

In contrast, while the manufacturing sector has been widely studied in DT research, it continues to face significant challenges in digital adoption. Manufacturing SMEs often struggle with DT implementation (Ghobakhloo and Iranmanesh, 2021). Studies indicate that adoption rates remain low, with reports from Korean and Brazilian manufacturing SMEs showing significantly limited uptake (Won and Park, 2020; Frank, Dalenogare, and Ayala, 2019). Despite these barriers, manufacturing remains a vital contributor to economic development, with firms increasingly recognising the need to invest in DT strategies (Jones, Hutcheson, and Camba, 2021). By including manufacturing SMEs in this study, the research captures a sector undergoing a slower yet crucial transformation, offering a contrast to the agility seen in retail.

3.2.3 SMEs Selection

This study is dedicated exclusively to SMEs, with a deliberate focus on two companies from different sectors. It selects a key case and an unusual case, in which the phenomenon is inherently interesting to observe (Thomas, 2011; Yin, 2018). The study focuses on two companies: one in non-manufacturing, which is retail, Company Y, and one in manufacturing, Company Z. The selection of these companies is driven by a research interest in rare cases, as both have implemented DT to some extent, whereas the majority of SMEs in these sectors have not (Ghobakhloo and Iranmanesh, 2021; Institute for Development of Economics and Finance, 2024; Ministry of Communication and Informatics of Indonesia, 2024). These two companies are chosen because they exemplify SMEs actively engaging in DT within sectors that follow distinct DT trajectories. Company Y is highly adaptive and customer-facing, while Company Z is process-intensive and requires operational transformation. As Stake (1995) suggests, maximising learning from a case study requires focusing on phenomena that provide the best insights. Both Company Y and Company Z are undergoing significant transformations due to DT, making them relevant for examining how DT enhances SME performance. These sectors are not only widespread but also critical for their potential in digital innovation. By investigating both companies, this study fosters research synergy, offering a more comprehensive understanding of how different SME sectors navigate DT to enhance performance.

Thus, the selection of Company Y, which operates in the non-manufacturing sector, specifically the retail sector, and Company Z, which operates in the manufacturing sector, represents both a key and an unusual case. Indonesia's economy is primarily driven by consumption (World Bank, 2024), rather than by manufacturing strength (House of Representatives of the Republic of Indonesia, 2024), as seen in other countries (Sahoo and Lo, 2022). Most SMEs in Indonesia continue to face challenges with DT, with the majority remaining offline (Ministry of Communication and Informatics of Indonesia, 2024). In this context, Company Y stands out as a retail SME that emerged during the early stage of the pandemic and successfully scaled its operations, outperforming many older retail businesses. Company Z, on the other hand, is a rare example of a manufacturing SME that has survived since 1993 and continues to grow despite the sector's national decline. These two cases are therefore both rare and strategically significant, offering valuable insights into how SMEs from distinct

sectors navigate DT in a country where digital adoption remains limited. Further explanations of the two companies will be discussed in the following section.

3.3 Data Collection

This part examines the data collection process in this study, discussing the methodological choices, ethical considerations, and data sources. These elements are essential to ensure that the research process is coherent, ethically grounded, and analytically rigorous, laying the groundwork for credible and meaningful findings. By outlining these components in detail, this section also demonstrates how the study maintains transparency and trustworthiness throughout the research process.

3.3.1 Methodological Choices

Continuing the typology of a case study by Thomas (2011), the previous section has discussed the subject, object, purpose, and approach of this research. This section explains the methodological choices and processes.

In the case study, multiple methodologies can be employed, rather than relying on a single method (Tellis, 1997). The combination of various data sources is a hallmark of a case study; it includes interviews, observations, documentation, archival research, and physical artefacts. It facilitates a comprehensive understanding of the observed phenomenon and enhances data credibility and rigour (Baxter and Jack, 2008; Harrison et al., 2017). Rather than being analysed separately, these data sources are combined during the analysis. It is like a puzzle; each piece of data contributes to understanding the phenomenon under study. This combination enhances the strengths of the findings by bringing together multiple data elements to promote a better understanding of the phenomenon (Baxter and Jack, 2008). However, Tellis (1997) stated that not all data sources are applicable to the case study. Different case studies offer different possibilities for data collection. Thus, four sources are employed in this study: interviews, observation, documentation, and informal dialogue.

Firstly, a semi-structured interview is conducted. It is a semi-formal interview that is guided by a structured question sequence. The interviewees have some flexibility, allowing them to discuss points beyond the planned questions. Clear instructions are given, allowing for flexibility in responses (Kvale, 1996). This research involves individual interviews, conducted both face-to-face and online, rather than in groups or focus groups. A purposive sampling technique is applied for this study. It is a deliberate

method to include specific categories of cases in a research sample, ensuring representation from diverse groups within the overall population. The rationale behind applying a purposive technique is that particular individuals may offer a unique, distinct, or essential viewpoint on the phenomenon under study (Robinson, 2014). This research targets participants actively implementing technologies in their SMEs, including CEOs, managers, and team members in operations, sales, marketing, finance, HR, and product development.

Secondly, direct observation is employed, which involves visiting the field to collect data casually and observe, measure, and record activities in the real-world setting of the case. This technique enables direct exploration of the subject and captures specifics that may not be apparent through other data sources (Tellis, 1997; Yin, 2018). The observations in this study include production processes, employee interactions, technology usage, and workplace culture. Thirdly, documentation is used, which is likely relevant to every case study topic. It strengthens, provides evidence, and enriches the researcher's understanding of the object of study. Documentation is a prominent feature of every data collection plan (Yin, 2018). Documentations such as social media analytics, financial statements, customer feedback and reviews, website information, and others are used for this study.

Fourthly, informal dialogue is used. Swain and King (2022) stated that informal conversations are spontaneous, unstructured exchanges that occur naturally and are not scheduled like formal interviews. They often emerge in everyday settings and can provide rich, authentic insights that may not surface in more structured interactions. These conversations reduce formality and allow participants to speak more openly, making the data more natural and less performative. Although not typically audio-recorded, informal conversations can meaningfully complement, or even substitute for, formal interviews in qualitative case study research (Swain and King, 2022). In this research study, informal dialogues with the CEO and department heads were frequently held.

Further, the final typology of case study is the process (Thomas, 2011). Following the justification for selecting the retail and manufacturing sectors, the study proceeds to a deeper focus on specific SMEs operating in these sectors. This study applies a multiple case study approach, which includes more than one case (Yin, 2018),

namely Company Y and Company Z. A multiple case design follows an analogous logic, where each case is carefully selected to either predict similar results or anticipate different outcomes for predictable reasons (Yin, 2018). Multiple case study techniques are often preferable to a single case when researchers have the option, as they enhance the reliability and robustness of findings. A single case study is comparable to putting all eggs in one basket, making it more vulnerable, whereas the analytical strength of multiple cases provides more substantial and credible insights (Yin, 2018).

Specifically, this study adopts a parallel multiple-case study design, where Pauwels and Matthyssens (2004) argue that parallel multiple-case research involves the simultaneous investigation of distinct cases using the same research framework to enable structured comparison and theoretical development. Each case is treated as an independent empirical unit, analysed separately through pattern-matching and replication logic before synthesising cross-case insights. This design enhances analytical generalisation by allowing researchers to explore variation across settings while maintaining conceptual consistency (Pauwels and Matthyssens, 2004). Cross-case synthesis in this multiple-case study design aims to compare and analyse findings across different cases. Unlike conventional research synthesis, it retains the holistic nature of each case rather than breaking them into isolated variables. Replication logic is essential in cross-case synthesis, treating each case as a separate experiment to determine whether similar patterns or findings emerge across cases (Yin, 2018). In line with Tellis (1997) and Yin (2018), each case is conducted separately, with data collection and case reporting taking place at different times, ensuring a comprehensive approach in which data are gathered from various sources to draw well-founded conclusions.

Therefore, this study begins with a within-case analysis for each SME, followed by a cross-case comparison. This means treating each case separately at first by providing a detailed description of each company, Company Y and Company Z, and identifying findings unique to that case. Once each case has been analysed separately, the study proceeds to a cross-case synthesis to identify patterns and differences across the two cases. Although the two companies are from different sectors, retail and manufacturing, the comparison is not about sector performance, but about how each SME navigates DT to enhance its performance.

To summarise, following Thomas's (2011) typology of case study, this research selects a key case in which the phenomenon has inherent interest to observe. Also, it serves as an unusual case because it is rare and unique in some important way. The object of this study is DT and SMEs, with an exploratory purpose. The approach used is theory-elaboration. The methodological choices include interviews, observation, documentation, and informal dialogue. The process is conducted as a parallel multiple-case study.

3.3.2 Ethical Consideration

This study was conducted in accordance with the ethical guidelines of the University of Nottingham and received formal approval from the Nottingham University Business School Research Ethics Committee (approval number 202324014). Ethical clearance was granted following the submission and review of the necessary documents, including the NUBS REC Ethics Review Checklist, Research Participant Information Sheet, Research Participant Privacy Notice, and Research Participant Consent Form. All participants were provided with clear and comprehensive information about the study's purpose, procedures, and their rights before giving informed consent. Participation was entirely voluntary, and individuals had the right to withdraw from the study at any stage without penalty or explanation. Anonymity and confidentiality were strictly maintained. Any personal information was removed or replaced with pseudonyms when the data were written up. Data were stored securely on password-protected, encrypted devices accessible only to the researcher. No personal data will be shared outside of the research.

All data is handled in accordance with GDPR regulations and the University's data protection policy. Participants were informed about how their data would be used, stored, and, where applicable, reused in future research. The storage and retention period complies with university policy, with data retained securely for a minimum of seven years and potentially archived for up to 25 years for future academic use. This study did not involve vulnerable groups or any activities that could cause harm. Nonetheless, care was taken to ensure that all questions were asked respectfully, and participants were reminded that they could skip any question they did not feel comfortable answering. This ensures that the research adhered to the University's standards for rigour, transparency, respect, and honesty, and that proper steps were taken to protect the participants.

3.3.3 Data Sources

This study conducts comprehensive data collection on SMEs, specifically Company Y and Company Z. Company Y is a retail company specialising in Islamic women's attire. Established in 2018, the company offers a range of products, including abaya dresses, headscarves, outerwear, and related accessories. The company has experienced rapid sales growth, receiving customer requests for up to 15,000 products per month, which are distributed across Indonesia and Southeast Asia.

Company Z, on the other hand, is a manufacturing company specialising in clothing accessories within the creative sector. Its product range includes woven labels, printed labels, hangtags, polyester buttons, packaging, and other clothing-related accessories. Additionally, the company provides consultation, design, and sampling services. Its client base primarily consists of local Indonesian brands, garment companies and individuals. Established in 1993, Company Z has continued to expand its operations over the years. Further details about the profiles of both companies are provided in Table 7.

Table 7. Company Profiles

Company Name	Company Y	Company Z
Year Established	2018	1993
Sector	Retail	Manufacturing
Number of Employees	35	40
Core Product	Islamic women's attire: abaya dresses, headscarves, outerwear, and related accessories.	Clothing accessories: woven labels, printed labels, hangtags, polyester buttons, packaging, and other clothing-related accessories

The data collection process is structured to align with the ongoing DT efforts within SMEs and their impact on performance. Four methods are used: interviews, observations, documentation, and informal dialogue (Table 8).

Table 8. Data Collection

Data Sources	Total and Breakdown	
Interviews	18 interviews, with a mean length of 30 minutes each. The approximate total word count for these 18 Indonesian-language interviews is 90,000.	Company Y
	16 interviews, with a mean length of 30 minutes each. The approximate total word count for these 16 Indonesian-language interviews is 80,000.	Company Z
Observation	Six occasions, each averaging 30 minutes, encompass production processes, employee interactions, technology use, live-streamed social commerce, morning meetings, and workplace culture.	
Documentation	social media analytics, financial statements, employee data, customer feedback and reviews, website information, photo and video processing, meeting minutes, memos, and technology descriptions.	
Informal Dialogue	With the CEO, HR, Head of Sales, Head of Marketing, and Head of Production during field visits, including seven phone conversations with the CEO and HR and 10 message exchanges	Company Y
	With the CEO, HR, Head of Sales, Head of Marketing, and Head of Production during field visits, including four phone conversations with the CEO and HR and six message exchanges	Company Z

Firstly, a total of 36 semi-structured interviews were conducted: 18 in Company Y and 18 in Company Z. In Company Y, 18 employees from various departments and hierarchical levels participated, including the CEO, as well as staff from Finance, Sales, Marketing, Human Resources, Logistics, and Production. One or two representatives from each department were interviewed. In Company Z, 18 interviews were conducted with employees from various departments, including the CEO's office, finance, sales, marketing, operations, production, and human resources. Two or three interviewees represented each department.

All interviews were recorded and transcribed. The average interview lasted approximately 30 minutes. The estimated total word counts for Company Y and Company Z were 90,000 and 80,000, respectively. The interview data captured participants' personal experiences navigating DT within their respective companies. It provided insights into their rationale, perceptions, and understanding of how DT influenced and enhanced their individual and departmental performance.

Additionally, the interviews followed a semi-structured format, guided by a protocol that covered several key themes: task characteristics, technology characteristics, how the technology fits with the task, how the technology is utilised, and the impact of DT within the company. The semi-structured approach allows

flexibility to probe deeper into specific experiences while maintaining consistency across all interviews.

To further ensure theoretical alignment, the interview protocol was informed by the dimensions of the TTF framework. Rather than isolating each dimension into separate questions, the design distributes these dimensions across different sections of the interview to reflect how they naturally emerge in practice. For instance, task-related dimensions such as task complexity, interdependence, and non-routineness are explored through questions on roles, responsibilities, and coordination across departments. Technology-related aspects, including system features, usability, and functionality, are captured through questions on the types of digital tools used and their perceived usefulness. Furthermore, the eight dimensions of task-technology fit, such as data quality, locatability, authorisation, compatibility, timeliness, reliability, ease of use, and relationships with users, are explicitly consolidated in Question 14, while also being implicitly reflected throughout earlier discussions. In addition, utilisation is explored through questions that examine the extent to which employees rely on digital technologies in their daily work. This captures the degree of dependence on technology and reflects how digital practices coexist within SMEs. Furthermore, performance impacts are addressed through questions that explore perceived outcomes of DT. These questions also allow participants to reflect on challenges and limitations, providing a more balanced understanding of how DT influences performance in practice. This approach allows respondents to articulate their experiences in a more natural and context-driven manner, while still ensuring that all eight dimensions of TTF are systematically covered within the interview design.

To provide a clearer view of the interview participants, Table 9 and Table 10 outline the job titles and key tasks of the interviewees from both Company Y and Company Z. These tables demonstrate the range of roles and responsibilities involved in the DT process. It also helps clarify the relevance of each participant's perspective to the research focus.

Table 9. Participant Description – Company Y

Participant	Position	Department
Y1	CEO	Executive
Y2	Head of Finance	Finance
Y3	Head of Sales	Sales
Y4	Head of Marketing	Marketing
Y5	Quality Control	Production
Y6	Research & Development	Production
Y7	Head of Human Resources	Human Resource
Y8	Head of Warehouse	Logistic
Y9	Head of Production	Production
Y10	Retail Growth	Sales
Y11	Art Director	Marketing
Y12	Pattern Maker	Production
Y13	Website Sales	Sales
Y14	Admin Marketplace	Sales
Y15	Host Internal	Marketing
Y16	Admin Production	Production
Y17	Accounting	Finance
Y18	Fashion Design	Production

Table 10. Participant Description – Company Z

Participant	Position	Department
Z1	CEO	Executive
Z2	Digital Marketing	Marketing
Z3	Head of Sales	Sales
Z4	Head of Operations	Production
Z5	Head of Human Resources	Human Resource
Z6	Head of Finance	Finance
Z7	Label Printing Production Manager	Production
Z8	Woven Production Manager	Production
Z9	Woven Machine Operator (1)	Production
Z10	Woven Machine Operator (2)	Production
Z11	Front Office	Sales
Z12	Admin Marketplace	Sales
Z13	Finishing Operator	Production
Z14	Offset Printing Production Manager	Production
Z15	Printing Machine Operator	Production

The second data source is direct observation. It involves visiting the field, where the researcher casually collects data by observing, measuring, and recording activities in real-world settings within both companies. This includes six observation occasions, with an average length of 30 minutes, covering aspects such as production processes, employee interactions, technology usage, live-streamed social commerce, morning meetings, and workplace culture. This technique enables direct exploration of the company and captures details that do not emerge through interviews and documentation. It provides a clear view of how the DT process enhances performance.

Thirdly, documentation encompasses financial statements, employee data, social media analytics, customer feedback and reviews, website information, process photos and videos, meeting minutes, memos, and technology descriptions. Documentation strengthens and adds evidence to support the data collected from interviews and observations. For example, when interviewees explained revenue scaling over specific periods, the financial statements they provided offered an explicit confirmation. Likewise, documentation enriches the researcher's understanding of how the DT process enhances company performance.

Lastly, informal dialogues are held with key personnel, including the CEO, HR, the Head of Sales, the Head of Marketing, and the Head of Production, during field visits at Company Y. These interactions are supplemented by follow-up communications, consisting of seven phone conversations with the CEO and HR, as well as ten message exchanges, which provided additional insights into the day-to-day processes and contextual understanding of the company's DT journey. Similarly, at Company Z, informal dialogue played a significant role in gathering nuanced perspectives from senior staff. Discussions took place during on-site visits, and the same key roles were held, including CEO, HR, Head of Sales, Head of Marketing, and Head of Production. These are supplemented by four phone conversations with the CEO and HR, along with six message exchanges, which offer deeper insights into the contextual understanding of the company's DT processes.

3.3.4 Trustworthiness in Qualitative Research

To ensure the quality and rigour of this qualitative study, the criteria of trustworthiness proposed by Lincoln and Guba (1985) are applied. Trustworthiness in qualitative research is established through four key criteria: credibility, transferability,

dependability, and confirmability. Firstly, credibility refers to the confidence that can be placed in the truth of the findings (Lincoln and Guba, 1985). In this study, credibility is supported through prolonged engagement with the field, triangulation of data sources, and member checking. Prolonged engagement is achieved through repeated observations across multiple field visits to the case companies, enabling a deeper understanding of the organisational context. Triangulation is achieved through diverse sources of evidence, including semi-structured interviews, direct observations, company documents, and informal employee dialogues, yielding a rich, comprehensive understanding of the phenomena under study. Member checking is carried out throughout the research process by regularly confirming the accuracy of interpretations with participants, ensuring that the accounts presented in the findings authentically reflect their perspectives and experiences.

Then, transferability concerns the extent to which the findings can be applied to other contexts (Lincoln and Guba, 1985). In this study, transferability is supported by providing thick descriptions of the research setting and participants. Detailed accounts of the case companies' sectors, sizes, structures, and DT initiatives are presented in the findings, along with descriptions of the participants' roles and experiences. These contextual details allow readers to judge the relevance of the findings to their own contexts. Further, dependability refers to the stability of the research process over time (Lincoln and Guba, 1985). In this study, dependability is supported by maintaining a detailed audit trail that documents all stages of the research. This included records of data collection activities, such as interview transcripts, field notes, and collected documents, as well as files from the data analysis process, including coding and theme outputs. These records provide transparency about how methodological decisions were made and ensure that the research process can be reviewed and understood by others, thus enhancing the dependability of the study. Lastly, Confirmability relates to the degree to which the findings are shaped by the participants' experiences rather than by the researcher's bias (Lincoln and Guba, 1985). In this study, confirmability is supported through triangulation across multiple data sources, including interviews, observations, documents, and informal dialogues, to ensure that the findings do not rely on a single perspective. A detailed audit trail is maintained to link raw data, such as direct quotations from participants, to the codes and themes developed during analysis, providing transparency in the interpretation process. Reflexive consideration is also

applied throughout the study to remain aware of the researcher's position and to minimise potential influence on data interpretation. These strategies ensured that the findings remained grounded in the participants' perspectives and experiences.

3.4 Data Analysis

This part examines the data analysis stage in detail, explaining how the process was conducted step by step to ensure rigour and transparency. This study used an abductive, theory-elaborating approach, combining deductive codes from the TTF framework with inductively identified codes. The data analysis for this study is carried out in four interrelated stages (Table 11).

Table 11. Stage of Data Analysis

Stages	Tasks	Outputs
1. Identify the revenue of Company Y and Company Z	1. Map the annual revenue of Company Y and Company Z to illustrate each company's growth over a specific period.	Comparison of Scaling Patterns: Company Y and Company Z
2. Construct case narrative	1. Identify the transformation that occurred in Company Y and Company Z, focusing on the key characteristics of DT, namely the extent of change in the properties that took place, as well as how technologies contributed to this transformation. 2. Develop a case storyline that illustrates the transformation in both companies, highlighting how these changes enabled them to enhance their respective performance. 3. Detail the tasks of company members across departments, highlighting key task characteristics and the technologies supporting them, and showing how these tasks changed before and after the adoption of technologies. 4. Examine the dynamics of TTF, focusing on how the fit emerged, evolved, and transformed over time throughout the DT process.	Distinctive transformations in Company Y and Company Z
3. Identifying the Mechanism	1. Conduct thematic analysis through six stages (Braun and Clarke, 2006): • familiarising with the data • generating preliminary codes • exploring potential themes • evaluating themes • clarifying and labelling themes • developing the final report 2. Conduct the analysis separately (Yin, 2018) for Company Y and Company Z	Mechanisms of enhancing SMEs' performance

4. Analyse and conclude the cross-case synthesis	Based on the multiple-case study procedure, there are four key tasks at this stage (Yin, 2018): 1. Conduct cross-case analysis to identify patterns, compare findings, and explain similarities and differences across the cases. 2. Modify, refine, or adapt the initial theoretical framework to ensure a better fit between the theory and the empirical data. 3. Develop policy implications to consider practical applications and guide decision-making. 4. Write the cross-case report to synthesise results from the multiple case studies into a comprehensive and cohesive report.	• Similarities and Differences in SME Performance Enhancement Mechanisms. • Extension of TTF theory

The first stage focused on identifying and comparing the annual revenue growth of Company Y and Company Z over the past several years. To examine this stage, financial records, specifically the annual revenue, were obtained. This data is part of the methodological choices of this study, particularly through documentation. These documents were used to illustrate each SME's growth trajectory. This revenue data was not analysed in isolation but was used to contextualise the companies' DT outcomes. Specifically, the revenue patterns helped identify periods of significant scaling, providing a comparative understanding of each company's growth trajectory. This evidence further supports the notion that both companies were selected as key and unusual cases for the study.

The second stage of the analysis involves constructing a case narrative for both Company Y and Company Z. This stage began by identifying specific transformations within each company, focusing on the key characteristics of DT. In particular, the extent of change was examined across four properties: process, structure, culture, and resources, as conceptualised in the literature review. To develop these narratives, a detailed analysis of the interview transcripts was conducted to trace and describe how changes emerged in each of these four properties. While formal coding had not yet begun, relevant segments from participant responses were highlighted and organised under each transformation category. Selected quotes were incorporated to support and illustrate each type of change, thereby grounding the narratives in participants' work experiences. Subsequently, a detailed storyline was developed for each company, mapping how the integration of technologies contributed to organisational change and performance enhancement. These narratives captured the sequence of change, the actors involved, and the internal and external challenges faced during the DT journey. The outcome of this stage is a comprehensive, structured narrative of each company's

distinctive transformation process, which serves as the analytical foundation for the thematic analysis in the next stage.

The third stage involves identifying the core mechanisms through a thematic analysis, guided by Braun and Clarke's (2006) six-phase framework. These steps include familiarising with the data, generating preliminary codes, exploring potential themes, reviewing and evaluating them, clarifying and labelling them, and finally developing the final thematic report. The researcher conducted the thematic analysis using NVivo software to facilitate systematic coding and data organisation. NVivo offers several benefits, including efficient data management, idea organisation, data querying, visualisation, and reporting (Jackson and Bazeley, 2019). As this study adopts a theory elaboration approach, the coding process followed a blended strategy that integrated deductive and inductive reasoning. Deductively, the initial coding process was informed by the TTF framework, which provided a conceptual lens for identifying codes. At the same time, inductive coding was used to remain open to unexpected patterns and emerging insights grounded in the empirical context. As the researcher engaged with the transcripts, new codes were created to capture ideas that extended beyond the TTF framework. This allowed the data to inform the theory, rather than forcing it into predefined categories. The coding process was conducted separately for each case, following Yin's (2018) multiple-case study strategy. Through a detailed analysis, codes were clustered into categories and synthesised into key themes. Each theme was supported by multiple coded segments and illustrative quotes from participants, which ensured transparency and grounding in the data. This stage identified key mechanisms through which SMEs enhance their performance in response to DT initiatives.

The final stage involves conducting a cross-case synthesis, following the multiple-case study strategy outlined by Yin (2018). This process was guided by the themes and mechanisms identified in Stage 3 and aimed to compare how each company's DT mechanisms influenced its performance outcomes. The cross-case analysis involved four key steps. First, a systematic comparison was conducted by aligning the key mechanisms derived from each case and identifying areas of convergence and divergence. This comparison focused on how the TTF dimensions were manifested differently across Company Y and Company Z. By examining similarities and differences, this step revealed how each company navigated DT within

its specific operational context. Second, the comparison enabled the refinement and extension of the initial theoretical framework. While the TTF model provided a foundational lens for understanding task–technology alignment, the cross-case patterns revealed additional variables that shaped the fit. These findings were used to elaborate the theory, ensuring it better captures the dynamics observed in SMEs. Third, the synthesis was used to develop practical policy implications, particularly for SME decision-makers. Lastly, a cross-case narrative was developed to present the synthesised findings in a coherent and comparative format. This narrative integrates theoretical insights and empirical evidence to advance understanding of how DT operates in diverse SME settings. The outcome of this stage is a set of cross-case insights that explain how and why performance enhancement through DT differs between cases, along with a refined version of the TTF framework tailored to the realities of SMEs.

In summary, the data analysis followed a structured sequence: starting with the comparison of scaling patterns, then constructing case narratives of distinctive transformations, identifying mechanisms through thematic analysis, and concluding with a cross-case synthesis. This stepwise approach ensured clarity, consistency, and depth in linking empirical data with theoretical refinement.

CHAPTER 4: FINDINGS

This chapter presents the findings of the study. The analysis begins with comparing scaling patterns between Company Y and Company Z, focusing on their revenue growth. It then develops case narratives that outline the distinctive transformations within each company, covering changes in processes, structures, cultures, and resources, as well as the extent of those changes. The chapter also identifies task and technology characteristics across departments in both companies and analyses the emergence and dynamics of task–technology fit, how it evolved, and how it transformed over time throughout the DT process. Finally, it examines the mechanisms through which DT enhanced performance, presenting thematic analyses of each company.

4.2 Comparison of Scaling Patterns: Company Y and Company Z

Figure 6 shows the scaling patterns of Company Y, a retail business founded in 2018, and Company Z, a manufacturing company established in 1993. Both companies scaled their revenue over time, but their growth trajectories differ.

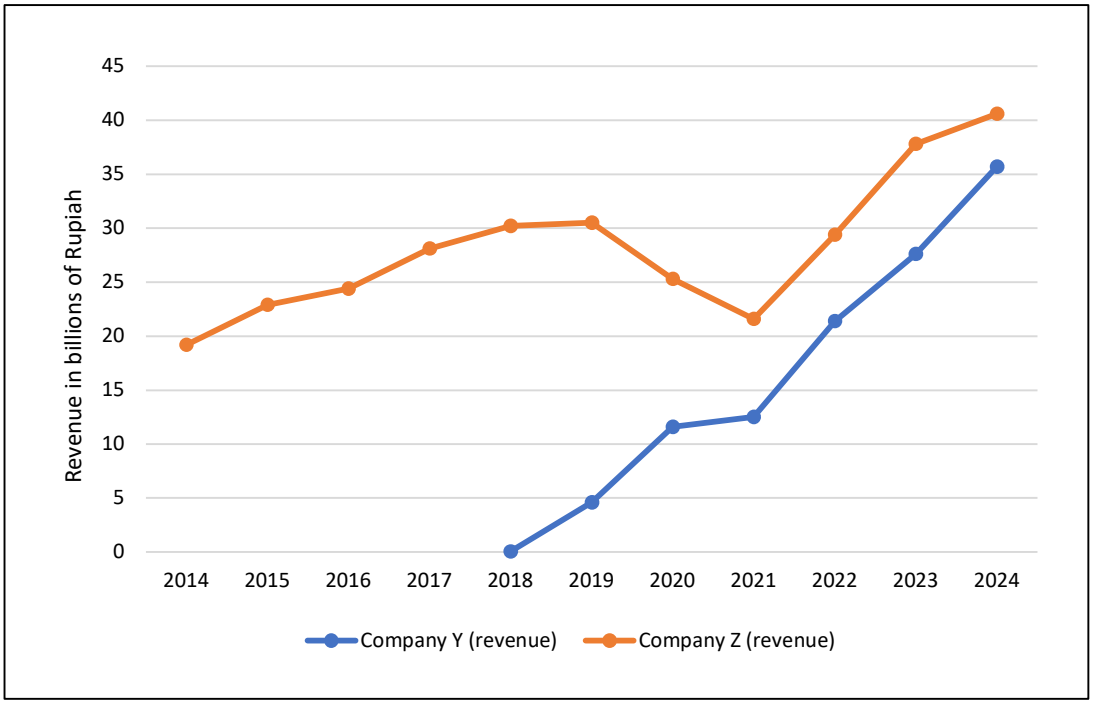


Figure 6. Comparison of Revenue Growth Patterns

Company Y is highly adaptive to DT processes. Since its establishment in 2018, the company has immediately begun its DT efforts. It started with a low revenue of about Rp 60 million in 2018. However, in 2019, its revenue jumped to Rp 4.6 billion. Despite the COVID-19 pandemic from late 2019 to 2021, the company continued to scale at a slower rate. Revenue reached Rp 11.60 billion in 2020 and Rp 12.50 billion in 2021. This pattern shows how DT helped the company maintain momentum despite external disruptions and is in line with the literature stating that Indonesia's consumption-based economy, supported by SMEs, remained resilient during the COVID-19 pandemic (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2021; Sulastri, 2022; Junaidi, 2024). From 2022 onward, Company Y entered a faster scaling phase, with revenue rising to Rp 21.40 billion in 2022, Rp 27.60 billion in 2023, and Rp 35.70 billion in 2024. Hence, DT has a significant impact on its revenue, and specific mechanisms within Company Y have contributed to this scaling.

On the other side, Company Z followed a different path. Established in 1993, it operated traditionally until 2014, when its revenue was Rp 19.2 billion. Before 2015, the company had never reached a revenue of Rp 20 billion. Its DT transition process started in 2015. As a result, revenue steadily increased, reaching Rp 30.2 billion in 2018 and Rp 30.5 billion in 2019. Unlike Company Y, Company Z experienced a revenue decline during the pandemic years from late 2019 to 2021, dropping to Rp 25.3 billion in 2020 and Rp 21.6 billion in 2021. However, even with this decline, revenue remained above Rp 20 billion, indicating the company did not return to its pre-2015 levels. This suggests that the decline was more closely related to the nature of the manufacturing industry, which indeed faced a downturn during the Covid-19 pandemic, as noted in the literature (House of Representatives of the Republic of Indonesia, 2024), rather than to the implementation of DT. The company began recovering in 2022, with revenue scaling to Rp 29.4 billion in 2022, Rp 37.8 billion in 2023, and Rp 40.6 billion in 2024. Hence, DT significantly impacts its revenue, and specific mechanisms within Company Z have contributed to this scaling.

In summary, the dataset highlights two different scaling patterns. Company Y scaled rapidly and exponentially, even amid external disruptions such as the pandemic. In contrast, Company Z followed a slower, more linear scaling process, shifting from traditional to DT over a longer period. Both companies reached similar revenue levels in 2024, with Company Y achieving Rp 35.7 billion and Company Z achieving Rp 40.6

billion. Company Y's rapid scaling is supported by its digital-native approach. Company Z's gradual scaling is tied to transitioning from traditional to digital operations. This study will further explore the specific mechanisms that contributed to their scaling. Likewise, as both cases experienced revenue scaling, they can be considered key cases, where the phenomenon itself has inherent interest in being observed (Thomas, 2011), and also unusual cases because they are rare and unique in important ways (Yin, 2018). This dual positioning provides a strong justification for selecting both cases, as they offer valuable insights into how SMEs navigate DT to enhance their performance, including scaling their revenue. While these scaling patterns are presented at an aggregate level, the following sections unpack the specific DT within each company, showing how particular technological interventions correspond to these shifts in revenue over time.

4.2 Distinctive Transformations in Company Y and Company Z

According to Vial (2019), the extent of change, referring to the degree to which the target entity's properties are transformed, is a crucial aspect of the DT process. These properties include processes (Correani et al., 2020), structures (Matt, Hess, and Benlian, 2015), culture (Steiber and Alvarez, 2025), and resources (Vial, 2019). Thus, in this section, the researcher examines the extent of change in these properties as they occurred in Company Y and Company Z separately.

4.2.1 Company Y's Transformation

Company Y, operating in the retail sector, has undergone a series of DT initiatives that reshaped its operational and company landscape. The extent of change within the company is reflected in four key properties: process, structure, culture, and resources, illustrating how the company navigated its DT efforts. The researcher examines these properties in the following subsections to capture the scope and nature of Company Y's transformation.

4.2.1.1 Process

The core activities, such as production, sales, reporting, and inventory, are carried out by Company Y. Although the production process is outsourced to a third party, their digital tools enable the entire process to be conducted transparently. This reduces concerns about receiving low-quality production results, as everything can be monitored through data reports shared via digital platforms between Company Y and its

suppliers, ensuring that the reports they receive match the actual output. Beyond that, the company has streamlined its operations, reporting, and inventory management by adopting digital tools. This is reflected clearly when the CEO mentioned,

"Everything is done through applications. Even daily work reports are submitted through apps... everything being systematised online...,"

showing how digital platforms are embedded into routine tasks. Additionally, the Head of Marketing described how they operationalise forecasts using digital technology such as Notion, stating,

> *"after we get forecasts from the sales team and the deadlines, we study, for the next one to two months, what will our plan be like? How many new products will there be? How many restocks of new colors will there be? Will there be any events? What will the promotions be like and when? Well, through Notion, I can translate it into a calendar format….when our content is ready, it coincides with new products that are ready at that time. So, the campaign can be implemented right away…Each job description becomes clear. It's very helpful. So, we can track all the processes like that. And I also get to know the productivity of my team's work every day".*

These quotes show that tools like Notion are not just for data storage but also actively help coordinate interdepartmental activities, ensuring structured reporting and greater clarity in day-to-day workflows.

> *"There are many benefits, such as even information dissemination across all teams. So, other teams know the issues from A to Z, making us all aware. Because, for instance, if there's a problem in the production process, other teams wouldn't know how it unfolded; they'd only know there's a sudden issue. Especially when they find out about it at the end, it might create misconceptions. With this DT process, these issues can be resolved" (QC).*

Problems in one part of the operation are now visible to others early on, preventing miscommunication and improving responsiveness. This transparency across departments strongly indicates how Company Y's reporting and internal coordination have shifted from reactive to proactive. Digital systems have also replaced manual reporting and have systematised their operations, with real-time data guiding production and stock decisions. This transformation is echoed in the CEO's comment:

> *"With just a few clicks, I can obtain data on product performance... we ensure the inventory is fully stocked."*

It highlights how decision-making has become more data-driven, agile, and immediate. The Head of Sales further reinforced this point, explaining how digital tools like Jubelio play a central role in updating stock across platforms and are integrated across departments:

> *"So, every catalog and stock on each platform needs to be constantly updated, and Jubelio really helps with that, so the stock is always accurate. And it's customizable, so I can change and modify it more easily. It can even help with promotions across all platforms, so it's truly integrated. And Jubelio is actually used in other departments too, like the warehouse department. So, overall, from the sales team's perspective, we're already highly digitized, there's nothing manual."*

This shows a company-wide embrace of systemised tools that ensure accurate stock levels and enable the business to act quickly as sales trends or market demand change.

> *The primary factor, actually, is more about time efficiency. Through this transformation, the improvement can even reach around 200%, based on my calculations at that time. What used to be manual, relying on manual checks, has now changed. Additionally, besides this transformation being more time efficient, it also makes the process much faster and safer. Because if, for example, in terms of data, which is now available digitally, when compared, any discrepancies are immediately noticed. Whereas, if it's still manual and relying on eyesight, even a slight misreading, like mistaking a size, can lead to errors in shipment. So, the point is, all of this really helps" (Head of Warehouse).*

As the head of warehouse staff noted, this shift toward efficiency is not just about speed but also accuracy and safety. He details how digital records reduce shipment errors that can occur with manual checks. This suggests that digitalisation has optimised operational tempo and reduced the likelihood of human error, which has significant implications for order fulfilment quality. Further, Company Y's confidence in investing heavily in inventory sets Company Y apart from other retail businesses. They are not worried about unsold stock because their data shows what products sell well, customer habits, preferred product colours, and accurate stock opname records, making their offerings unique compared to competitors. As a result, the large inventory they prepare aligns closely with their sales predictions. This logic is articulated by the CEO, who explained:

> *"Our distinctive characteristic is that we always provide our products in ready stock. Most other brands, especially in the same industry as Company Y, offer pre-orders. I see pre-ordering as a way for them to play it safe, which often limits their inventory. Perhaps because many of these managers are women, they might be cautious about having too much inventory, fearing potential risks. At Company Y, our largest investment is in inventory. Our characteristic is that our products are always in ready stock. The products we always have in stock are a mix of best sellers and new arrivals."*

Their confidence does not stem from instinct, but from data-backed insight into market preferences and purchasing patterns. The comment also highlights a broader strategic distinction from competitors, most of whom rely on pre-orders. At the same time, Company Y dares to lead with significant, ready stock investments based on solid data foundations. This data-centric confidence is also evident in their aggressive advertising spending. As the Head of Sales shared,

> *"For example, on Shopee ads, we can spend up to 2 billion in January. In the previous month, it could be up to 700 million per month. And that's just one platform. Our superiors are really brave to take risks by investing through these ads because they know how many benefits can be gained."*

Taken together, these process-level transformations illustrate how digital tools such as Jubelio and Notion enabled Company Y to move from fragmented and partially manual operations toward fully integrated and synchronised workflows. In particular, the ability to maintain real-time inventory accuracy across multiple sales channels and coordinate campaigns across departments reduced operational delays and supported higher sales volume. This operational shift directly corresponds to the revenue scaling observed in Figure 6, particularly the sharp increase in 2019 following the company's early digital implementation and the accelerated growth phase after 2022. Rather than DT acting as a general enabler, these findings indicate that specific system integrations played a direct role in enabling the company to scale its revenue efficiently.

4.2.1.2 Structure

Company Y's organisational structure consists of several departments, some of which work remotely based on their specific needs. However, going to the office remains a core principle within the company.

> *"...there are several departments that can work remotely at Company Y. But I still adhere to the principle of going to the office..." (CEO)*

This reflects the adoption of a hybrid work model that balances remote and in-office practices. The quote shows that while digital tools allow flexibility, the company still values physical presence, especially for maintaining organisational culture and shared discipline. Remote work is allowed selectively, based on roles, without entirely abandoning the office-based model. Company Y allows certain departments to work remotely because digital tools enable real-time tracking of daily tasks and progress.

> *"Not all team members are in the office all the time, including myself as the CEO... The solution lies in digital tools... like Notion, Trello, and Google Drive." (CEO)*

> *"It's easier, simpler, saves time, and we can track employees' work wherever they are, even outside, so employees can't lie." (HR)*

These tools support decentralised and asynchronous workflows, ensuring collaboration, accountability, and productivity are maintained regardless of physical location. What the CEO and HR mentioned clearly shows that the organisation remains functional and traceable with the right digital tools. This digital infrastructure provides visibility into individual work, regardless of where they operate, eliminating the need for physical supervision.

> *"In this company, finding solutions... is a mix of top-down and bottom-up approaches." (CEO)*

Decision-making in Company Y is not purely hierarchical; instead, it adopts a mixed approach in which managers and employees can give directions. This is further emphasised by the Art Director's explanation of how ideas and requirements are first validated with the CEO before being translated to the team:

> *"So far, I've been doing a lot of validation with the CEO, who also acts as a project manager. For example, I discuss and validate what kind of visual they want for a particular campaign. Then, I communicate these needs to*

the team, explaining the CEO's desires and what needs to be done to achieve them."

This shows that while strategic vision comes from the top, the implementation relies on active interpretation and discussion across levels. The process allows for collaborative refinement before execution, strengthening team understanding and engagement.

> *"Actually, in terms of organisation, we're constantly evolving. Even the structure can change; it used to be like that, now we've changed it. Company Y is just that flexible. So, it's quite surprising, actually. And yes, it's because of the DT process happening here. We even have an annual update of job descriptions. So, there's always something new. For example, the sales team, they used to focus solely on marketplaces, where they were only responsible for responding to customer chats, monitoring what's happening there. But now, there's something new and different; they have to participate in campaigns, customize for each marketplace, decorate for live product showcases, live sales on each marketplace, and so on." (HR)*

This shows that Company Y's DT is directly linked to organisational agility. The structure is not fixed, it is reviewed and updated regularly, including job descriptions. HR's account of the sales team's evolving role shows how digital demands and platform-based commerce push employees to take on broader responsibilities. What used to be static or operational tasks now involve content, campaign, and engagement strategy, reflecting the shift from traditional to more dynamic roles.

> *"We can do a lot of things there (digital tools), like tracking work, making notes, and various other things. Basically, we can create anything based on what we write. So, it's more convenient. And it's transparent too, right? Even KPIs can be included in Notion. Also, OKRs can be too. So, through Notion, we can see the percentage of each individual's work achievement. So, it's clear. Also, because nowadays we can't predict or read algorithms, KPIs can change, especially for the sales and marketing teams, where sales targets are heavily influenced by social media algorithms. So, we try to be flexible. The important thing is we can ensure their work performance. In essence, by using HRIS Notion and online HRD room tests, I can handle everything on my own. So, I don't waste time when dealing with administrative matters." (HR)*

This reflects how digital platforms like Notion and HRIS are not just tools for tracking but are integrated into the company's performance system. Flexibility is key, especially in marketing, where outcomes can shift quickly with algorithm changes. The

company can stay agile and accountable by keeping KPIs and OKRs adaptive and visible to all team members. The statement also shows that HR-related processes are now more efficient and self-managed, reducing administrative delays and allowing HR to focus more on strategic and developmental roles.

4.2.1.3 Culture

In terms of culture, Company Y reflects a mindset centred on openness to technology, adaptability, and innovation. People in company Y are already accustomed to solving problems quickly, with digital tools consistently serving as their go-to solutions.

> *"They're already accustomed to finding the fastest solutions... searching online before going to a manager." (CEO)*

This highlights the emergence of a culture of digital independence and tech-savvy problem-solving, with a clear shift toward innovation, fast response, and tech-first thinking. Employees are encouraged to explore solutions independently before escalating issues. This quote from the CEO shows that searching online and using digital tools first is not just allowed but part of the work habit. Instead of depending on instructions, employees are expected to think critically and act quickly with available technology.

> *"Yes, we have a lot of connections with the production division, the warehouse division, and also with the sales division; we intersect with each other. For example, with the sales division, when there's an issue like a customer complaint about the product quality, we assist the sales division in explaining it to the customer. Usually, it's not a major problem, and eventually, the sales team explains it to the customer in their own language. With the production division, of course, we always monitor the process from start to finish. For example, if there's trouble, we assist the production division from the initial stage so that the problem doesn't escalate to the finishing stage. In terms of quality, we can't guarantee it's 100% good because we're not the ones who work on the product until it's finished (outsourced production), but we strive to ensure that what the external party does aligns with our SOP and what we want. So when there are many issues with the final result, if we can prove through data that it's after the SOP, then the problem lies with the external party. That's one example. That's why we're required to find reliable vendors for outsourcing." (QC)*

The QC quote also reinforces the culture of active problem-solving. Even when issues arise from external partners, the internal team does not remain passive; they

monitor, trace, and try to resolve problems early using SOPs and data documentation. The ability to cross-functionally collaborate across divisions such as sales, production, and QC also supports a more integrated culture, where teamwork and transparency are emphasised.

Additionally, with a highly tech-savvy CEO, Company Y continuously explores digital technologies and fosters a culture of ongoing learning.

> *"I have always had a high interest in exploring, especially in the digital world,". (CEO).*
>
> *"In Company Y, our CEO has big goals. Maybe technology is only utilised because he likes to utilise technology. So, the goals of the owners are what most influence how this DT process can develop until now." (HR)*

This shows how the CEO's personal interest in digital exploration directly influences the company's direction. It also reflects how leadership shapes organisational culture. The HR statement confirms that DT's growth is not driven only by necessity but by the founder's vision and habit of continuously exploring new possibilities. This environment encourages others to follow suit, creating a tech-friendly culture throughout the company. Digital literacy not only shapes daily workflows but also informs managerial decisions, especially in selecting and approving tools.

> *"If a team wants a specific software, there's the question of 'what for?' I need to be familiar with it... to understand how much benefit the application can provide." (CEO)*
>
> *"from the leader who really likes to explore something new. So, all the platforms and features we try, it's not initially from us. But it starts from the CEO first. For example, in the sales team I handle, there's one platform called Kontak, which can broadcast messages in bulk, handle inbound and outbound chats in one application, with multiple agents, and I only knew about it from him. So, after he studied it, he gave it to me to learn more deeply." (Head of Sales)*

This illustrates the CEO's vital role in fostering a tech-driven environment. Most of the tools and platforms used across departments are introduced by the CEO, who not only initiates the search for useful technologies but also personally learns and evaluates them before passing them along. The sales team's exposure to a tool like Kontak came directly from the CEO's experimentation. This top-down approach in tool adoption

reflects a leadership style that is hands-on and exploratory. Because of this strong digital orientation, decision-making at Company Y is always grounded in data.

> *"That's correct. It's based on data. And again, this comes from DT... With just a few clicks, I can obtain data on product performance..." (CEO)*

> *"For the targets, it's actually calculated and analsed by the superiors first. And Alhamdulillah, for two consecutive years, we've seen growth. Now, in 2024, the target for growth is 15%, which is larger than before. But actually, 15% is not a small number, because every year we can increase. And for goals, we want to have offline stores, and that will be realized soon. Because through offline stores, it can help with branding and also promote our new products. Because we can have 2 to 4 new products every month. So, based on data, we eliminate what doesn't sell well, and we maintain what's still in demand." (Head of Sales)*

The way both the CEO and the head of sales refer to data shows that the company relies heavily on measurable outcomes when setting goals or evaluating product decisions. From calculating growth targets to deciding which SKUs to remove or keep, all decisions are filtered through digital performance data. This culture of data-backed reasoning replaces guesswork or intuition, and has become a common mindset across departments.

As a result, data-driven decision-making has become a habit across all departments, replacing intuition or guesswork. In terms of communication, there has also been a cultural shift, from face-to-face interactions to predominantly digital communication, which subtly influences how employees connect and collaborate.

> *"...direct communication declines because all activities can be done online... perhaps that's why many companies have succeeded with remote work." (CEO)*

> *"So, breaking down the concept, the launching roadmap, with specific dates, all of that we can discuss within Notion. So, in case of revisions, they're all communicated there, so it's neatly organized, so we know what each of us has to do. Each job description becomes clear." (Head of Marketing)*

These statements reflect how communication patterns have changed over time. With tools like Notion central to daily operations, collaboration has shifted from direct verbal discussions to organised, platform-based communication. This not only ensures traceability and structure but also reshapes individual interactions, placing greater

emphasis on digital clarity over spontaneous communication. It shows that knowledge-sharing and task coordination are no longer dependent on physical meetings but instead rely on the documentation and visibility provided by digital systems. This transformation has not only changed how people work but also how they engage and share knowledge across the organisation.

4.2.1.4 Resources

In terms of resources, Company Y has a team that is highly adaptable to change and is supported by a wide variety of digital technologies. In total, they currently utilise ten different digital tools: Notion, Trello, Zahir, GajiHub, Jubelio, AI Graphic Design, Cloud Drive, Marketplaces, social media, and their website. Uniquely, Company Y relies entirely on third-party digital tools rather than developing its own systems, apps, or software.

> *"For example, we use several tools or systems that rely on third-party services. These third parties gather feedback from their clients regarding systems, services, and satisfaction. The requests from SME clients vary. The third parties then conduct internal evaluations and suddenly change their systems, like updating software from version 1.0 to 2.0, changing the user interface, and even the user experience, thus altering the workflow… So, it's essential for all SMEs to realize that compared to corporations, there are inherent gaps that cannot be bridged. If we really want to, we have to develop our own systems, create our own applications. But how much investment is needed? Not to mention maintenance costs and others… Currently, we prefer using third-party solutions because they suffice for our needs." (CEO)*

This explains why Company Y chooses to depend on third-party platforms. It is not only a strategic decision but also a practical one, especially given their status as an SME with limited resources. The CEO acknowledges that while developing their own system could offer more control, the cost and complexity would be far greater. Instead, they have found that well-chosen external tools already meet their operational demands.

As an SME, Company Y naturally has a more limited budget than large corporations, but these third-party tools have proven sufficient to cover its operational needs. Therefore, the key is not how sophisticated the technology is, but how well it fits the company's specific needs. This reflects the idea that the DT process can still be realised effectively through the adoption of existing third-party tools, as seen in Company Y. This is visible from the company's ability to operate and grow using these

tools without developing its own systems. The CEO has acknowledged the gap between SMEs and large corporations and how they respond to it by focusing on practicality over custom development. Their approach reinforces that transformation is not always about building new tech, but it is about using what already exists and making it work.

> *"Well, each platform has different treatments. For example, on Shopee, even without placing traffic ads, the traffic can increase on its own. Plus, Shopee has its live feature, where we know the patterns of peak traffic and the right times…In case, if a platform or marketplace shuts down,..Like the case of TikTok Live sales being suddenly stopped by the government at that time,…Luckily, we don't just focus on TikTok…that's why we don't rely on just one platform. And every year, even every month, we have different targets, so I can't rely on just one platform. Each platform…has its own advantages and features." (Head of Sales)*

> *"When I use various platforms, I utilise each platform as much as possible. Because if we compare with others, sometimes they use a platform, but its features are not maximized or even not used at all. That's the difference with Company Y. For example, Company Y and competitors are both live on one platform, for instance. Many of them do not use features like live boosters, coins, likes, exclusive launching, special features that actually, if studied, can increase our traffic and followers. From there, we maximize this traffic by following them up with good service and good products." (Head of Sales)*

This statement shows that Company Y does not just use digital tools but goes deep into each platform and studies its features. The head of sales demonstrates a level of digital literacy that allows them to adjust, test, and leverage tools like Shopee Live and TikTok depending on the situation. Their ability to shift quickly between platforms is a direct reflection of their agile mindset. Further, digital tools are also fast-changing by nature, so adjustments to the tools they use are constantly evolving, based on the needs of their tasks.

> *"For example, in payroll, we changed software several times. For example, in the previous software, attendance had to be done through face recognition, so it was a bit complicated for the employees here, so we finally switched to a software called Gajihub, where attendance can be done just through location." (Head of Finance)*

This illustrates how Company Y does not remain static in their tool choices. If a system no longer fits, they adapt and move on. In this case, the head of finance made a switch when the previous tool caused friction for employees. Their openness to trying,

evaluating, and replacing tools shows a pragmatic approach to DT. Further, as this is an SME, where budget is a limitation, not all systems are fully digital, so some parts must still be done manually. So, a hybrid system is a necessity.

> *"As for QC tools, we use them (technology) to some extent, while the rest is documented manually and neatly. This way, all documents, whether digital or manual, can be supportive in case of trouble with external parties." (QC)*

> *"I still have to reconcile data manually between Jubelio and Zahir." (Retail Growth)*

These examples show that full automation is not always realistic in SME contexts. Manual processes are still used strategically, especially when it comes to quality control or syncing between systems. The company understands the balance: where digital makes sense, they use it; where manual work is more practical or required, they keep it.

On the people side, team members are undergoing a skill transformation to better adapt to these digital tools.

> *"The biggest challenge is approaching our team to get them used to and comfortable with digital technology... Several... come from conventional backgrounds..." (CEO)*

> *"As for the challenges, some people in my team may not fully understand or find it difficult to input data. Utilizing technology is aimed at simplifying our work processes, but if the capacity of individuals' understanding doesn't match, then it becomes challenging. Some may not be familiar with technology, and their backgrounds and experiences differ, making it difficult for them to adapt to the system initially. Some are still in the process of getting used to it even now. So, I continually mediate with them, reassuring them that despite the initial complexity, the technology will ultimately ease their work, as that's the purpose of using the system." (production)*

The shift is not just about tools; it is also about people. Not everyone in the company came from a digital background, which means the learning and adaptation process is ongoing. These quotes show that even though the tools are helpful, there is a real human effort involved in closing the gap between old and new ways of working.

Hence, the leadership plays a vital role in this transition, consistently encouraging team members to embrace digital learning, even when it feels unfamiliar.

"I push them to learn on their own because usually, applications or digital products have tutorials, webinars, and customer service." (CEO)

"So, when there's a problem, for example, from the lack of human resources, or evaluating campaign strategies, I can immediately connect and assist them. Even the bosses come down to solve specific problems that need to be addressed quickly. So, solving a problem is always quick, for example, if training is needed, we process the training right away." (HR)

"When I joined, my superior facilitated my participation in external HR-related training. This allowed me to gain insights, aligning with the initial vision of upgrading the competencies of all employees in Company Y. Why? So that we could all operate on the same level." (HR)

This reflects the top-down support for digital adoption. Leaders do not just expect employees to adapt; they also support them with access to resources, external training, and quick problem-solving. From encouraging independent learning to arranging immediate hands-on training when needed, the leadership actively works to build confidence and competence within the team. As a result, Company Y places strong emphasis on continuous learning and upskilling, providing training and fostering a culture in which digital literacy evolves alongside operational needs. The training initiatives and learning culture are not just occasional; they are embedded in the company's operations. Whether it is onboarding, upgrading skills, or responding to platform changes, learning is positioned as a shared responsibility. This creates a dynamic work environment where technology adoption moves in sync with people development.

4.2.1.5 The Extent of Change at Company Y

Overall, the extent of change in Company Y shows how deeply DT has affected their processes, structure, culture, and resources. In terms of process, internal coordination has become more proactive across departments. While speed in production remains important, it is now aligned with accuracy. Data-centric operations have become key in every aspect, replacing instinct-driven decisions. This shift has set them apart from competitors: their priority is stock investment, whereas others rely more on pre-orders, and they are also more aggressive in advertising.

In terms of structure, they have implemented a hybrid work model, with real-time tracking that enables operations to run smoothly regardless of physical location. Their organisational style is mixed, not strictly hierarchical, which encourages more

active and engaged teamwork, even in a fully digital environment. The structure is also agile, with evolving and dynamic roles, giving the company strong flexibility. Administrative tasks have been reduced, allowing them to focus more on developmental roles.

In terms of culture, adaptability, and an innovative mindset have developed, making them active problem-solvers. Digital independence has also emerged: when problems arise, technology is their first solution, demonstrating a straightforward tech-first approach. Their leaders are tech-savvy and keep up with technological developments, fostering ongoing learning and exploration of new possibilities. Here, DT is driven not only by necessity but also by leadership vision. A tech-friendly culture has taken root, along with data-driven habits. Digital clarity in communication has impacted daily practices; what was once spontaneous discussion is now more structured and more transparent in digital formats.

In terms of resources, the company uses third-party platforms, so developing its own system is not essential to keep DT processes running smoothly. Growing digital literacy ensures that every available technology is thoroughly learned and its features maximised. As technology continues to evolve, continuous adjustments are made, keeping them ready for any changes that arise. Because SMEs have limited budgets compared to those of large companies, a hybrid system is used here. Full automation is often unrealistic for SMEs, so the hybrid model becomes a practical solution. For people, an agile mindset has made them pragmatic. Transformation is not just about technology but also about upgrading skills and closing the gap between old and new ways of working. In this phase, the leadership role is essential; leaders apply a top-down strategy, ensuring they fully understand new systems before passing them down to others. Access to support is provided, fostering a culture of learning. A dynamic work environment is in place, where technology adoption is synchronised with employee development.

While some of these changes, such as the adoption of digital tools and platforms, may initially resemble digitisation or digitalisation, the transformation in Company Y extends beyond process-level improvements. This is reflected in the coordinated shifts across organisational structure, management practices, and decision-making processes, indicating a broader DT.

4.2.2 Company Z's Transformation

Company Z, operating in the manufacturing sector, has experienced DT that redefined its overall company landscape. The extent of change in the company can be observed across four core properties: process, structure, culture, and resources. Together, these properties illustrate how the company navigated its DT transition. In the following subsections, the researcher explores these properties to highlight the scope and nature of Company Z's transformation.

4.2.2.1 Process

Company Z's operational process is closely tied to its production activities. Interestingly, the company shows a unique characteristic in how it serves its clients. Company Z offers a full consultation service, starting from zero, meaning they are open to working with clients who have no existing brand or product. The general order process includes consultation, design and sampling, production, revision, quality control, and delivery. Because of this open and collaborative service model, many new businesses have come to consult with Company Z. In fact, several client companies have grown from zero to becoming established businesses through their partnership with Company Z.

> *I've managed to take on several small brands that have experienced rapid growth. These brands, which initially only ordered one roll, have now experienced significant growth, with orders reaching tens of thousands of rolls, and they continue to exclusively produce with us (Sales Manager).*

The products manufactured by Company Z include labels, clothing accessories, and packaging materials. These products are generally divided into three areas: woven labels, printed labels, and offset printing. Company Z has the capability to produce across all three areas comprehensively, which is rare for SMEs in this industry. Most companies at the SME level only focus on one of these areas. In Company Z, the most visible sign of DT appears in the integration of advanced machinery into production processes. Multiple informants frequently mention this machine-centric transformation, and it becomes a foundational shift in how the company operates. The CEO reflects on a critical moment when he realised,

> *"From that experience, I realized my weakness was actually in technology, I didn't have these machines. All this time, I was a middleman."*

This realisation triggered a series of investments in high-end machines from Switzerland, Taiwan, and Germany. It also highlights how new machines resolved past quality issues, noting that,

> *"In 2017, a machine arrived from overseas... using ultrasonic technology instead of heat. It's more advanced, especially in terms of quality." (The Operational Manager)*
>
> *"Previously we had 4 machines. Now we have 7. What used to take 500 hours now takes 100–200 hours," (The Head of Woven Production)*
>
> *"The machines we have are very helpful, especially in terms of speed… we also use ultrasonic machines, so the results don't cause itching and are very smooth," (Head of Printing Production).*

indicating a significant gain in time efficiency, and the adoption of ultrasonic machines also improved output quality. Another driving force behind these process improvements is the company Z's responsiveness to customer feedback and order complexities. Both the front-end and back-end units adapt their processes to customer needs. As it is noted,

> *"If clients want a design with unusual colors, we offer alternatives… we don't order new threads immediately without analysis." (The Head of Woven production)*
>
> *"Customers said the satin caused itching... so we bought an ultrasonic machine that solved the issue." (The Operational Manager)*

This shows how design and material considerations become part of a collaborative dialogue with clients. These cases demonstrate how customer expectations are translated into internal changes, particularly in the selection or modification of materials and machines. The CEO reinforces this approach by stating,

> *"We follow what the consumers want… whatever they ask for, we try to provide. If we can't, we research until we can."*

This customer-centred strategy is supported by a well-organised lead-to-delivery workflow that has emerged through digital tools like CRM systems and collaborative platforms. The digital marketing team describes the workflow clearly:

> *"Customers enter CRM tools like Makari. The chats are then routed to relevant agents. Then comes price list, design, down payment, and production."*

Also, digital systems have improved visibility into performance. As it is said:

> *"It all started with complaints about tracking work... the digital marketing team proposed CRM. Now, we can evaluate who performs and who needs coaching," (Sales Manager).*

> *"I receive SPKs from marketing, then I process everything with estimated lead time. After printing and cutting, we pass it to the warehouse." (Head of Printing Production).*

These integrated handovers between marketing, production, and warehouse show a clear transition from informal coordination to structured, trackable flows. Beyond connectivity, the company also moves from manual operations toward data-driven decision-making. Manual logs have been replaced with spreadsheets and digital archives.

> *"We didn't have clear data before... now we track how long the machine runs, how much material is used, all using Google Sheets." (The Operational Manager)*

> *"We now have almost 59,000 files archived by code. If there's a repeat order, we can easily retrieve it. Before, it was manual and very difficult,"* (Head of Woven Production).

> *"Now we track everything: chats, customer types, monthly order growth/decline." (Digital marketing)*

A long-standing digital archiving system is in place. These developments point to a culture of evidence-based tracking that supports more consistent, scalable operations. While the processes are increasingly standardised, Company Z also retains the flexibility to accommodate urgent requests or design limitations. This is reflected in the printing team's scheduling logic.

> *"Even if the quantity is large, we manage schedules with shift work to meet the 12-day estimate," (Head of Printing Production).*

In the woven division, machine constraints are managed through consultation with clients:

> *"If the design exceeds 8 colors, we either make adjustments or ask for redesigns while maintaining quality."*

The Sales Manager mentions a similar practice:

> *"When I receive urgent requests, I coordinate with production to see if it can be fast-tracked."*

These examples highlight the balance between process discipline and operational agility. However, Company Z's transformation has not been without internal resistance. Many employees, especially those accustomed to conventional practices, struggled to adopt new systems. It illustrates the social learning and leadership dynamics behind process adoption.

> *"I prefer to have fewer people but manage them well" (CEO).*
>
> *"Some staff resisted changes. They said: why not just use the old machines? I gave bonuses to those who were willing to learn" (The Operational Manager).*
>
> *"There were debates with CEO because he didn't believe in online at first. But after online sales hit 200 million, he trusted me" (Sales manager).*

An essential aspect of Company Z's process transformation lies in branding and digital content, which are now treated as structured, ongoing practices. As described,

> *"We use Meta ads, Instagram, even podcasts. Branding is now a process, from visibility to lead handling." (Digital Marketing)*
>
> *"Instagram isn't just to show products. I use it to educate: what's cotton, its benefits, etc. That's branding now." (Sales Manager)*
>
> *"We used to go door to door. Now, customers come to us through our content. That's the power of DT." (CEO)*

These narratives confirm that branding is no longer a side task but a formalised and digitalised component of the company's sales and marketing process.

Overall, the DT process in Company Z reflects a deep shift in how processes are organised, tracked, and improved. Increase speed and quality, customer input shapes workflows, and digital systems enable clarity, consistency, and responsiveness. Yet, full integration and cultural alignment remain ongoing efforts. The company's experience shows that DT in SMEs involves both technological and human adjustments, evolving one process at a time while responding to market dynamics and internal realities.

Building on these process-level changes, the evidence demonstrates that the transformation in Company Z's processes extends beyond the adoption of advanced machinery and reflects a broader reconfiguration of organisational practices. The integration of CRM systems, the transition from manual to data-driven tracking, and the formalisation of lead-to-delivery workflows indicate a shift toward structured,

transparent, and scalable operations. At the same time, the coordination between marketing, production, and warehouse functions, alongside the increasing reliance on digital branding and content, shows that processes are no longer isolated but interconnected within a digitally enabled environment. These changes are further reinforced by evolving decision-making practices, in which data visibility and performance tracking shape operational choices. Together, these developments demonstrate that digital technologies in Company Z do not function merely as tools for efficiency, but actively reshape how work is organised and executed. This confirms that the changes observed represent a process-level transformation characteristic of DT transformation rather than limited digitisation or modernisation.

Overall, these process transformations show how the introduction of CRM systems and advanced production machinery reshaped Company Z's operational logic. CRM systems enabled structured customer tracking, performance monitoring, and more coordinated lead-to-delivery workflows, while machine upgrades improved production speed, consistency, and capacity. These changes reduced reliance on informal processes and allowed the company to manage larger and more complex orders more effectively. This progression corresponds to the revenue trajectory presented in Figure 6, particularly the steady increase following the initiation of DT in 2015 and the recovery and accelerated growth observed after 2021. Rather than DT acting as a general enabler, these findings indicate that the combined implementation of CRM systems and production technologies played a direct role in strengthening the company's ability to scale over time.

4.2.2.2 Structure

In the context of DT at Company Z, one of the most visible changes has been in its organisational structure. A major structural development is the establishment and professionalisation, which previously did not exist. The company is transitioning from a family-based structure to a more professional model. As explained by the HR officer,

> *"Previously, it wasn't very professional, for example, due to familial relationships, some employees were paid differently. But now, we've moved to a professional approach" (HR).*

This shift reflects an effort to reduce informal practices and bring consistency to how employees are treated across the company. Another significant structural change is the specialisation of roles within divisions. Tasks that a single person once handled are

now divided among specific roles, marking a more transparent functional structure. For example, in the finance division, the team has grown, and responsibilities are now divided:

> *"Now, the finance team has specific individuals assigned to different tasks. For example, there's someone dedicated to purchasing, another for warehouse inventory, and similarly for payroll" (Finance).*

This indicates that the company is moving away from generalist roles and toward a more departmentalised structure. Within the production side, the company has also implemented a more structured approach through shift systems and measurable production targets. These were not in place before but are now being formalised as part of operational management. The operational manager explains,

> *"Back then, there weren't any targets. Now, I want to have targets… Now, we have 3 divisions; first is weaving, second is printing, and third is finishing."*

This shift reflects a broader attempt to organise workflows and improve output consistency across different parts of the production process. Regarding communication across departments, Company Z has also taken steps to formalise and digitise internal coordination. What was previously done informally is now handled through digitally mediated interdepartmental communication systems, such as Google Sheets, and structured work orders are managed digitally. This is illustrated in the marketing division, as shown below:

> *"They send us their designs... I forward them to the graphic design team... then to the setting team or operators" (Front Office Marketing).*

This shows that workflows are now defined and managed through digital systems, enabling better traceability and collaboration across units. Alongside this, the company has also introduced monitoring and accountability mechanisms, such as key performance indicators (KPIs) and digital reporting. These help to make performance more transparent across all levels of the organisation. As the HR and operational manager described,

> *"I implemented KPIs (key performance indicators) for all employees from all divisions" (HR),*
>
> *"This system makes the effectiveness and transparency of each staff member's role in the process visible" (Operational Manager).*

These initiatives reflect an evolving performance culture and a move away from purely task-based expectations to output and results-based accountability. DT has also led to the creation of new, digitally defined roles, especially in marketing and sales. One such role is that of the online admin, which was not part of the previous structure. According to the online admin,

> *"My role is focused on online tasks… processing customer orders online through WhatsApp… creating work-order for the production team."*

This indicates that the organisation is adapting its structure to align with digital workflows and assigning new responsibilities accordingly. Despite the digital shift, Company Z still maintains a dual system where digital and manual processes coexist. This is evident in customer data management. While digital records exist, physical backups are still in use:

> *"This data is also available in manual hardcopy as a backup" (Front Office Marketing).*

This reflects the company's transitional stage, progressing toward digitisation while still relying on older systems for security and continuity. It is also important to note that, even as structural reforms progress, the company's decision-making remains centralised and driven by the owner. As the CEO stated,

> *"I've been minimizing the number of employees to focus more on technology. If I can handle the work myself, I do it."*

This quote reflects that while the organisation is evolving in terms of systems and roles, strategic and resource-related decisions still rest heavily with the founder, which is typical in many family-owned SMEs. Lastly, employee readiness has emerged as a critical structural concern. As the company introduces more systems, platforms, and machines, it becomes clear that digital infrastructure alone is not enough; people must also adapt. As some of the staff members said,

> *"Improving the skills of the staff is crucial, not just the technology itself" (Front Office Marketing).*

> *"Employees need to learn a lot… they need training to learn how to operate [new machines]" (Machine Operator).*

These statements show that without corresponding investments in human capital, the structural benefits of digital tools may not be fully realised.

Overall, the company has moved toward formal role definitions, accountability mechanisms, digital workflows, and interdepartmental coordination, while still grappling with centralisation and the varying readiness of its workforce. These shifts mark a deeper internal transformation, where digital technology is not only altering tools but also reshaping the very structure of how work is organised and managed.

Building on these changes, the evidence shows that Company Z's transformation reflects a fundamental reorganisation of the organisation rather than a purely technological upgrade. The transition from a family-based to a professional structure, the introduction of specialised roles, and the implementation of formal accountability mechanisms such as KPIs indicate a shift toward a more systematic and performance-oriented model. At the same time, the emergence of digitally mediated workflows and new roles, particularly in online operations, demonstrates that digital technologies are embedded in how responsibilities are defined and coordinated across the organisation. Although elements of centralised decision-making and hybrid manual–digital practices remain, these coexist with increasingly formalised structures that support scalability and transparency. Collectively, these developments show that digital technologies are not only supporting existing structures but actively reshaping organisational arrangements, confirming that the transformation in Company Z represents a structural shift characteristic of DT rather than limited digitisation or modernisation.

4.2.2.3 Culture

Company Z has served as the supplier to some of Indonesia's best local fashion brands. Established in 1993, the company has not only survived the pandemic but also continued to grow. This success is mainly due to its goal of helping clients reach their full potential, especially those who are just starting their businesses. Company Z is

> *"…. always been dynamic, following the market, not being idealistic but staying relevant." (CEO)*

The quality of its production is one of the main reasons why clients have remained loyal over the years, and why new clients continue to come in. The company specialises in producing custom clothing accessories, and its strength lies in delivering value through customisation. This allows the company to meet the specific needs of each client and sets it apart from other SMEs in the clothing manufacturing sector. This personalised and service-oriented mindset has become part of Company Z's identity and continues

to shape its culture. It is also one of the main cultural foundations that supports its ongoing DT.

One of the most important cultural shifts during this DT is the transition from a family-based to a professional work culture. In the past, employee treatment was often influenced by personal relationships. As the HR officer explained,

> *"Previously, it wasn't very professional, for example, due to familial relationships, some employees were paid differently. But now, we've moved to a professional approach. Pay and evaluations are based on performance and skills, not family connections."*

This shift caused resistance among long-time employees, as confirmed by the Operational Manager:

> *"Perhaps because of the family system from the beginning of CEO's leadership, it was less professional. So, the transformation that occurred was considered a culture shock for many employees here at the beginning."*

These changes show how DT is not only technical but also social, requiring a shift in mindset and values. The use of digital tools has also introduced a new culture of transparency and accountability. Systems such as KPIs, performance evaluations, and digital tracking platforms have enabled both employees and managers to understand their responsibilities more clearly.

> *"The performance of each employee has become more transparent... KPIs help them feel monitored," (HR)*

> *"This system makes the effectiveness and transparency of each staff member's role in the process visible." (The Operational Manager)*

This shows how DT supports a shift toward more open and data-driven work practices. Cultural resilience and adaptability have also become important. The CEO shared a personal turning point during a business downturn:

> *"I analysed my weaknesses. Oh, my weakness was actually in technology... All this time, I was a middleman, consumers saw me as a broker, not as a producer."*

His recovery and learning from this experience set the tone for a company culture that values growth, even during difficult times. In the sales and marketing division, DT has shifted from traditional selling to branding and creative identity. As the Sales Manager explained,

"I consistently focus on branding. So, it's about thinking about how to keep the branding strong. Branding is the key."

Sales is now about telling stories, building trust, and engaging customers through digital platforms. Another crucial cultural development is the rise of learning by doing and peer mentorship, especially in response to new technology.

"When we bought new machines, I was the one taught by the machine seller, and then I taught all the employees in this company," (Operational Manager).

"The solution I've found is to start over when a thread breaks and keep practicing until I get used to it." (Machine Operator)

This shows a culture that allows space for mistakes, learning, and continuous improvement. Despite these modern developments, ethical and spiritual values remain central. The CEO emphasised,

"Business isn't just about making money. We're looking for blessings. Because employees is also an asset, right? That's why I prefer to have fewer people, but manage them well."

This mindset continues to influence how leadership is practised and how people are treated across the company. Company Z also demonstrates a strong client-centred, service-oriented culture. Even when specific requests are beyond internal capacity, the company prioritises finding solutions.

"We never reject any customer orders... The important thing is that the customer gets the result," (Head of Offset Printing).

"We simply inform them that it's not possible... It's better to be clear about our machine's limitations rather than struggling." (Head of Label Printing)

These values reinforce trust and long-term client relationships. Together, these insights show a culture that is learning to move forward thoughtfully, embracing change without losing its values.

Building on these cultural developments, the evidence shows that the transformation in Company Z extends beyond technological adoption and reflects a shift in underlying values, norms, and ways of working. The transition from a family-based to a professional culture, the emergence of transparency and accountability through digital systems, and the growing emphasis on branding, learning, and adaptability indicate that employees are not only using new technologies but also redefining how work is understood and performed. At the same time, the coexistence of ethical,

spiritual, and client-oriented values demonstrates that the organisation is not replacing its identity but evolving it in response to a digital environment. These changes highlight that digital technologies in Company Z are embedded within everyday practices and belief systems, shaping behaviours and decision-making processes across the organisation. This confirms that the transformation observed is cultural in nature and aligns with the broader characteristics of DT rather than limited digitisation or technological modernisation.

4.2.2.4 Resources

As a manufacturing company, Company Z operates with a wide range of advanced machines. These machines are fully integrated with back-office systems, allowing digital data to flow seamlessly across departments. In total, the company operates 15 production machines, supported by several third-party digital technologies, including Zahir accounting software, CRM platforms, social media channels, and other tools. Altogether, Company Z utilises 20 technologies that support both operational and administrative tasks. These tools are fully aligned with the workforce's needs. As a result, there is synergy between people and technology in Company Z, allowing employees to complete their tasks.

One of the most visible changes at Company Z through DT is the expansion and upgrading of production machines. Across departments, this investment has allowed the company to increase efficiency and improve quality.

> *"Initially, we only had 4 woven machines; now we've added 3 more." (The Head of Woven production)*
>
> *"We have a lot of printing machines here... especially the hot cut machines." (The Head of Label Printing).*
>
> *"Now, we have a new laminating machine that can cut automatically." (finishing)*

These machines not only enhance capability but also reduce maintenance complexity, as stated by the Printing Operator,

> *"The new machines are easier to maintain. The old machines were more complicated."*

In the offset printing division, a long-term strategy has been to rely on trusted equipment,

"Our offset printing machines come from Germany... still highly reliable."

These upgrades reflect a company-wide effort to improve output speed, quality control, and long-term reliability. A direct benefit of these investments is the efficiency gains through automation. New machines have reduced operator dependency, allowed shift-based work, and enabled single-person operations.

> *"With this new machine, the process is faster... and productivity is also higher," (Finishing).*
>
> *"With ultrasonic cutting, the new machine can achieve higher speeds," (the Printing Operator).*
>
> *"Screen printing used to require two people... now only one operator is needed." (the Operational Manager).*

These changes show how Company Z has transformed labour into a more efficient, technology-supported structure. This shift has also driven the upskilling and adaptation of human resources. Staff must now learn to use these new tools quickly, often through internal knowledge transfer.

> *"I was the one taught by the machine seller, and then I taught all the employees in this company." (The Operational Manager)*
>
> "There's always an adjustment period... but now *everything is running smoothly," (finishing).*
>
> *"When a new machine comes in... it's just a matter of adapting." (Printing Operator)*

These examples reflect a cultural shift toward peer-led learning and continuous adaptation. As machine numbers increase, Company Z has scaled its human resource capacity accordingly. More operators have been hired to ensure that machines are adequately supported and workflows are maintained.

> *"We now have 5 operators because the number of machines has increased," (The Head of Label Printing)*
>
> *"With the 7 machines we have, we can produce quickly while maintaining quality." (the woven division)*

This balance between technology and employees shows how Company Z manages growth holistically, not just through tools, but through people, too. On the administrative and digital side, CRM and tracking tools have become essential.

"The digital marketing team provided a solution by utilizing CRM... the results have been very noticeable." (Sales Manager).

This tool helps manage customers, monitor staff activities, and structure business operations in a way that was previously informal. Company Z also maintains a flexible staffing model through cross-functionality and multi-role deployment. Staff are often asked to assist outside their core responsibilities.

"I also help with front office tasks when it's busy," (Online Admin)

"There are only 7 people, split among sales, digital marketing, and R&D." (the Sales Manager)

This approach ensures agility and reflects a resource-conscious structure common in SMEs adapting to change. However, the company recognises that even with advanced technology, machines have limits. These boundaries are technical and must be communicated clearly to clients.

"We can't do more than 4 colors," (the Head of Label Printing).

"The machine can only handle one print at the back," (Printing Operator)

"Woven production supports up to 8 colors." (the woven division)

These constraints require adjustments to production planning and client expectations, ensuring the company does not overpromise beyond its actual capabilities. Meanwhile, data systems and digital archiving have replaced manual processes in managing material histories and customer records.

"We now have nearly 59,000 files... With the software, everything is much easier." (the woven division)

"Our data is tracked digitally using specific software... securely stored." (offset printing)

These changes have led to faster access to information, fewer errors, and greater operational control. Across all units, technology adoption is seen as a core driver of growth. As the Head of Label Printing expressed,

"Because of the machines we have, we excel in quality compared to other competitors." (The Head of Label Printing)

"One of the main factors is definitely our awareness of technology." (finishing)

"One reason we've advanced is our awareness of technology, like the advanced machines we now have." (printing Operator)

These statements reveal that DT is no longer seen as a trend or short-term project but as a strategic enabler of productivity, consistency, and future readiness for Company Z.

Building on these resource developments, the evidence shows that Company Z's transformation is not limited to the acquisition of advanced machinery, but reflects a broader reconfiguration of how technological and human resources are combined and utilised. The integration of multiple digital systems with production machines, the shift toward more autonomous and efficient operations, and the continuous upskilling of employees indicate that resources are no longer static assets but are actively restructured to support new ways of working. At the same time, the alignment between workforce capabilities and technological tools, alongside the use of data systems for tracking and decision-making, demonstrates that value is created through the interaction between people and technology rather than from machines alone. The presence of cross-functional roles and flexible staffing further reinforces this adaptive use of resources within a digitally enabled environment. Collectively, these changes show that digital technologies in Company Z are embedded within a broader resource configuration that enhances organisational capability, confirming that the transformation extends beyond digitisation or equipment modernisation and reflects a resource-level shift consistent with DT.

4.2.2.5 The Extent of Change at Company Z

Overall, Company Z demonstrates the extent of DT's impact on its processes, structures, culture, and resources. In terms of process, the company is unique because it offers comprehensive consultation services, from idea development, design, material selection, sampling, and production, all the way to delivery. This makes the company highly client-centric, with strong responsiveness to client needs. Other manufacturers in the same industry typically focus only on production, while this company offers much more. Their entire process is supported by CRM systems and digital tools, which simplify transactions and workflow. The company is also highly versatile in production; unlike others that focus on just one area, this company specialises in three: woven,

printing, and offset. In production, they have integrated advanced machines, successfully shifting from traditional machinery. This allows them to maintain high quality, improve time efficiency, retain flexibility, and strengthen operational agility. Visibility at each stage of the production process also makes it easy to track the workflow. A data-driven approach is key to this transformation. Even though they are a manufacturing company, they are fully aware of the importance of a branding strategy. They actively invest in digital branding, which consistently attracts new clients.

In terms of structure, although the company started with a family-based style, it has successfully shifted toward professionalisation. A clear functional structure has been established, setting measurable production targets for each department that are both tangible and actionable. Internally, coordination is now digitally mediated, whereas it used to be handled face-to-face. Digital KPIs have also been implemented, enabling better monitoring and accountability across the company. However, like many SMEs, they still face limitations and use a hybrid system that combines automated and manual processes.

In terms of culture, because the company is client-centric, its role is to help clients reach their full potential. This focus keeps the company dynamic while remaining relevant. Personalised, service-oriented work has become their identity in clients' eyes. The shift from a family-based to a professional structure was certainly a major culture shock for the company and not an easy transition. However, they succeeded, proving that DT is not only about technical matters, such as how digital technology is used, but also about social aspects, particularly how people within the company respond to the transformation. As a result, the company has become more open to change, with improvements in how employees are treated. Leadership awareness also plays a key role here, underscoring that DT is driven not only by technology but also by leaders' vision.

In terms of resources and technology, the company has been proactive in investing in advanced machines, making data-driven decisions rather than relying on predictions before purchasing or using new machinery and digital platforms. Through technological investments, they have maintained high production quality, enabled shift-based work for urgent orders, and even introduced single-person machine operation, where previously, multiple people were needed for one machine. For people, agility in

task handling has grown, and training has upskilled employees. As a result, both human and technological resources are developing holistically within the company.

These developments collectively demonstrate that the transformation in Company Z extends beyond technological upgrades and reflects a comprehensive organisational change. The shift toward professionalised structures, digitally mediated coordination, evolving organisational culture, and data-driven decision-making processes indicates that digital technologies are embedded in how the organisation operates, rather than functioning as standalone tools. This confirms that the changes observed represent a holistic DT, encompassing processes, structures, culture, and resources.

4.2.3 Task and Technology Characteristics in Company Y and Company Z

This section presents the task and technology characteristics across members of Company Y and Company Z. In line with the original TTF framework, task characteristics are defined by three aspects: non-routineness, interdependence, and job title (Goodhue and Thompson, 1995). The following findings are presented separately: first, the task characteristics of each company, followed by the technology characteristics of the tools used across roles. This structure ensures clarity in distinguishing how tasks are shaped and how technologies support them.

Table 12. Task Characteristics – Company Y

Job Title	Non-Routineness	Interdependence
CEO	Strategic decision-making under uncertainty	Depends on all departments and external partners
Head of Finance	Adjusting financial processes and ensuring accuracy	Works with sales, warehouse, production, and marketing
Head of Sales	Managing multiple platforms, shifting strategies with market changes	Coordinates with marketing, warehouse, and IT
Head of Marketing	Designing campaigns and strategies in fast product cycles	Works with R&D, sales, and leadership
Quality Control	Inspecting products from raw to finished goods with variable issues	Works with production, warehouse, and sales
Research & Development	Selecting fabrics, solving material issues, and guiding design	Works with designers, pattern makers, and management
Head of Human Resources	Building HR systems and structures from scratch	Coordinates with all departments
Head of Warehouse	Designing and improving warehouse processes	Coordinates with sales, finance, and operations

Head of Production	Planning and negotiating outsourced production	Works with R&D for job orders and the warehouse for materials
Retail Growth	Researching and executing collaborations	Coordinates with marketing, sales, and warehouse
Art Director	Directing creative visuals and adapting brand identity	Aligns with the CEO, marketing, and creative team
Pattern Maker	Creating master patterns and adapting to new fabrics	Coordinates with R&D, purchasing, sales, and marketing
Website Sales	Managing website sales, promos, and reseller relations	Coordinates with warehouse, R&D, and production
Admin Marketplace	Running Shopee & Lazada campaigns, handling customers	Coordinates with warehouse and R&D
Host Internal	Conducting daily livestream sales	Coordinates with marketing and warehouse
Admin Production	Recording raw materials and finished goods	Works with the warehouse and accounting
Accounting	Tracking unsettled payments across marketplaces	Coordinates with the admins, warehouse, and finance
Fashion Design	Researching trends and creating original designs	Coordinates with the CEO, sample room, purchasing, and production

Table 13. Task Characteristics – Company Z

Job Title	Non-Routineness	Interdependence
CEO	Strategic decisions on business direction, investments, and market adaptation	Relies on loyal long-term employees, outsourcing partners, and family members
Digital Marketing	Developing digital strategies, shifting channels, and building online ecosystems	Works with sales agents, content creators, and management for campaigns and customer handling
Head of Sales	Managing diverse brands, creating unique products, and expanding networks	Works with digital marketing, R&D, and sales staff to secure clients
Head of Operations	Overseeing machine effectiveness and setting production targets	Works with production teams, marketing, and management to meet orders
Head of Human Resources	Establishing rules, KPIs, and discipline in a new division	Works with all divisions to monitor attendance and enforce SOPs
Head of Finance	Preparing reports, managing accounts payable/receivable, and aligning financial data.	Coordinates with purchasing, warehouse, payroll, and marketing for accurate records
Label Printing Production Manager	Managing complex printing processes with varying materials and colours	Coordinates with marketing for orders and the warehouse for finished goods
Woven Production Manager	Managing made-to-order woven label production with quality checks	Coordinates with marketing for orders, the warehouse for delivery, and clients for approvals
Woven Machine Operator (1)	Running production, monitoring machines, and ensuring quality	Coordinates with the finishing division for product flow

Woven Machine Operator (2)	Running production, threading yarn, and inputting data into machines	Coordinates with the finishing division for product flow
Front Office	Handling diverse customer demands and custom orders	Coordinates with design, production, and warehouse teams
Admin Marketplace	Handling online customer chats, processing orders, and creating SPKs	Coordinates with design, production, and the Instagram team for content/testimonials
Finishing Operator	Ensuring final quality through cutting, laminating, and spot UV	Coordinates with printing and marketing for order specifications
Offset Printing Production Manager	Overseeing end-to-end printing from pre-press to finishing	Coordinates with design, marketing, and customers for approval
Printing Machine Operator	Operating multiple printing machines with setup and adjustments	Coordinates with the production head and other operators for continuity

As shown in Table 12 and Table 13, these task characteristics provide a grounded view of how company members carry out their roles in practice. Such detail not only contextualises the original TTF dimensions but also surfaces elaborated aspects that reflect the realities of SMEs undergoing DT. While task characteristics explain what and how members perform their roles, the TTF framework also emphasises the importance of technology characteristics in shaping fit. The following tables, therefore, examine technology characteristics, showing how members perceive and interact with the digital systems and tools that shape their workflows.

Table 14. Technology Characteristics – Company Y

Tool / Technology	Key Characteristics
Notion	Centralised project & workflow management, task assignment, KPI/OKR tracking, timeline visibility
Trello	Workflow visualisation and task coordination (earlier use, limited compared to Notion)
Zahir	Financial data structuring, multi-department access (finance, warehouse, sales, production)
Google Drive & Spreadsheet	Cloud-based file storage, reporting, production tracking, and inventory management
Jubelio	Integrated sales & inventory synchronisation across marketplaces and offline stores
GajiHub	Automated attendance and payroll via a location-based system
Marketplaces (Shopee, Tokopedia, Lazada)	E-commerce scalability, live sales features, promotional tools
Social Media (TikTok, Instagram)	Digital engagement, content promotion, live streaming sales, and ads
Website	Owned digital platform, brand exclusivity, international reach

AI/Design Tools (Adobe, CapCut, Corel, VN)	Creative production, design automation, and video editing flexibility
Telegram	Real-time communication, file sharing, QC reporting and archiving

Table 15. Technology Characteristics – Company Z

Tool / Technology	Key Characteristics
New Production Machines (Woven, Label Printing, Offset, Laminating)	Digitally enabled machines, automated label production, 59,000+ thread colour database, repeat order efficiency, reduced manual records, improved time accuracy.
Custom-built Finance Application	Automated invoicing and financial tracking, tailored for the made-to-order model, integrated with accounts.
Trello	Workflow visualisation, collaboration, recruitment, and task management.
Talenta Payroll & Fingerprint Attendance System	Automated payroll and attendance tracking, integrated with HR operations.
Google Sheets	Cloud-based linked sheets for production reporting, order tracking, and inventory management.
Social Media (Instagram, Facebook, TikTok, YouTube)	Branding and engagement platforms are used for content promotion, podcasts, educational media, and ads.
WhatsApp Business	Customer interaction tool with a catalogue, quick replies, automated responses, and integrated with social media leads.
Telegram	Real-time communication, file sharing, and quality control reporting.
AI/Design Tools (Adobe, Corel Draw)	Creative production, design mock-ups, and marketing content generation.
Google Ads	Digital advertising platform; enhances visibility and supports lead generation.
Mekari (CRM)	Customer relationship management integrates chatbot, agent assignment, and order flow tracking.
Website	Owned a digital platform for branding and customer acquisition.

As shown in Table 14 and Table 15, these technology characteristics illustrate the range of digital tools and systems adopted by Company Y and Company Z. The tables highlight how various systems, including production, finance, sales, marketing, HR, and other departmental platforms, are embedded in daily operations. These tools not only enhance efficiency and coordination across departments but also provide the foundation for evaluating task–technology fit in this study.

In sum, the task and technology characteristics of both Company Y and Company Z demonstrate how SMEs undergoing DT operate in complex, evolving environments. Task characteristics highlight the varying degrees of job title, non-

routineness, interdependence, and additional phenomena emerging from the data, while technology characteristics reveal the selective adoption of digital tools across functions. Together, these findings emphasise that DT is not only about the tools in place but also about how they align with the nature of tasks within each company. This alignment is further explored in the analysis of the Task–Technology Fit dimensions presented in the next section, which provides a structured lens for assessing how technologies support, constrain, or reshape task execution in these SMEs.

4.2.4 Emergence and Transformation of Fit in Company Y and Company Z

Building on Goodhue and Thompson's (1995) conceptualisation of TTF, this study elaborates the fit across the case through eight dimensions: data quality, locatability, authorisation, compatibility, timeliness, reliability, ease of use, and relationship. The analysis highlights continuous processes of negotiation and adjustment. The following sections illustrate how fit emerges, adapts, and transforms, and how it changes over time within these dimensions, supported by empirical evidence from Companies Y and Z.

4.2.4.1 Fit in Company Y

Firstly, the dimension of data quality showed a clear trajectory of change. Initially, manual warehouse recording created negative stock and mismatches between reported and actual goods. The adoption of Jubilio resolved these issues by ensuring consistency, especially when integrated with Zahir. As the Head of Finance explained, *"When using Jubilio, this problem was solved very well, it's more organized, there are no negative stocks, there's never a discrepancy between the data and the goods in the warehouse or the data in Jubilio and Zahir."* This evolution illustrates how fit emerged through integration and alignment across systems, while partial gaps remained when manual checks were still necessary. As the Head of Warehouse said, *"we still need some manual checks to adjust the inventory in both systems to ensure they match."* Thus, data quality was not a fixed state but improved and renegotiated as systems evolved.

Secondly, locatability also reflected a dynamic shift. Early digital platforms functioned only as static databases, limiting access to a few individuals. The adoption of Notion enabled more structured and accessible information, improving team-wide tracking. The Head of Marketing highlighted, *"(previously) We still used other digital*

platforms, where its function was less effective, it could only serve as a database, and there was no tracking supervision either, so only a few people from my team could benefit from it, not everyone. So, I feel it's really structured now." This shows that the locatability of information evolved over time, moving from restricted and fragmented access to broader organisational visibility and coordination.

Thirdly, shifts in authorisation practices revealed further adaptability in fit. Attendance management initially relied on face recognition systems, which were perceived as inflexible and inconvenient for employees. The transition to Gajihub introduced location-based attendance, simplifying authorisation while enhancing managerial control. As the Head of Finance explained, *"In the previous software, attendance had to be done through face recognition… so we finally switched to a software called Gajihub, where attendance can be done just through location."* This illustrates how authorisation processes are adapted to balance ease of use, accuracy, and control, showing fit as a dynamic outcome of organisational choice.

Further, compatibility emerged as one of the most dynamic dimensions. The CEO highlighted the company's need for flexibility during shifting digital platforms, emphasising that, *"If we aren't flexible, we won't survive. Changes are rapid and massive, with sales platforms constantly evolving, new platforms emerge, and some shut down suddenly."* The Head of Sales described a journey from reliance on Excel and manual processes to multi-platform integration with platforms such as Shopee, Lazada, Tokopedia, and TikTok Shop. Meanwhile, the Head of Marketing noted that not all platforms fit organisational needs, and trial-and-error was necessary. As she said, *"Sometimes there are digital platforms that don't support what we actually need. So, there are limitations… I got a lot of info from friends to use this and that platform, but after I tried it, it just didn't fit."* The HR department confirmed this adaptability by citing the annual revision of KPIs to align with evolving tools. These examples illustrate that compatibility was continuously tested, adjusted, and realigned, rather than achieved once and for all.

Fifthly, the alignment between tasks and timeliness improved significantly with digital adoption but remained subject to ongoing adaptation. Initially, mobility and deadlines created bottlenecks, yet platforms like Notion and Trello later streamlined reporting (CEO). The Head of Sales emphasised resilience by adopting backup

strategies to avoid delays, stating, *"In case, if a platform or marketplace shuts down, we wouldn't know. So, we still have a backup on the Company Y website. Like the case of TikTok Live sales being suddenly stopped by the government…"* Marketing and HR also benefited from digital scheduling and recruitment tools, while warehouse operations scaled from 100 to 700 orders daily (Head of Warehouse). These cases highlight timeliness as an evolving fit, requiring continuous adaptation to both internal needs and external disruptions.

Then, reliability appeared especially unstable, as external changes frequently disrupted fit. Third-party updates often changed workflows, as the CEO described: *"Third parties… suddenly change their systems, like updating software from version 1.0 to 2.0, changing the user interface, and even the user experience, thus altering the workflow."* The CEO also gave an example with the finance platform Zahir: initially, they used Zahir; later, updates made it no longer fit their needs, so they switched to another platform; and when that platform updated again, they returned to Zahir, as the current version fit their needs once more. The Head of Sales reported significant revenue losses due to the government ban on TikTok Live. At the same time, the Head of Finance acknowledged that location-based attendance introduced new dependencies on internet connectivity. HR and production leaders further highlighted the need for ongoing testing and tool adjustments. Collectively, these accounts show that the reliability of fit was never guaranteed, but negotiated through diversification, workarounds, and organisational resilience.

Seventhly, the process of achieving ease of use and staff adaptation progressed gradually. The CEO noted the challenge of shifting employees from manual to digital tasks, remarking, *"The biggest challenge is approaching our team to get them used to and comfortable with digital technology… Some tasks that were manual before now involve digital elements, which means stepping out of their comfort zones."* Age-related differences also shaped this trajectory: younger employees adapted quickly, while older employees required additional training (HR). The Head of Warehouse confirmed that initial resistance was overcome through repeated orientation sessions, though full adaptation took several months. These examples demonstrate that ease of use was not an inherent property of technology but emerged progressively through learning, training, and adjustment.

Lastly, the relational dimension revealed trade-offs between efficiency and social interaction. While integrated digital systems reduced shipment errors and improved accuracy (Head of Warehouse), they also weakened interpersonal communication. The Head of Finance noted, *"The challenge is more about communication… because with this system, we communicate less because it's digitized."* Similarly, the Head of Warehouse observed, *"The most noticeable negative impact might be more on the social aspect. Because now everything is online, so there's no need for interaction… I think that could be a downside."* These accounts illustrate that while technical fit improved, relational fit sometimes declined, demonstrating the multidimensional and evolving nature of TTF.

4.2.4.2 Fit in Company Z

Firstly, in Company Z, data quality underwent a significant transformation as digital tools replaced informal and unclear practices. For example, customer communication was previously distributed across personal WhatsApp accounts, leaving no centralised records. With the adoption of Makari CRM, all chats became traceable and assignable, thus enhancing accountability and transparency. As one Digital Marketing manager observed, *"Previously, it was sent to the salespersons' personal numbers. So, how many chats come in each month, and how they are handled? That, we never know. But now… we track all of that."* Similarly, production and HR processes shifted from conventional reporting to digital tracking and KPI-based evaluations, making employee performance more visible (Head of Operations, HR). These changes show that data quality was not static but improved gradually as tools were introduced and integrated into core business processes.

Secondly, the ability to locate information changed drastically with the transition from manual to digital archiving systems. In the woven production division, records of colour codes once required time-consuming searches, described as *"like finding a needle in a haystack."* With the introduction of specialised software, nearly 59,000 files are now digitally stored and instantly accessible. As the Woven Production Manager explained: *"From the beginning, it has never been lost. Since the start of woven production with colour code 0001, we now have nearly 59,000 files."* This evolution demonstrates how digital adoption reshaped locatability, moving from inefficiency and uncertainty to rapid, accurate access to historical data.

Thirdly, authorisation practices also showed a dynamic trajectory, particularly as Company Z formalised its HR functions. Unlike many SMEs in the manufacturing sector, which specialise in cloth accessorising and labelling and lack structured HR divisions, Company Z established a dedicated HR unit two years ago. This allowed the gradual integration of digital payroll, KPI monitoring, and performance evaluation systems. As the HR manager noted, *"The SMEs in the labelling industry are below that. Not to mention, they may not even have HR in their company. Even though we've had HR for about two years, there's still a lot of improvement needed."* Thus, authorisation fit emerged through institutionalisation, shifting from informal oversight to structured and digitally supported mechanisms.

Further, compatibility in Company Z was shaped by both financial pragmatism and proactive technological adoption. For instance, the CEO highlighted careful investment choices between Chinese and European machines based on depreciation and long-term sustainability: *"Buying a machine is quite an investment… So, we have to calculate carefully."* Additionally, the Head of Sales emphasised a proactive stance, insisting on being a *"maker"* by adopting digital tools early, even before competitors. Marketing decisions also reflected evolving compatibility, with experimentation across platforms before prioritising Meta ads as the most effective. Furthermore, HR transitioned from family-based practices to performance-based systems, while Finance shifted from third-party software to custom-built applications better suited to its made-to-order model. Together, these examples show compatibility as a negotiated and evolving fit shaped by both external conditions and internal strategies.

Fifthly, timeliness improved significantly as Company Z transitioned from offline, manual processes to digital platforms and automation. Customer acquisition, once dependent on slow word of mouth, accelerated through Meta ads and Instagram campaigns (CEO, Digital Marketing, Head of Sales). Production timelines also shortened dramatically with advanced machinery, reducing workloads from 500 hours to 100–200 hours (Woven Production Manager). In HR, platforms such as Google Workspace and Microsoft To Do streamlined task tracking, while Finance reduced delays by linking invoicing directly with accounts. As the Head of Operations explained, *"Previously, they could finish 1000 sheets per day manually, but with the new machine, it could produce 2000 sheets, twice as much as before."* These shifts

highlight how timeliness was dynamically reshaped through technological integration across multiple functions.

Then, reliability in Company Z remained a moving target, shaped by technological choices, workforce readiness, and external forces. European machines were valued for their durability and consistent performance, though they were costly and dependent on imported parts (CEO). At the same time, new platforms introduced restrictions that required adaptation, with older employees struggling more than younger staff (Digital Marketing). Reliability was also affected by competitors copying digital branding strategies (Head of Sales), integration gaps between divisions (Head of Finance), and technical limits such as machine colour capacity (Woven Production Manager). These examples demonstrate that reliability was not stable but continuously negotiated and strengthened through backup systems, adaptation, and training.

Seventhly, ease of use emerged only after phases of resistance, training, and adaptation. Operators adapted more easily to European machines thanks to detailed manuals, whereas digital marketing staff initially struggled with CRM until they experienced its benefits. As one staff member stated: *"At the beginning… there were some protests because it was tiring… But when we have it, we can evaluate which staff can achieve… which are not active."* Resistance was not limited to staff; the Head of Sales described initial difficulty convincing senior management of online strategies until sales figures proved their worth. Likewise, operators needed training and incentives to adapt to touchscreen-based machines. These accounts prove that ease was socially and managerially constructed over time, rather than inherent in the technologies themselves.

Lastly, DT reshaped relational dynamics within and beyond Company Z. Externally, maintaining long-term trust with customers was prioritised over short-term wins, as the CEO explained: *"If we have a misunderstanding with a customer and win, but we will lose that one customer. So, we just have to admit defeat."* Sales strategies also expanded by building ties with smaller yet reputable brands to strengthen the reputation. Internally, HR digitisation triggered cultural shifts from a family-style to a professionalised management style, creating culture shock for employees. Meanwhile, competitors unexpectedly became collaborators, sharing knowledge about new

machinery (Head of Operations). These cases highlight how relational fit evolved, often balancing efficiency gains with social adaptation and external collaboration.

To sum up, across these eight dimensions, the findings demonstrate that TTF is not a static condition but a dynamic process shaped by Company Y and Company Z through adaptation, trial-and-error, external disruptions, and evolving needs. Fit develops gradually, is continuously re-negotiated, and at times shifts backwards before stabilising. As such, the evidence supports the view that TTF should be understood as a dynamic phenomenon, characterised by adaptation and ongoing adjustment, rather than as a once-achieved alignment.

4.3 Mechanism of Enhancing SMEs Performance: A Thematic Analysis

Using Braun and Clarke's (2006) thematic analysis approach on the cases of Company Y and Company Z, several sub-themes and themes emerge that represent the mechanisms through which these SMEs' DT efforts translate into enhanced performance. The analysis follows the six stages of thematic analysis: familiarising with the data, generating preliminary codes, exploring potential themes, evaluating themes, clarifying and labelling themes**,** and developing the final report (Braun and Clarke, 2006). As this research adopts a parallel multiple case study design, thematic analysis is conducted separately for Company Y and Company Z (Tellis, 1997; Pauwels and Matthyssens, 2004; Yin, 2018). The themes were developed by grouping related codes and sub-themes, and each is supported by evidence from the cases. Each theme aligns with changes in processes, structure, culture, or resources, which are key dimensions reflecting the properties of the target entity and the extent of change within the DT process. Together, they illustrate how Company Y and Company Z leverage DT to enhance performance.

Table 16. Thematic Analysis of Company Y

Sub-Themes	Themes	Description
Deliberate Tech Fit	Leadership-Orchestrated Strategic Tech Selection	Leadership-driven decision-making and support mechanisms that ensure technology choices align with organisational goals.
Dialogic Leadership		
Action-Oriented Support		
Navigating Unpredictable Algorithms	Tool Adaptation and Digital Disruption	Organisational responses to unpredictable digital tools and the ability to transition across platforms when disruptions occur.
Adaptive Platform Transition		

Digital Systems Dependence	Hybrid Synchronisation	Balancing reliance on multiple digital systems while addressing integration challenges and technological gaps.
Multiple Platforms		
Gaps in Technology		
Flexibility and Adaptability	Fusion Digital Agility	The integration of flexibility, efficiency, and workforce development to strengthen organisational agility in digital environments.
Operational Efficiency and Systemisation		
Employee Development and Productivity		

Table 17. Thematic Analysis of Company Z

Sub-Themes	Themes	Description
Strategic Tech Investment	Leadership-Orchestrated Strategic Tech Selection	Leadership-driven technology adoption supported by strategic investment and active involvement to encourage organisational change.
Hands-On Leadership		
Incentivising Change Adoption		
Data-Driven Management	Tool Adaptation and Digital Disruption	Organisational use of data and digital branding to adapt to technological disruptions and market changes.
Digital Marketing and Branding		
Growing Professionalism	Hybrid Synchronisation	Efforts to integrate workflows, digital tools, and employee professionalism while addressing technological gaps and coordination challenges.
Integrated Workflow		
Digital Machines		
Gaps in Technology	Fusion Digital Agility Versatility Production	The ability to deliver diverse and customised production solutions to meet varied client demands.
Comprehensive Production Range		
Customised Production Solutions		
Consultative Growth Partnership	Client-Centric	Building strong client relationships through partnership, prioritisation, and transparent communication.
Client-First Commitment		
Transparent Expectation Management		

In line with Braun and Clarke's (2006) first stage of thematic analysis, the process began with familiarising with the data, which was undertaken through the transcription of 36 interviews from Company Y and Company Z. The offline interviews were recorded using a phone, while the online interviews were recorded through Microsoft Teams. 25 interviews were conducted offline, while 11 were conducted online, as online meetings provided a practical solution when participants were unavailable for in-person interviews. All interviews were conducted in the Indonesian language. The recordings were first transcribed automatically using a tool called Speak Ai, but the outputs required extensive editing. The transcripts were often inaccurate

when participants used local dialects or slang, which differed from formal Indonesian. To address this, the researcher carefully reviewed all 36 transcripts, listening to the recordings to allow time for corrections. This process not only ensured accuracy but also increased the researcher's familiarity with the dataset. It further created opportunities for reflection, allowing the researcher to record early thoughts, ideas, and impressions immediately after editing each transcript. The transcription was carried out separately for each company; 18 interviews from Company Y were transcribed first, followed by 16 interviews from Company Z.

The second stage of thematic analysis, generating preliminary codes (Braun and Clarke, 2006), was conducted in NVivo. Preliminary coding produced 50 codes across the two cases. For Company Y, the codes are: *ROI focus, sustainability, dual approach, skill growth, proactive learning, hands-on leadership, continuous testing, content adjustment, rapid pivot, budget reallocation, workflow alignment, tool reliance, platform diversification, account segmentation, manual reconciliation, stock checking, rapid response, quick adjustment, process tracking, system integration, continuous training, and AI training*. For Company Z, the codes are: *producer identity, tech upgrade, step-by-step training, lean staffing, learning incentives, evidence buy-in, CRM adoption, data visibility, multichannel branding, educational content, performance pay, role transparency, handover flow, Leadtime control, productivity boost, speed increase, partial integration, manual backup, capacity expansion, equipment breadth, design alternatives, quality fix, brand scaling, inbound growth, customer obsession, order acceptance, scope control, and clear limits*. The codes were derived from all transcripts. The researcher read the transcripts multiple times and reviewed them carefully to ensure the codes were accurate.

The third stage of thematic analysis involves exploring potential themes (Braun and Clarke, 2006). The codes were reviewed to assess whether they could be grouped into broader themes. During this process, attention was given to similarities, differences, and conceptual links across the codes to ensure meaningful categorisation. By the end of this stage, the codes had been organised into broader themes that aligned with the objectives of this study. Then, the fourth stage of thematic analysis involves evaluating themes (Braun and Clarke, 2006). The data linked with each theme, previously coded in NVivo, were reviewed, refined, and further developed. All material relating to each theme was re-examined, with particular attention given to whether the coding was

consistent with the emerging theme. The review also considered the coherence of the themes, the extent to which the data supported them, potential redundancies between themes, and the identification of any sub-themes.

The fifth stage of thematic analysis focuses on clarifying and labelling themes, during which the researcher seeks to capture the core meaning of each theme (Braun and Clarke, 2006). For example, in Company Y, *digital systems dependence, multiple platforms, and gaps in technology* were combined into the theme *Hybrid Synchronisation*. In Company Z, *consultative growth partnership, client-first commitment, and transparent expectation management* were combined into the theme *Client-Centric*. The final thematic tables (Tables 16 and 17) present the themes and sub-themes identified in this study, along with their interrelationships. Then, the final stage of thematic analysis involves developing the final report (Braun and Clarke, 2006). The main themes and sub-themes outlined in Tables 16 and 17 provide the foundation for the findings section. In the following chapter, each theme from Company Y and Company Z is elaborated in detail, supported by illustrative quotations from participants. A more detailed description of the coding process, along with the complete set of participant quotations, is presented in the appendices.

4.3.1 Themes Identified in Company Y

In the thematic analysis process of Company Y, several sub-themes were generated, which then formed four themes, as shown in Table 18: Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid Synchronisation, and Fusion Digital Agility.

Table 18. Themes of Company Y

Sub-themes	Themes
Deliberate Tech Fit	Leadership-Orchestrated Strategic Tech Selection
Dialogic Leadership	
Action-Oriented Support	
Navigating Unpredictable Algorithms	Tool Adaptation and Digital Disruption
Adaptive Platform Transition	
Digital Systems Dependence	Hybrid Synchronisation
Multiple Platforms	
Gaps in Technology	

Flexibility and Adaptability	
Operational Efficiency and Systemisation	Fusion Digital Agility
Employee Development and Productivity	

4.3.1.1 Theme 1: Leadership-Orchestrated Strategic Tech Selection

This theme captures the central role of leadership in shaping Company Y's DT by balancing strategic decision-making and collaborative engagement. Multiple sub-themes, such as *deliberate tech fit, dialogic leadership, and action-oriented support,* were grouped here. Leaders at Company Y do not simply dictate change; they actively participate in it, guide it with a clear strategic vision, and support it with a responsive, team-oriented approach. Digital tools are adopted through careful consideration of operational fit, financial return, and team readiness, rather than following trends. At the same time, leadership cultivates a collaborative culture in which employees are encouraged to contribute ideas, provide feedback, and participate in refining digital practices. This synergy between top-down direction and bottom-up initiative helps embed DT deeply into daily operations. Leadership not only defines the strategic direction but also ensures alignment through open dialogue, ongoing upskilling, and hands-on support, creating a transformation process that is both intentional and inclusive.

The CEO and Head of Finance at Company Y emphasise that technology selection is guided by business sense and practicality. For example, tools are reviewed annually, and those that "don't deliver sufficient value" are replaced. The Head of Finance notes that investment decisions must "align with our financial constraints and offer strong ROI," while the CEO adds that decisions focus on "long-term sustainability" rather than trends. These statements reflect a deliberate, strategic approach to technology adoption, where digital investments are examined not only for cost-effectiveness but also for their integration potential and usefulness to the team. At the same time, leadership at Company Y promotes a culture of continuous learning and adaptability. The CEO pushes staff to engage in self-learning, attend webinars, and explore new tools, stating that without upskilling, "we'll be left behind." The HR manager supports this by updating SOPs to reflect new tools and embedding skill development into daily operations. This top-down encouragement of digital literacy

ensures that employees are not just expected to adapt, but are actively prepared and supported to do so.

Crucially, leaders lead by example. Both the CEO and Head of Sales personally test tools before wider implementation, ensuring new systems "match our needs" in real use cases. They engage directly in troubleshooting, training, and problem-solving. One employee recalls how her manager facilitated her external training immediately, aligning with the company's vision that everyone should "operate on the same level." This hands-on leadership ensures that staff feel confident, supported, and heard. In parallel, collaboration is deeply embedded in decision-making. The CEO describes their process as a "mix of top-down and bottom-up," inviting input from across levels. The Art Director shares how she conducts "validation with the CEO" to align on campaign direction and translate executive goals into actionable team tasks. This two-way feedback loop, where strategic intent meets operational insight, helps ensure that digital initiatives remain practical, relevant, and broadly accepted.

In short, Company Y's DT is not just driven from the top but co-created across levels. Leadership combines strategic foresight with an inclusive and responsive management style. This integration of orchestrated strategy and collaborative execution makes digital change both sustainable and deeply rooted in the company's daily culture.

4.3.1.2 Theme 2: Tool Adaptation and Digital Disruption

This theme summarises Company Y's ability to adapt to the unstable digital marketplace continually. Two sub-themes, such as *navigating unpredictable algorithms and adaptive platform transition,* were grouped here. The company operates in an environment where platform algorithms shift unpredictably and digital channels can emerge or disappear overnight. Rather than being destabilised by these changes, Company Y treats them as opportunities to innovate. The team maintains a flexible mindset and a habit of rapid experimentation, adapting marketing tactics and sales strategies whenever the online ecosystem shifts. When digital disruptions occur, such as a TikTok ban or sudden algorithm changes, Company Y is quick to pivot to alternative platforms and approaches. This proactive adaptation not only minimises downtime and losses but also reflects a culture that embraces change as a constant in the digital era.

The marketing team's experience with social media algorithms illustrates this adaptive ethos. The Head of Marketing emphasises the need to adjust because digital

algorithms are “unpredictable continuously”: a strategy that succeeds one day might fail the next. He notes that whether it is Shopee, TikTok, or Instagram, they “constantly test and iterate” as algorithms evolve. A member of the social media team adds that TikTok’s algorithm once favoured certain video formats but later shifted, prompting the team to revise its content strategy monthly to sustain engagement. These insights show how Company Y approaches digital channels with agility, monitors performance metrics, and is ready to adjust campaigns frequently. The willingness to engage in trial-and-error indicates a comfort with experimentation, which is crucial for staying effective amid digital disruption.

Company Y’s resilience was tested when TikTok Shop was suddenly banned in its market. The response was immediate and strategic. According to the Head of Sales, the team “prepared backup strategies” in advance and swiftly moved customers to Shopee Live, ensuring the live commerce operations could continue with minimal interruption. The Head of Finance describes how advertising budgets were rapidly reallocated from TikTok to other platforms, “so we didn't lose revenue momentum”. This quick pivot to alternative sales channels and rebalancing of resources emphasises a high level of organisational agility. Rather than lamenting the loss of one channel, Company Y leveraged its multi-platform presence to absorb the shock. The operational resilience demonstrated here is a direct result of prior planning and a flexible mindset: the company had contingency plans, and the team was mentally prepared to execute them. In essence, Tool Adaptation and Digital Disruption as a theme shows that Company Y survives and even thrives amid digital turbulence by being agile, experimental, and ready to redirect its efforts whenever the digital landscape changes.

4.3.1.3 Theme 3: Hybrid Synchronisation

This theme describes how Company Y synchronises its operations through a hybrid of digital and manual systems, ensuring smooth coordination across the organisation. Some sub-themes, such as *digital system dependence, multiple platforms, and gaps in technology,* were grouped here. The company has become heavily dependent on a range of digital tools to manage tasks across both in-office and remote contexts. Cloud-based collaboration platforms enable asynchronous work, allowing team members to contribute and monitor progress from anywhere. At the same time, Company Y runs on multiple online platforms for sales and marketing, diversifying its digital presence to reach customers through various channels. This multi-platform

approach mitigates the risk of putting all eggs in one basket. However, reliance on numerous tools and platforms also exposes integration gaps; some systems do not work perfectly, requiring manual checks and data reconciliation. Despite these challenges, the company adeptly blends its digital and manual practices into a cohesive workflow. The result is a largely digital operating model that preserves sufficient oversight to cover technology's limitations, exemplifying a hybrid mode of working.

Daily operations at Company Y are fundamentally dependent on coordination through digital systems. The CEO explains that with some team members frequently out of the office, "the solution lies in digital tools" to unify workflows and track tasks. Digital platforms are used to assign responsibilities and monitor execution in real time, making it "possible to maintain our operational speed" even when people are not physically together. The Head of Marketing confirms that without these tools, the current pace of work would be impossible, though they do keep backups so that if one tool fails, there are alternatives. This indicates that remote and distributed work is fully synchronised through digital means, and contingency planning ensures that work continues smoothly despite the failure of any single system. The dependency on digital infrastructure presents both opportunities and risks, which Company Y manages through careful preparation.

In addition, the company employs a multi-platform strategy for its external operations. The Head of Sales notes that they "can't rely on just one platform" for online sales; they use TikTok, Shopee, Lazada, and even their own website, each contributing in different ways to the business. This diversification paid off when TikTok Shop became unavailable; having other channels like Shopee Live ready meant the sales team could quickly shift focus. The marketing department similarly operates several Instagram accounts; for branding, product catalogues, and audience engagement, so that algorithm changes or policy shifts on one account do not entirely undermine their outreach efforts. By synchronising efforts across multiple online places, Company Y spreads risk and maintains a broad market presence. The coordination of content and inventory across these platforms is aided by digital tools such as the omnichannel stock system, Jubelio, though it requires diligent management.

Cracks in full automation do exist, highlighting the "gaps in technology" that necessitate manual intervention. For instance, a Retail Growth team member shares that

sales recorded in the store's system do not seamlessly integrate with the finance software, so she must manually reconcile the data. Likewise, the Head of Warehouse notes that his team still performs "manual double-checks" on inventory because real-time updates in the digital system can lag, and over-reliance could risk stock count errors. These examples show that while Company Y has adopted many digital solutions, it remains aware of its limitations and retains parallel manual processes as safeguards. Despite these challenges, what stands out is how effectively the company synchronises its predominantly digital workflow with necessary manual workflows. By leveraging digital tools for most tasks and inserting human oversight where needed, Company Y keeps its operations running smoothly. Hybrid Synchronisation, therefore, captures the balance the company strikes between embracing digital systems for efficiency and maintaining enough manual control to ensure reliability and accuracy.

4.3.1.4 Theme 4: Fusion Digital Agility

The Fusion Digital Agility theme reflects how Company Y blends digital technology use with an agile organisational mindset. Some sub-themes, such as *flexibility and adaptability, operational efficiency and systemisation, and employee development and productivity,* were grouped here. It signifies that the company's DT is not just about installing new tools, but about using them to become faster, more responsive, and more efficient across all aspects of work. In practice, this means the company can swiftly adjust to any changes in its environment by leveraging its digital infrastructure. Workflows have been streamlined, information flows freely, and tasks are coordinated in real-time, allowing the business to react and iterate quickly. Moreover, Company Y places strong emphasis on continuously developing employees' capabilities so that the workforce is digitally agile: employees are trained and comfortable with new technologies, enabling the organisation to implement changes without lengthy skill gaps. In essence, digital tools and agile practices are fused together, resulting in a company that is both high-tech and highly adaptable.

A core aspect of this agility is the company's flexibility in the face of rapid change. The CEO describes the digital marketplace as one of "rapid and massive" changes, where new sales platforms can appear or vanish suddenly. He expects the team to "always be ready to move" when such shifts occur. An example he gives is the TikTok Shop ban: rather than seeing this as a crisis, the company "immediately shifted our promotions to Shopee and Lazada" to keep sales on track. The Head of Marketing

echoes that adapting quickly is “crucial” and explains that they monitor market trends and customer behaviour daily to catch any signal that strategies need to change. This real-time vigilance and willingness to pivot demonstrate how digital agility is embedded in their operations. Change is met with prompt action, supported by the digital channels they have in place. The fusion here is evident: without digital platforms and data, such rapid shifts would be difficult to make, and without an agile mindset, the tools themselves would not be utilised to their full potential. Company Y combines both, enabling swift strategic pivots.

Another side of Fusion Digital Agility is the drive for operational efficiency through digital systems. The marketing team member notes that using a shared platform like Notion to track processes and timelines has eliminated “unnecessary delays” and reduced the need for additional meetings, since updates are visible in real time. Similarly, the Head of Production discusses how integrating various software creates alignment across departments, helping them “maintain efficiency” despite not having a perfect all-in-one system. These insights show that digital tools are not adopted for their own sake, but to streamline coordination and speed up workflows. By systematising tasks and information flows, the company reduces downtime and responds faster to issues such as low inventory or production bottlenecks. In short, DT has been leveraged to eliminate redundancies and make the company more agile.

Importantly, Company Y recognises that true agility comes from people as much as technology. Continuous employee development ensures the staff can fully leverage new digital tools. The HR department and creative teams invest heavily in training. Employees are advised to “learn new systems continuously” and become comfortable using multiple platforms. Regular internal training sessions and even external workshops, such as those on AI-powered design tools, are organised so that the team “remains efficient and doesn’t get stuck using outdated methods”. By upskilling employees, the company closes the gap between technological change and human capability. This ongoing development of digital skills means that when a new tool or process is introduced, the workforce can integrate it into their work immediately, sustaining high productivity. The evidence of this is clear in how employees handle change with minimal direct supervision, which itself is a product of the learning-oriented culture. Together, these practices illustrate Fusion Digital Agility: the

combining of advanced tools, streamlined processes, and a continuously learning workforce, all coming together to give Company Y a competitive edge in adaptability.

In conclusion, the four themes represent the mechanisms through which Company Y enhances its performance by leveraging DT: Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid and Synchronisation, and Fusion Digital Agility.

4.3.2 Themes Identified in Company Z

In the thematic analysis process of Company Z, several sub-themes were generated, which then formed five themes, as shown in Table 19: Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid Synchronisation, Versatility Production, and Client-Centric.

Table 19. Themes of Company Z

Sub-themes	Themes
Strategic Tech Investment	Leadership-Orchestrated Strategic Tech Selection
Hands-On Leadership	
Incentivising Change Adoption	
Data-Driven Management	Tool Adaptation and Digital Disruption
Digital Marketing and Branding	
Growing Professionalism	Hybrid Synchronisation
Integrated Workflow	
Digital Machines	
Gaps in Technology	
Comprehensive Production Range	Versatility Production
Customised Production Solutions	
Consultative Growth Partnership	Client-Centric
Client-First Commitment	
Transparent Expectation Management	

4.3.2.1 Theme 1: Leadership-Orchestrated Strategic Tech Selection

This theme captures the proactive role of Company Z's leadership in directing DT through thoughtful technology selection, implementation, and internal alignment. Multiple sub-themes, such as *strategic tech investment, hands-on leadership, and*

incentivising change adoption, were grouped here. Leaders at Company Z did not follow trends blindly but chose tools that addressed their specific operational gaps, such as quality control issues and production delays. This leadership was not limited to selecting tools but extended into the implementation phase, where leaders personally ensured that systems were adopted and internalised by the team. The theme also includes how leaders actively managed employee resistance by incentivising learning and change, offering rewards and showcasing tangible outcomes to support adoption.

The CEO identified the company's technological shortcomings and acted swiftly to address them: *"My weakness was actually in technology... All this time, I was a middleman, consumers saw me as a broker, not as a producer."* This led to major strategic tech investments, including high-end machines from Switzerland and Germany. The Operational Manager affirmed this shift: *"In 2017, a machine arrived from overseas... using ultrasonic technology instead of heat. It's more advanced, especially in terms of quality."* These investments were not just about efficiency, but about transforming the nature of the company's operations. Leadership also ensured adoption did not stop at installation. The Operational Manager stated, *"When we bought new machines, I was the one taught by the machine seller, and then I taught all the employees in this company."* Similarly, the CEO emphasised minimal employee numbers and high capability: *"If I can handle the work myself, I do it."* These quotes show the hands-on leadership style that helped embed technology into daily routines.

Management also provided incentives to ensure the workforce adapted. The Operational Manager shared, *"Some staff resisted changes. They said: why not just use the old machines? I gave bonuses to those who were willing to learn."* This indicates that leadership did not assume alignment would happen organically; they actively managed behaviour change. The Sales Manager described generational resistance as well: *"There were debates with CEO because he didn't believe in online at first. But after online sales hit 200 million, he trusted me."* In both cases, incentives, whether financial or performance-based, were critical to gaining support.

Together, these practices show that leadership at Company Z operated at multiple levels: strategically selecting the right technologies, implementing them through personal involvement, and sustaining their use through motivational strategies.

This theme highlights how leadership was central to generating and maintaining alignment between tasks and technologies across the company.

4.3.2.2 Theme 2: Tool Adaptation and Digital Disruption

This theme reflects Company Z's agility in adapting to new digital tools and disruptive digital trends to enhance its operations. Two sub-themes, such as *data-driven management and digital marketing and branding,* were grouped here. Rather than relying on traditional manual methods, Company Z adopted data-driven tools and digital marketing platforms, transforming the way work was carried out. Tool adaptation refers to how Company Z continuously integrates new software and systems to improve decision-making and workflows. The "digital disruption" aspect highlights that the company navigated major shifts in how it reaches customers, for example, moving from door-to-door sales to online engagement, by leveraging emerging digital channels. In sum, the theme captures an organisational mindset of continuously updating processes through digital means, using data and new media to stay competitive.

One significant change was the adoption of a Customer Relationship Management (CRM) system to formalise and track sales activities. The Sales Manager explained, *"It all started with complaints about tracking work... the digital marketing team proposed CRM. Now, we can evaluate who performs and who needs coaching."*. This quote illustrates how data-driven management became part of the culture, and performance is now transparent and measurable, which was not possible before. In operations, manual logs have given way to digital tracking: *"We didn't have clear data before... now we track how long the machine runs, how much material is used, all using Google Sheets,"* according to the Operational Manager. Embracing simple digital tools for analytics shows adaptation of tasks to readily available technology, greatly improving oversight and planning.

At the same time, Company Z reinvented its marketing and branding through digital platforms. The Digital Marketing officer described how *"branding is now a process – from visibility to lead handling,"* involving the use of Meta ads, Instagram, and even podcasts to generate and nurture customer interest. The Sales Manager added that Instagram is used to educate customers about materials and their benefits, not just to showcase products. This marks a shift from static advertising to interactive, content-driven engagement. The CEO summed up the impact of this digital outreach: *"We used*

to go door to door. Now, customers come to us through our content. That's the power of DT.". These pieces of evidence show Company Z's ability to adapt tools and channels, adopting a CRM for internal coordination and social media for external reach, in response to new digital opportunities. Rather than being disrupted by changes in technology and consumer behaviour, the company leveraged these changes to its advantage. In doing so, it transformed workflows by making them data-centric and marketing strategies by making them digitally driven, demonstrating resilience and innovation in the face of a rapidly evolving digital landscape.

4.3.2.3 Theme 3: Hybrid Synchronisation

This theme describes how Company Z blends digital systems with manual processes to maintain cohesive operations and overcome resource constraints. Multiple sub-themes, such as *growing professionalism, integrated workflow, digital machines, and gaps in technology,* were grouped here. Instead of achieving a fully integrated, high-tech system all at once, the company practices hybrid synchronisation. It is a pragmatic mix of new digital tools and old-fashioned methods to ensure that work continues smoothly. This includes partial digital integration combined with manual coordination or backups to fill the gaps. Additionally, as the company grows, it is formalising and professionalising its management practices to better synchronise tasks across departments. In essence, the theme highlights that Company Z coordinates its activities through a hybrid approach, simultaneously modern and manual, as a deliberate strategy to maintain efficiency and consistency during its DT.

Company Z has not yet achieved a seamless end-to-end IT system, but it coordinates across teams by bridging digital and manual methods. The Operational Manager candidly stated, *"Currently, operations only use basic apps for input. Full system integration across divisions is still my goal."*. This reveals that while some processes are digitised, complete integration is pending. In the meantime, the company ensures synchronisation through supplementary practices. For example, even after implementing digital records, *"This data is also available in manual hardcopy as a backup,"* noted a front-office staff member. Keeping parallel paper records provides a safety net and cross-check, which is a very SME-oriented solution to technology gaps.

Furthermore, the workflow between departments has become more structured despite the use of a mix of tools. One production manager described the order handover:

"I receive SPKs (order forms) from marketing, then I process everything with an estimated lead time. After printing and cutting, we pass it to the warehouse.". This indicates an integrated workflow where digital order information flows through each division in a coordinated sequence. What used to be uncoordinated is now synchronised through clearly defined steps, even if a single unified software does not manage each step. Alongside these process changes, the company has been professionalising its structure to support fair and transparent management. Previously, family ties sometimes influenced pay and roles, but *"now, we've moved to a professional approach. Pay and evaluations are based on performance and skills, not family connections,"* explained the HR officer. The Operational Manager added that the new system *"makes the effectiveness and transparency of each staff member's role in the process visible."*. These quotes show that formal HR practices and performance tracking have been introduced, reducing informality. This cultural shift works alongside digital tools; together, they synchronise expectations and information across the organisation. In summary, at Company Z, Hybrid Synchronisation refers to achieving DT through a combination of partial technological solutions and human coordination. This approach ensures that, even without fully integrated technology, different parts of the company remain aligned and operationally efficient while a more robust digital system and structure gradually take shape.

4.3.2.4 Theme 4: Versatility in Production

This theme represents Company Z's broadening of its production capabilities through DT, enabling a high degree of versatility in what the company can produce and how it produces it. Two sub-themes, such as *comprehensive production range and customised production solutions,* were grouped here. Unlike typical SMEs that specialise in one area, Company Z invested in a comprehensive range of production technologies, from woven-label machines to printed-label presses and offset printing equipment, so that it can meet diverse client needs under one roof. This production versatility means the company can handle various product types and order sizes, and quickly adjust to special requirements. DT here is very tangible: by upgrading to a digital machine, the company not only increased its capacity and speed, but also its flexibility to customise products and maintain quality. In short, the theme highlights how technology investments expanded the company's task scope, making it far more versatile than before.

Company Z's machinery upgrades are a cornerstone of its transformation. The company dramatically expanded its equipment portfolio: *"Initially, we only had 4 woven machines; now we've added 3 more,"* noted the Head of Woven Production. Similar growth happened in other divisions; the Head of Label Printing reported having *"a lot of printing machines... especially the hot cut machines"* to meet demand. This extent of technology is unusual for an SME in this industry, as most SMEs focus on only one area. In contrast, Company Z built capability in *"all three areas comprehensively"*: woven labels, printed labels, and offset printing, which *"is rare for SMEs in this industry."*. By covering the full spectrum of label and packaging production, the company can serve as a one-stop shop.

Upgrading to advanced digital machines also brought significant improvements in efficiency and quality. After the new machines arrived, production times dropped dramatically; tasks that previously required hundreds of hours can now be completed in just a few hours. For example, with the addition of high-tech weaving machines, *"what used to take 500 hours now takes 100–200 hours,"* according to the Woven Production head. Quality issues were also resolved; the introduction of ultrasonic cutting technology meant that *"the results don't cause itching and are very smooth,"* as a production manager described. These outcomes show how strategic technology investments gave Company Z a versatile edge: they can switch processes or materials as needed while maintaining speed and quality. Moreover, versatility is not only about having many machines, but also about how they use them to tailor solutions. For instance, when a client requested a design with unusual colours, the team did analysis and offered alternatives rather than simply saying yes or no; they avoided ordering special threads impulsively, ensuring feasibility and client satisfaction. And when customers complained about a material causing discomfort, Company Z proactively *"bought an ultrasonic machine that solved the issue"*. This responsiveness is a direct result of having a wide range of technological options and the willingness to implement new solutions. In summary, Company Z's DT greatly extended its production range and agility. The company can handle more types of tasks than before, illustrating how investing in versatile technologies expands service offerings.

4.3.2.5 Theme 5: Client-Centric

The final theme centres on Company Z's deeply client-focused approach, which drives its service model and innovation. Multiple sub-themes, such as *consultative*

growth partnership, client-first commitment, and transparent expectation management, were grouped here. Client-centric innovation means clients' needs guide the company's DT and wants. Instead of pushing standard products, Company Z offers extensive consultation and adapts its processes to help clients, even small businesses, achieve their goals. This theme encompasses building customer partnerships, a customer-first commitment, and transparent expectation management. Company Z's use of technology and new practices is thus often motivated by enhancing customer experience and success. Ultimately, this client-centric approach has become a hallmark of the company's transformation, ensuring that technology is used not just for internal efficiency but to create better outcomes for the clients.

Company Z actively partners with its clients, resulting in mutual growth. The Sales Manager described how the company is willing to start from zero with new brands: *"I've managed to take on several small brands that have experienced rapid growth. These brands, which initially only ordered one roll, have now reached tens of thousands of rolls, and they continue to produce with us exclusively"*. This quote illustrates a consultative growth partnership: Company Z helped new clients scale up by providing guidance and reliable service, securing loyalty as those clients became successful. DT also played a role in this success, particularly in how the company attracts and interacts with clients. The CEO noted*, "We used to go door to door. Now, customers come to us through our content."* This indicates that their online presence and educational marketing attract clients. This inbound flow is *"the power of DT,"* showing that being visible and helpful online is a client-centric strategy that drives growth.

Once clients engage with Company Z, the company's ethos is never to say no and to go the extra mile to meet client needs. The CEO explained, *"We follow what the consumers want… whatever they ask for, we try to provide. If we can't, we research until we can."*. This attitude permeates the company. The Head of Offset Printing echoed, *"We never reject any customer orders... The important thing is that the customer gets the result."*. Even if fulfilling a request is challenging, the team either finds a way or innovates new solutions. There is also an element of honesty and expectation management in their client-centric approach. In cases where a request truly exceeds what their current technology can do, for example, a design that exceeds the colour capacity of their machines, the team does not simply promise and risk failure. Instead,

"We simply inform them that it's not possible... It's better to be clear about our machine's limitations rather than struggling," said the Head of Label Printing. By transparently communicating constraints and suggesting alternatives, Company Z maintains client trust and avoids compromising on quality.

All these practices demonstrate how client-first requests guide DT at Company Z. The company leverages new tools to serve clients better. By continuously adapting to customer feedback and requests, essentially letting client needs drive innovation, Company Z not only achieves higher customer satisfaction but also locks in long-term business. This theme demonstrates that focusing on the customer can amplify the benefits of technology: the value of any digital tool or process improvement is ultimately measured by how much it helps deliver what the client expects. Company Z's success in growing alongside its clients affirms that a client-centric approach can be a powerful engine of transformation and performance.

In conclusion, the five themes represent the mechanisms through which Company Z enhances its performance by leveraging DT: Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid and Synchronisation, Versatility in Production, and Client-Centric.

CHAPTER 5: DISCUSSION

This chapter presents the discussion of the study. The analysis will first focus on the mechanisms in Company Y and Company Z separately. It then continues with a cross-case analysis that provides a combined discussion. Further, the study seeks to explain how and why these patterns emerged within the two contexts. Based on this, the TTF framework will be modified, refined, or adapted to ensure a better fit between the theory and the empirical data, which also covers the theoretical implications of this study. Finally, the section highlights both theoretical and practical implications, considering practical applications and providing guidance for decision-making.

5.1 The Mechanism of Company Y

The four themes identified in the previous section are conceptualised as the mechanisms of Company Y, namely Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid and Synchronisation, and Fusion Digital Agility. As presented in Table 20, each of these mechanisms will be elaborated in the following section.

Table 20. Mechanism of Company Y

Mechanism	TTF Dimension	Theoretical Contribution
Leadership-Orchestrated Strategic Tech Selection	Influences the task and technology characteristics at the upstream stage	Introduces leadership as a fit constructor in SME settings; fit is not assumed, but shaped upstream
Tool Adaptation and Digital Disruption	influences Utilisation and Performance Impacts	Proposes Dynamic TTF as a necessary capability for navigating external instability
Hybrid Synchronisation	Utilization	Introduces hybrid-fit logic: partial digital fit + manual adaptation can sustain performance
Fusion Digital Agility	Performance Impact	Extends TTF as fit-in-practice: performance depends on the ability to reconfigure fit continually

The first is Leadership-Orchestrated Strategic Tech Selection. DT does not directly translate into performance gains. Instead, performance emerges through intentional leadership efforts that manage the fit between task characteristics and technology characteristics. In this context, leaders serve as active variables who shape and sustain digital fit, rather than passive receivers of technological change. This mechanism is particularly evident in Company Y, where leadership plays a central role

in orchestrating the fit between tasks and technologies. As noted by Kuo and Lee (2011), Organisational managers play a crucial role in technology adoption, and their leadership style is a key factor influencing the success or failure of implementation. This mechanism represents a refinement of the original TTF theory. Whereas TTF typically assumes that task and technology characteristics are pre-existing inputs into the fit process, Company Y demonstrates that fit is actively constructed through leadership choices. In this case, leadership functions as a fit-enabling force. The selection and framing of technologies condition and shape the fit between task and technology characteristics. This is consistent with the statement that top management support is often essential for fostering a supportive environment and ensuring sufficient resources are available for adopting new technologies (Kuo and Lee, 2011). Additionally, Maruping and Agarwal (2004) emphasise that leaders must be thoughtful in their selection of technologies, noting that factors such as platform richness and communication synchronicity should guide their choices. As such, the formation of TTF depends on upstream strategic orchestration. This insight elaborates on the TTF framework by introducing leadership as a critical actor in generating fit, particularly in the resource-limited context of SMEs. The concept aligns with the perspective that empowering leadership encourages employees to be more willing to adopt the system and supports them in carrying out their work tasks (Kuo and Lee, 2011).

The second mechanism is Tool Adaptation and Digital Disruption. Company Y operates in a digital environment characterised by high volatility and frequent sudden shifts, such as changes in platform policies or market disruptions. In this context, performance is not achieved through a stable and continuous fit between tasks and technologies, but through the organisation's ability to rapidly reconfigure that fit when external disruptions occur. This dynamic perspective is supported by Wirtz, Weyerer, and Heckeroth (2022), who assert that digital disruption requires ongoing adaptation and dynamic capabilities to respond effectively. This mechanism extends the original TTF theory in two critical ways. First, it challenges the static nature of traditional TTF (Vendramin, Nardelli, and Ipsen, 2021) by showing that fit is not a one-time match, but a dynamic process that must be recreated continuously, aligning with the view that dynamic capabilities are fundamental to enhancing a company's ability to innovate and respond to disruption (Wirtz, Weyerer, and Heckeroth, 2022). Second, it introduces agility as a meta-capability that enables the organisation to sustain and re-establish TTF

in changing conditions, echoing the argument by Kraft, Lindeque, and Peter (2022) that agility is essential for SMEs to maintain competitiveness in rapidly changing digital environments. The implication is that TTF should not only account for fit quality at a given time, but also for the organisation's capacity to adjust and realign that fit in response to external disruptions, reflecting Kraft, Lindeque, and Peter's (2022) notion that agility is a key outcome of successfully implementing digital strategies.

The third mechanism is Hybrid Synchronisation. Company Y does not rely on full system integration to achieve performance. Instead, it adopts a hybrid coordination model that combines digital tools with manual processes to fill operational gaps. This approach is not viewed as a fallback or temporary fix, but rather as a deliberate and pragmatic solution to the limitations of SMEs' resources. Merín-Rodrigáñez, Dasí, and Alegre (2024) observe that, due to widespread resource constraints, SMEs must implement these practices efficiently and effectively to achieve performance gains, highlighting the practical need for flexible and cost-sensitive strategies. This mechanism challenges the assumption that fit must be absolute for performance to take place. Instead, it demonstrates that partial fit, when supported by low-cost human adaptations, can still produce reliable performance outcomes.

This aligns with the point made by Vendramin, Nardelli, and Ipsen (2021), who suggest that users assess both the functionality of the technology and the extent to which it supports task completion and aligns with their abilities. This acknowledges that performance depends on a combination of technological capability and human adaptation. Rather than seeking full automation or seamless integration, which is very rare in many SME contexts, particularly in developing countries like Indonesia, where only 26% of SMEs have shifted to digital platforms (Ministry of Communication and Informatics of Indonesia, 2024), and even these do not necessarily achieve full automation, Company Y strategically designs fit by layering manual processes where necessary.

This ensures continuity, reduces error, and maintains coordination across functions, even when technologies are diverse and not fully integrated. This case contributes to the elaboration of TTF theory by introducing the concept of hybrid-fit logic. It suggests that in practice, fit is not always an all-or-nothing condition. Particularly in resource-limited environments, performance is achieved through a mix

of digital automation and manual control. As Howard and Rose (2019) underline, refining and extending TTF requires acknowledging varying degrees of fit and even misfit, which aligns with Company Y's pragmatic hybrid model. Therefore, TTF should account for hybrid utilisation strategies as valid and often necessary pathways to effective task–technology fit.

The last mechanism is Fusion Digital Agility. In Company Y, DT does not occur as a one-time shift, but as a continuous, cumulative process that becomes embedded in the organisation's way of working. This aligns with Troise et al. (2022), who emphasise that agility should not be regarded as a 'stand-alone capability', but rather as a collection of dynamic capabilities that evolve over time. The company's performance improvements over time are not merely the result of successful adoption of individual tools, but of its growing ability to repeatedly adjust the alignment between tasks, technologies, and people. This capacity to adapt quickly and in coordination across departments reflects what is described in the literature as the essence of agility, defined as a company's ability to cope with rapid, continuous, and uncertain changes and to thrive in a competitive environment where opportunities are continually and unpredictably changing (Troise et al., 2022). Tools and workflows are frequently revisited, refined, or replaced to meet evolving operational needs. This process echoes the notion of agility as an ongoing endeavour that requires companies to develop new capabilities continuously (Troise et al., 2022).

When digital platforms introduce new features or when business requirements shift, Company Y responds not with hesitation but with experimentation. This perspective is also captured by Troise et al. (2022), who explain that business model innovation often arises from "trial-and-error learning," reinforcing the link between agility and experimentation. These behaviours are not imposed from the top down, but emerge organically within teams, aligning with the idea that agile companies depend on self-disciplined, organised, and motivated teams to maintain agility (AlNuaimi et al., 2022). This mechanism contributes to the elaboration of TTF theory by shifting the focus from fit as a static configuration to fit as an evolving organisational capability. Rather than simply maintaining fit, Company Y develops the capacity to continually generate fit, aligning with AlNuaimi et al. (2022), who highlight that successful SMEs in digital environments maintain competitiveness by cultivating agility as a continuous capability. This insight suggests that TTF should not be limited to examining whether

technology fits current tasks, but should also consider whether the organisation has the agility to adapt to fit as conditions evolve repeatedly. In this sense, cumulative digital agility becomes the mechanism through which long-term performance is sustained.

5.2 The Mechanism of Company Z

The five themes identified in the previous section are conceptualised as the mechanisms of Company Z, namely Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid and Synchronisation, Versatile Production Capability, and Client-Centric Adaptation. As presented in Table 21, each of these mechanisms will be elaborated in the following section.

Table 21. Mechanism of Company Z

Mechanism	TTF Dimension	Theoretical Contribution
Leadership-Orchestrated Strategic Tech Selection	Influences the task and technology characteristics at the upstream stage	Elaborates on TTF by introducing leadership as an active fit constructor
Tool Adaptation and Digital Disruption	influences Utilisation and Performance Impacts	It challenges the static view of TTF and shows that fit must be continuously reconfigured in a changing digital environment.
Hybrid Synchronisation	Utilization	Introduces hybrid-fit logic: partial digital fit + manual adaptation can sustain performance.
Versatile Production Capability	Performance Impact	Extends TTF as fit-in-practice: versatile production capability enables SMEs to continually reconfigure fit, linking production flexibility to scalable and measurable performance outcomes
Client-Centric Adaptation	Influences the task and technology characteristics at the upstream stage	Elaborates TTF by showing that client needs and market responsiveness can externally define task-tech alignment.

The first mechanism is Leadership-Orchestrated Strategic Tech Selection. This mechanism influences task and technology characteristics in the upstream phase of fit formation. At Company Z, leadership actively selects and integrates technologies that align with production needs, customer expectations, and internal capacities. Fachrunnisa et al. (2020) emphasise that agile leadership is crucial for successful DT, particularly through fostering strategic flexibility and responsiveness in turbulent environments, which aligns with Company Z's proactive approach to technology selection. Leaders do not merely adopt available tools; they assess gaps, procure suitable systems, and personally guide implementation. This active role aligns with findings that leaders and managers are essential for overcoming resistance and that

effective leaders are competent with digital platforms and capable of reconfiguring resources to sustain SMEs' performance (Imran, Hamid, and Haque, 2025). They also manage change adoption by incentivising staff, addressing resistance, and sharing tangible outcomes to build trust. This is consistent with the observation by Kuo and Lee (2011) that top management support is vital for fostering a supportive environment and ensuring sufficient resources for the adoption of new technologies.

This mechanism elaborates on TTF by introducing leadership as a fit constructor, actively shaping both the nature of tasks and the tools used to complete them. Empowering leadership has been shown to positively shape individuals' perceptions of a technology, ultimately leading to its adoption and use (Kuo and Lee, 2011). In resource-constrained SMEs, this orchestration is critical to ensuring that technology serves strategic priorities, not just operational tasks, aligning with the argument that digital leaders play a crucial role in identifying opportunities to leverage advanced digital technologies, thereby ensuring sustainability through strategic technology selection (Imran, Hamid, and Haque, 2025).

The second mechanism is Tool Adaptation and Digital Disruption. This mechanism impacts utilisation and performance impacts by demonstrating that fit is not static but continuously reconfigured. Company Z routinely adjusts workflows and tools in response to market, technological, and internal changes. Whether shifting to CRM systems or adopting new marketing platforms, the organisation iteratively refines how tasks are performed and supported. This mechanism challenges the static assumptions of TTF (Vendramin, Nardelli, and Ipsen, 2021), introducing dynamic fit as a meta-capability. Kraft, Lindeque, and Peter (2022) emphasise that SME managers must rework routine practices within the workplace and adopt new digital tools across both managerial and operational functions to sustain competitive advantage, highlighting that DT involves more than simple tool adoption. Furthermore, Wirtz, Weyerer, and Heckeroth (2022) highlight that the dynamic capabilities, specifically sensing, seizing, and transforming, are essential at the organisational level, enabling companies to continually realign their digital systems and workflows in response to disruptive pressures, thereby putting dynamic fit into practice. The ability to repeatedly realign tasks and tools in response to disruption is essential for maintaining long-term performance. Thus, TTF is extended to account not only for the presence of fit but also for its resilience and reconfigurability of fit over time.

The third mechanism is Hybrid Synchronisation. This mechanism primarily concerns utilisation and shows how partial or layered systems can still produce an effective fit. Company Z operates with a blend of manual processes and digital tools, compensating for integration gaps with organisational routines and human coordination. Rather than waiting for perfect system integration, the company ensures continuity and coordination through hybrid practices. This supports Vendramin, Nardelli, and Ipsen (2021), who point out that users evaluate both the technology's functionality and its fit with their abilities, highlighting that performance relies on both technological capability and human adaptation. Rather than aiming for full automation, which is rare among SMEs, especially in Indonesia, where only 26% have adopted digital platforms (Ministry of Communication and Informatics of Indonesia, 2024), Company Z builds fit strategically by incorporating manual processes where needed. This approach is further supported by Merín-Rodrigáñez, Dasí, and Alegre (2024), who state that business model innovation serves as both an alignment tool and a blueprint, directing digital investments toward performance outcomes. This suggests that hybrid approaches offer practical solutions for SMEs navigating transformation despite resource limitations.

This mechanism introduces a hybrid-fit logic to TTF, suggesting that performance can still be achieved even when digital alignment is incomplete, provided that manual or adaptive strategies effectively bridge the gaps. It refines the theory by demonstrating that pragmatic fit, rather than ideal or perfect fit, often underpins operational continuity in SMEs. Howard and Rose (2019) emphasise that TTF does not reside solely in the properties of tasks or technologies, but emerges from their interaction, highlighting that practical adaptations represent operational fit rather than a purely technical match. They further argue that this nuance is essential given the complex operational realities faced by SMEs and acknowledge the need to extend TTF theory to accommodate better a wider range of contexts (Howard and Rose, 2019).

The fourth mechanism is Versatile Production Capability. This mechanism now emphasises performance impact as its main TTF dimension. Through extensive technology investments, Company Z expanded its ability to handle diverse production tasks, resulting in faster delivery, higher quality, and greater customisation. Wan et al. (2020) explain that intelligent manufacturing systems enable dynamic reconfiguration and high production flexibility, showing that technology not only streamlines existing

operations but also broadens the scope of efficient production. This versatility leads directly to improved client satisfaction and repeat business. It also allows the company to respond quickly to unique or urgent orders. In doing so, the organisation does not just achieve fit, it broadens the performance outcomes that result from that fit. The theoretical contribution here is that task-technology fit becomes a pathway to scalability and differentiation, not just task efficiency. Chirumalla et al. (2025) emphasise that DT provides enhanced flexibility, adaptability, improved access to technical systems, and greater productivity and efficiency, highlighting that effective digital integration enables manufacturers to meet evolving customer demands and outperform competitors. This extends TTF by showing that achieving versatility through technology yields measurable, sustainable performance gains.

The fifth mechanism is Client-Centric Adaptation. This mechanism influences task and technology characteristics in the upstream stage of TTF, as clients' needs define the tasks the company must perform and the technologies it must adopt at Company Z. Client feedback and requirements shape decisions about materials, production methods, and digital tools. Pascucci, Savelli, and Gistri (2023) highlight that DT reshapes traditional value creation by enhancing market analytics, pricing, and channel management, underscoring the role of client input in driving the adoption of digital tools and the redesign of processes. For instance, CRM tools and new machines were acquired in direct response to client input. Leipzig et al. (2017) confirm that proactive client orientation is a consistent driver of both client value and competitive advantage, demonstrating that client needs are not secondary but central triggers for digital investment decisions. The company's commitment to never rejecting orders and to communicating transparently also means that technologies are selected or modified to meet external, not just internal, fit.

Li et al. (2023) highlight that although client concentration can complicate DT, it also influences companies' choices in adopting specific digital processes, emphasising that client concentration can either hinder or stimulate DT depending on how companies align with client needs. This extends TTF by broadening the focus of task definition, suggesting that fit involves not only the alignment between internal workflows and tools but also the match between organisational capabilities and customer expectations. Matarazzo et al. (2021) stress that DT in SMEs succeeds when companies use sensing and learning capabilities to develop new distribution channels and innovate in value

creation and delivery for client segments, highlighting how external client demands actively shape task-technology fit. Thus, client-centricity acts as an upstream mechanism for shaping task-technology fit, reinforcing the view that fit arises from continuous interaction between market demands and internal capabilities in tasks and technologies.

5.3 Cross-Case Analysis of Company Y and Company Z

In this section, the findings will be discussed in depth. This is done by conducting a cross-case analysis (Yin, 2018) to identify patterns, compare findings, and explain the similarities and differences between the two companies. Although Company Y and Company Z are both categorised as SMEs, they operate in different sectors: Company Y in non-manufacturing (retail) and Company Z in manufacturing. Sectoral differences shape the characteristics of SMEs, leading to both similarities and differences between the two cases. Both companies implemented a set of complementary mechanisms to drive their DT.

The cross-case analysis compares how each mechanism manifested in the two contexts and identifies patterns of similarity and difference. These findings reflect organisation-wide DT rather than isolated digitisation or digitalisation efforts, as the changes observed extend across processes, structures, and organisational practices (Vial, 2019). The findings reveal that successful SME DT is underpinned by active leadership guidance, continuous adaptation of tools and processes, synchronisation of old and new ways of working, the development of agile capabilities, versatile production, and a strong customer-centric focus. These patterns contribute to theory by elaborating on the TTF framework and to practice by highlighting actionable strategies for SMEs. Table 22 summarises the similarities and differences between the two companies. Each point is elaborated in the following section.

Table 22. Comparative Mechanisms of DT in Company Y and Company Z

Mechanism	Similarities	Differences
Leadership-Orchestrated Strategic Tech Selection	Leadership guided tech adoption strategically, ensuring high TTF.	In Company Y, tech selection was centralised on the CEO's expertise. In Company Z, decisions were consultative within the leadership team.
	Leaders acted as digital champions, aligning tech with goals.	In Company Y, the focus was on long-term vision. In Company Z, the focus was on production processes and growth strategy.

Tool Adaptation and Digital Disruption	Both adapted digital tools to fit unique workflows, turning disruption into opportunities.	In Company Y, adaptation relied entirely on third-party tools and their features. In Company Z, adaptation included third-party tools, developing its own finance system and investing in advanced machinery.
	Both treated tools as flexible/malleable, not fixed.	In Company Y, adaptation was more defensive (pivoting when TikTok was banned or algorithms changed). In Company Z, adaptation was more offensive, using innovation (e.g., online client portals) to disrupt the market.
	Both achieved closer TTF over time through adaptation.	In Company Y, adaptation mainly supported sales innovation. In Company Z, adaptation focused on sustaining internal production continuity.
Hybrid Synchronisation	Both combined digital and manual methods, investing in training and adjustments, avoiding "rip-and-replace.	In Company Y, synchronisation focused on sales, integrating e-commerce platforms with offline stores. In Company Z, synchronisation focused on production, aligning digital tools with machinery.
	Both kept parallel practices (manual checks, backups) to handle gaps.	In Company Y, gaps arose from third-party tools/platforms that required manual reconciliation. In Company Z, backups were kept as paper records alongside digital systems.
Versatile Production Capability and Fusion Digital Agility	Both developed digital-enabled agility, allowing quick responses to change.	In Company Y, agility came from the fusion of digital tools with workflows (analytics, project management, creative tools). In Company Z, agility came from advanced machinery integration, enabling flexible production.
	Both leveraged affordable modern tech to enhance flexibility.	In Company Y, agility emphasised internal operations and workflows. In Company Z, agility emphasised production speed, customisation, and quality.
	Both achieved dynamic capabilities by combining and reshaping resources.	In Company Y, adaptation focused on operational flexibility. In Company Z, adaptation focused on production versatility.
Client-Centric Adaptation	Both used DT to sense and respond to customer needs.	In Company Y, adaptation occurred indirectly through the use of e-commerce data, advertising, and stock investments to meet demand. In Company Z, adaptation occurred directly through configuring tools and continuously refining services based on client feedback.
	Both demonstrated customer agility, ensuring value delivery.	In Company Y, the focus was on availability (keeping stock ready). In Company Z, focus was on customisation (offering tailored products through versatile production).
	Both aligned technology with customer value creation.	In Company Y, customer focus was secondary to internal workflows. In Company Z, customer focus was central, driving most digital initiatives.

5.3.1 Leadership-Orchestrated Strategic Tech Selection

In both cases, top management played a vital role in steering technology adoption to fit with task needs. Company Y's CEO and manager oversaw the selection of key new digital technologies, ensuring they fit with the company's tasks and long-term vision. Similarly, Company Z's leadership team proactively orchestrated strategic tech selection, evaluating advanced machinery and digital solutions to align with its service processes and growth strategy. This strong leadership involvement reflects a widely recognised success factor: top management support and vision drive the effective implementation of digital technologies, particularly in SMEs (Thong, 1999). Research shows that SMEs are more likely to adopt and benefit from digital technologies when their CEOs and leaders are innovative, knowledgeable, and supportive of technology (Thong, 1999).

In this case study, leadership ensured that technology choices were not random but strategically purposeful, creating a high initial TTF. A minor difference was observed in approach; Company Y's tech selection was highly centralised around the CEO's personal expertise. In contrast, Company Z's decision-making was somewhat more consultative, but the overall pattern is similar. In both companies, leaders acted as "digital champions" who aligned technology with company goals from the outset, echoing the view that effective digital business strategy requires visionary leadership (Bharadwaj et al., 2013). This mechanism underlines that the fit between task and technology, shaped by leaders, is crucial for setting the stage for a successful transformation.

5.3.2 Tool Adaptation and Digital Disruption

Both Company Y and Company Z actively adapted digital tools to fit their unique workflows, turning potential disruptions into opportunities. Rather than merely adopting standard technologies, they modified and innovated with them through a process of tool adaptation to better serve their tasks. For example, Company Y relies entirely on third-party digital tools rather than developing its own systems, making full use of the available features. Company Z, although also using third-party tools, developed its own finance system and invested in advanced machinery. By tailoring technology to their specific contexts, both companies achieved a closer task–technology fit over time. This adaptive approach aligns with the view that technology

implementation is a gradual learning process in which systems and work practices must be co-adjusted to avoid misfits (Strong and Volkoff, 2010).

Particularly, these adaptations enabled the companies to navigate digital disruption in their environments. Company Y's tool adaptation was more defensive; for instance, when TikTok was banned or sudden algorithm changes occurred, the company quickly pivoted to alternative platforms and strategies. By leveraging its multi-platform presence, Company Y effectively absorbed uncertainty. Company Z's innovations with digital tools, on the other hand, enabled it to introduce disruptive services in its market, such as new online client portals that competitors lacked, thereby positioning the company as a digital pioneer. In both scenarios, flexibility in adjusting technology mitigated the risks of disruption and even turned disruption into a competitive advantage. This finding aligns with Karimi and Walter's (2015) study of newspapers, which shows that companies need to be flexible in responding to digital disruption by adapting their resources and tools to rapidly changing conditions. Indeed, this case study illustrates that maintaining a continuous fit between technology and task needs through adaptation is key to surviving and thriving amid digital disruption (Karimi and Walter, 2015). The pattern is one of proactive learning and customisation, rather than being constrained by a technology's initial design; both SMEs treated tools as malleable. A difference is that Company Y primarily leveraged adaptation for sales innovation through third-party tools, whereas Company Z focused on maintaining continuity in internal production processes by using third-party tools and creating its own systems. Nonetheless, both demonstrate that fitting the tool to the task through creative adaptation is a critical mechanism in DT.

5.3.3 Hybrid Synchronisation

A common challenge in the two transformations was hybrid synchronisation, integrating new digital processes with existing operations. Company Y did not discard its traditional techniques overnight. Instead, it gradually synchronised them with digital workflows. For example, Company Y's reliance on multiple third-party tools and platforms exposes integration gaps, leading to imperfect system functionality and requiring manual checks and data reconciliation. This results in a synchronised hybrid of old and new practices. Similarly, Company Z has not yet achieved a fully seamless end-to-end technology system but coordinates across teams by combining digital and manual methods. The company ensures synchronisation through additional practices.

For instance, even after adopting digital records, paper records are still maintained as backup. Keeping parallel paper records provides a safety net and a means of cross-checking, offering a practical, SME-oriented response to technology gaps. Both cases highlight the importance of socio-technical integration, where technological change is coordinated with organisational processes and culture. This reflects an ambidextrous approach, where the companies had to be efficient in managing current business demands while also being adaptable to new digital ways (Raisch and Birkinshaw, 2008). In other words, they practised organisational ambidexterity by balancing the exploitation of existing capabilities with the exploration of new digital capabilities (Raisch and Birkinshaw, 2008).

The synchronisation prevented a gap between "old" and "new", avoiding productivity losses that can occur when new technology is not well integrated. Prior research notes that aligning new technology with legacy processes and workflows is crucial to realising benefits and user acceptance (Strong and Volkoff, 2010). Both SMEs invested effort in training, change management, and iterative adjustments to get the old and new systems working together seamlessly. A pattern of similarity is clear. Neither company pursued a "rip-and-replace" strategy. Instead, both layered digital innovations onto their existing operations and then carefully integrated them. If there was a difference, it might lie in the complexity of synchronisation. As a retail business, Company Y focuses on sales and requires integrating digital technologies across e-commerce platforms and offline stores. In contrast, Company Z, as a manufacturing company, primarily synchronises digital tools with machine-based production processes. Despite this contextual difference, the fundamental challenge and solution were alike. Effective DT requires bridging the past and the future, creating a synchronised hybrid system in which traditional expertise and digital technology complement each other.

While SMEs often aspire toward full digitalisation, prior research suggests that DT does not occur through complete system replacement, but rather through the alignment of new technologies with existing organisational processes (Strong and Volkoff, 2010). This is particularly evident in resource-constrained contexts, where digital strategies are shaped by organisational capabilities and limitations (Bharadwaj et al., 2013). From a socio-technical perspective, technology is enacted through ongoing

interaction with human practices rather than fully replacing them, resulting in the coexistence of digital and manual processes (Orlikowski, 1992).

In this sense, hybrid synchronisation should not be viewed as a transitional inefficiency, but as a practical mechanism through which DT is operationalised in SMEs. Rather than indicating incomplete transformation, this hybrid configuration enables firms to sustain performance while managing system limitations and operational risks. At the same time, this condition remains context-dependent. As digital technologies become more accessible and embedded, the reliance on manual processes may evolve. However, under current conditions, hybrid synchronisation represents a stable and necessary configuration rather than a temporary stage (Vial, 2019).

5.3.4 Versatile Production Capability and Fusion Digital Agility

Each company developed a form of digitally enabled agility, though in different ways. Company Z achieved versatile production capability, while Company Y developed what can be described as fusion digital agility. For Company Z, integrating advanced machinery and digital technologies enabled highly flexible production processes. The company became capable of quickly switching product designs, customising orders, and scaling output up or down with minimal efficiency loss. In essence, digital tools enabled Company Z to rapidly reconfigure its operations in response to changing demands, a hallmark of agility. Company Y, by contrast, blended digital technology with its service development practices. By integrating digital analytics, project management platforms, and creative design tools, Company Y gained agility that is both technologically sophisticated and highly adaptable. The term 'fusion' refers to the close integration of technologies and business expertise. Cross-functional teams at Company Y seamlessly integrated digital tools into their workflows, enabling them to work faster, respond more quickly, and operate more efficiently across all aspects of the business.

The outcome in both cases is an organisation that can sense and seize opportunities quickly and flexibly. This closely aligns with the concept of dynamic capabilities in the literature. Dynamic capabilities refer to a company's capacity to combine, develop, and reshape its internal and external resources to adapt to fast-changing environments (Teece, Pisano, and Shuen, 1997). Both companies developed this capability through their own mechanisms. Company Y adjusted its internal

operations, while Company Z adapted its service offerings by aligning digital capabilities with client needs and combining internal and external resources. These capabilities allowed the companies to pivot or adapt whenever market conditions or customer requirements changed. Prior research on technology and agility highlights that transformation can provide companies with flexible digital options that greatly enhance organisational agility (Sambamurthy, Bharadwaj, and Grover, 2003).

This case study confirms that digital investments were not just static tools but also options that enabled versatility. A key similarity is that both SMEs leveraged relatively affordable modern technologies such as Cloud, IoT, BDA, and others to enhance flexibility, demonstrating that even with limited resources, SMEs can achieve high agility through smart technology integration. The key difference between the two is that Company Y's agility is more operational, emphasising flexibility within its internal workflows, while Company Z's agility centres on production, prioritising speed and quality in manufacturing. Both types represent aspects of digital agility and are essential for maintaining competitiveness over time. Overall, the development of these agile capabilities highlights a clear pattern. The success of DT in SMEs often depends on developing versatile, technology-driven capabilities that enable rapid adaptation. This finding provides empirical support to the theory that technology-enabled agility and dynamic capabilities are critical for strong performance in rapidly changing environments (Teece, 2007).

5.3.5 Client-Centric Adaptation

Client-centric adaptation, defined as the continuous tailoring of digital solutions to meet evolving client needs, emerged as an important mechanism in both companies, with greater emphasis in Company Z compared to Company Y. In Company Z, clients were placed at the centre of its technology initiatives. Every new tool was configured based on client feedback, and services were frequently refined using insights from client data. The company offered a comprehensive process that included consultation, design, sampling, production, revision, quality control, and delivery. Each stage was structured to prioritise the client's needs. A clear example was the versatility in production, which was driven by client requests for customised products. Unlike many manufacturing SMEs that focus on a narrow product range, Company Z invested in a wide range of production technologies. These included woven-label machines, printed-label presses, and offset printing equipment. This investment allowed the company to respond quickly

to client-specific orders. The result was a continuous, client-driven process of adaptation that contributed to high client satisfaction and loyalty. This demonstrates how DT can enhance customer experience when guided by a strong client focus. Company Y did not explicitly label its approach as customer-centric adaptation, but still showed similar practices. Through various e-commerce platforms and digital tools, Company Y gathered insights into customer behaviour. For example, while many retail SMEs relied on pre-order strategies, Company Y chose to maintain stock so that products are always available. This approach was based on understanding customer purchasing patterns. However, in Company Y's DT process, the customer was not the primary focus. The company concentrated on improving internal workflows, maximising the features of digital platforms, and using advertising as a key marketing strategy. Despite these differences, both cases highlight the importance of aligning technology with customer needs as an essential factor for success.

This finding reflects a broader industry trend in which DT has raised customer expectations for personalised and responsive service (Verhoef et al, 2021). Research in information systems and marketing emphasises that organisations need to leverage digital technologies to sense customer needs and respond rapidly with tailored solutions. This capability is often described as customer agility (Setia, Venkatesh, and Joglekar, 2013). In this case study, Company Z's close alignment of technologies with client input provides a strong example of developing client agility. The company's client-focused actions were often carried out behind the scenes, such as adjusting production schedules to meet a key client's deadline or customising products based on specific client requests. In contrast, Company Y demonstrated customer agility by using customer insights to guide immediate decisions. For example, the company detected increased customer demand and quickly invested in stock to ensure product availability.

Although the two companies applied different strategies, they shared the same underlying principle of using DT to respond to customer needs. The pattern here is the recognition that technology fit is not just about internal tasks, but also about fitting the way a company delivers value to its clients or customers. By continuously adapting digital solutions to serve clients better, these SMEs ensured that their transformations translated into tangible market benefits. A difference in emphasis can be observed. Company Z's manufacturing context placed customer focus mainly through product customisation. On the other hand, Company Y's approach to business model innovation

was expressed through stock investment. Despite these differences, both cases suggest that a successful DT is not driven by technology in isolation. Instead, it is guided by the ultimate goal of creating customer value. This client-centred perspective acted as a guiding principle for their digital investments and adjustments, reflecting the idea that a digital strategy should always follow the needs of the customer.

5.4 Theory Elaboration: Extending the TTF Framework

In this section, the TTF framework (Goodhue and Thompson, 1995) is used to compare and contrast two SMEs. Company Y represents retail, and Company Z represents manufacturing. The comparison focuses on key TTF dimensions, which are task characteristics, technology characteristics, task-technology fit, utilisation, and performance impacts. The details of each are explained below, including the extensions based on the findings from the empirical research.

Across the two cases, five mechanisms were identified: Leadership-Orchestrated Strategic Tech Selection, Tool Adaptation and Digital Disruption, Hybrid Synchronisation, Fusion Digital Agility / Versatile Production Capability and Client-Centric Adaptation. Company Y exhibits four mechanisms (Leadership-Orchestrated Strategic Tech Selection; Tool Adaptation and Digital Disruption; Hybrid Synchronisation; Fusion Digital Agility), while Company Z exhibits five mechanisms (Leadership-Orchestrated Strategic Tech Selection; Tool Adaptation and Digital Disruption; Hybrid Synchronisation; Versatile Production Capability; Client-Centric Adaptation). Across both cases, the five mechanisms collectively explain how the eight TTF dimensions are dynamically shaped; however, each case draws on a different subset of these mechanisms. Figures 7 and 8 therefore visualise the case-specific extension of the TTF process model, and do not imply that every cross-case mechanism appears in every case. A visual summary is also shown in Figure 7 and Figure 8.

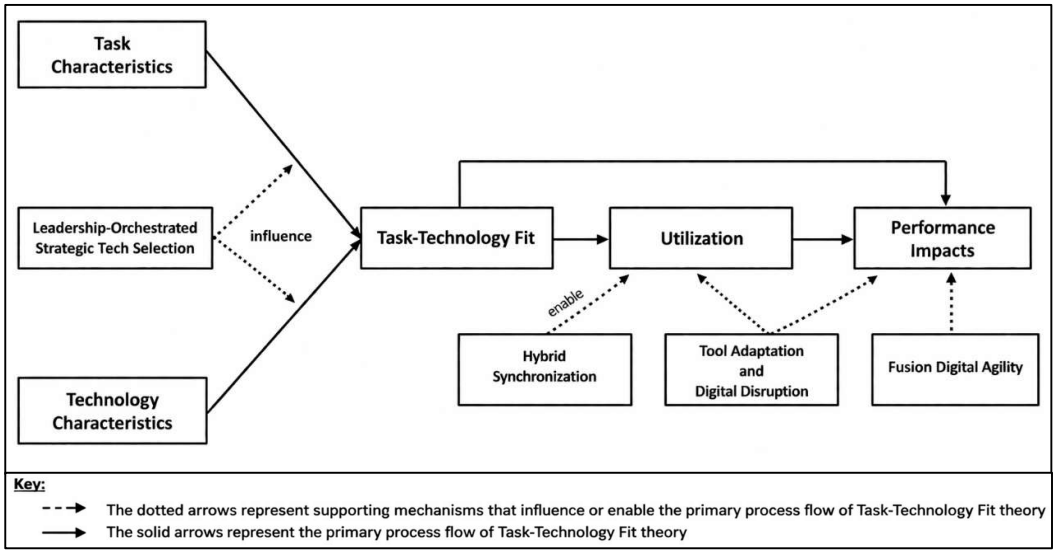


Figure 7. Extension of the TTF Model in Company Y (Retail)

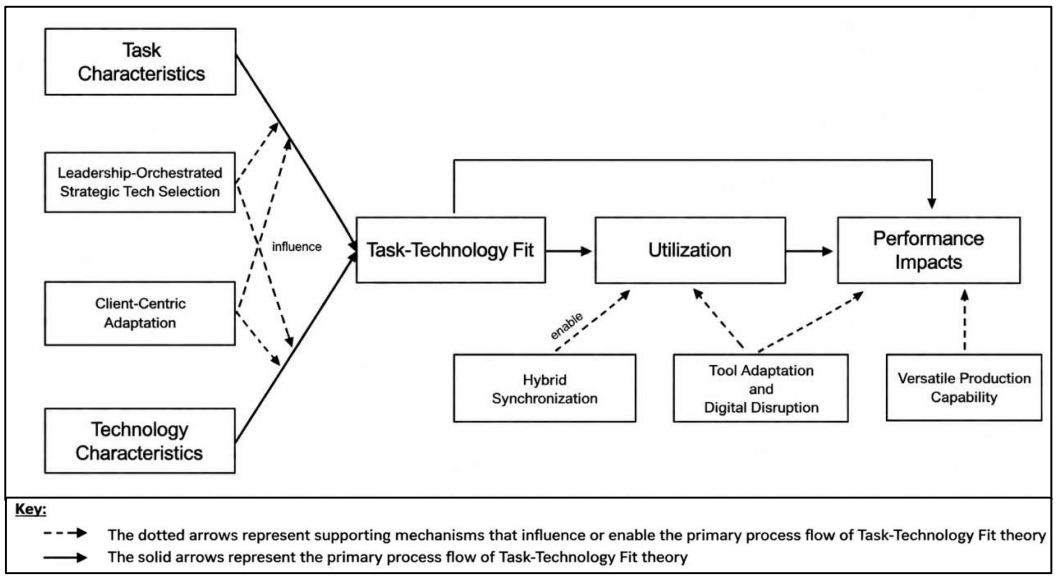


Figure 8. Extension of the TTF Model in Company Z (Manufacturing)

To clarify how the empirical findings contribute to the extension of the TTF framework, the identified themes can be understood as mechanisms that shape specific TTF dimensions. Rather than existing as separate constructs, each theme reflects how dimensions such as data quality, locatability, authorisation, compatibility, timeliness, reliability, ease of use, and relationship with users are actively constructed and adjusted in practice. Leadership-Orchestrated Strategic Tech Selection influences dimensions

such as authorisation, reliability, and compatibility by shaping how technologies are selected, controlled, and aligned with organisational priorities. Tool Adaptation and Digital Disruption directly affect compatibility, ease of use, timeliness, and reliability, as technologies are continuously modified and reconfigured to meet evolving task requirements. Hybrid Synchronisation relates to dimensions such as reliability, timeliness, and data quality, where digital and manual practices are combined to maintain accuracy and continuity despite partial misfits. Versatile Production Capability and Fusion Digital Agility strengthen timeliness, reliability, and compatibility by enabling faster responses, flexible operations, and scalable processes. Finally, Client-Centric Adaptation influences data quality, locatability, and relationship with users, as customer demands shape how information is captured, accessed, and used to deliver value. In this way, the mechanisms collectively explain how the eight TTF dimensions are not static attributes, but are dynamically shaped through organisational practices in SMEs undergoing DT.

5.4.1 Task Characteristics

The cross-case analysis from Company Y and Company Z suggest that task characteristics in practice are not fixed. Instead, they are actively shaped by leadership and external factors of achieving fit. Both companies demonstrated a mechanism of Leadership-Orchestrated Strategic Tech Selection, where top management took an active role in defining and prioritising tasks to be supported by new technologies. Rather than accepting task needs as static inputs, leaders in these SMEs proactively constructed fit by adjusting task processes and selecting technologies at the same time.

This aligns with Kuo and Lee's (2011) observation that top management support and vision are crucial in shaping how new technologies are adopted to support work; managers essentially act as architects of the task-tool alignment. This proactive shaping of task requirements by leadership extends TTF theory by introducing management as an upstream force in defining task characteristics relevant for technology fit, rather than assuming tasks come from outside the organisation. It echoes research suggesting that leaders influence technology success by framing work processes and selecting tools that enrich those processes (Maruping and Agarwal, 2004). Maruping and Agarwal (2004) highlight that decision-makers should evaluate whether a platform provides sufficient richness and supports the level of synchronicity required for communication. This consideration reflects the type of purposeful task–technology fit observed in both

Company Y and Company Z. In summary, the task characteristics dimension is refined to include managerial agency. Leaders in SMEs actively redefine and prioritise tasks in line with strategic goals and then seek technologies to fit, rather than passively implementing technology and hoping tasks will adapt.

Beyond leadership, the cases highlight an important external influence on task definition, namely client-centric Adaptation. This mechanism was especially prominent in Company Z, where major clients' needs and feedback significantly shaped the nature of tasks the company undertook and how those tasks were carried out. In the original TTF model, task characteristics are mostly viewed as internal organisational activities. Company Z extends this by broadening the task to include meeting external client expectations. This finding supports Li et al. (2023), who note that in SMEs undergoing DT, customer concentration and demands can directly influence what processes are adopted or modified, effectively shaping task requirements from the outside. Through this study, TTF is extended by suggesting that fit means aligning technology not only with internal workflow tasks but also with tasks defined by external market expectations. Matarazzo et al. (2021) similarly stress that successful DT in SMEs comes from using sensing and learning capabilities to redefine tasks. In essence, Company Z's case shows that the company and its clients shape task characteristics together. Tasks are continuously adjusted to deliver value to clients, and technology fit is sought to support this wider scope.

These two cases thus illustrate that task characteristics are dynamic, shaped by leadership decisions and the client. This extension to TTF theory implies that what constitutes a task in fit analysis must be viewed flexibly. By acknowledging these influences, it moves beyond the original static view of tasks as a given to a richer perspective in which task design and reconfiguration are part of achieving task-technology fit (Fachrunnisa et al., 2020; Li et al., 2023).

5.4.2 Technology Characteristics

The cross-case evidence suggests that in practice, companies do not passively accept technology characteristics; instead, they actively shape and select technologies as part of achieving task–technology fit. Both Company Y and Company Z demonstrated that Leadership-Orchestrated Strategic Tech Selection involves actively aligning technology characteristics with task requirements to achieve fit. Leaders in

these SMEs carefully fit technological capabilities to task requirements by choosing, configuring, or even modifying tools strategically. This goes beyond the original framework by highlighting that technology characteristics can be shaped and adapted by companies rather than fixed attributes. This reinforces the point made by Maruping and Agarwal (2004) that leaders must be thoughtful in their technology selection, considering factors such as platform richness and communication synchronicity. By deliberately choosing technologies that possess the required characteristics, these companies extended the TTF theory. Technology characteristics are not just given; they are strategically aligned and even engineered by companies. In other words, the fit is partially determined by selecting technologies with appropriate features (Kuo and Lee, 2011; Imran, Hamid, and Haque, 2025). Prior studies have noted that top management influence can ensure sufficient resources and suitable technology features are in place for success (Kuo and Lee, 2011). These cases provide empirical support for the idea that leaders actively bridge the gap between what technology can do and what tasks need.

Another key extension is recognising external input in shaping technology characteristics, which is especially evident in Company Z via client-centric adaptation. Company Z frequently adjusted or augmented its technology in response to client-driven requirements. This shows that technology characteristics evolve through ongoing adjustments to maintain task–technology fit with client-defined tasks. Existing research supports this adaptive perspective, showing that external pressures can drive companies to modify their technological resources, thereby altering the functional capabilities they can access (Li et al., 2023; Pascucci, Savelli, and Gistri, 2023). Further, both companies demonstrated that technology characteristics were not static limitations. Instead, these characteristics functioned as variables that the companies could adjust through technology upgrades or customisation in response to emerging needs. This challenges the static view of TTF by showing that fit can be achieved through ongoing adjustments to technology features. Indeed, Vendramin, Nardelli, and Ipsen (2021) point out that users judge not only the initial function of a system but also how well it continues to support tasks over time. This means technology needs to be continuously adjusted to fit the tasks at hand. This case illustrates that TTF is an evolving target, with technology characteristics regularly adjusted through new tool selection, configuration, or integration to maintain a good fit. The theoretical implication is that task–technology fit is not only achieved through initial matching, but through the continuous adaptation of

technology characteristics over time. Effective fit emerges not only from initial matching, but from a company's ongoing capability to shape and reconfigure technology characteristics in response to strategic intent and external change.

5.4.3 Task–Technology Fit

The cross-case analysis of Company Y and Z reveals that task-technology fit is not a one-time evaluation but an ongoing, actively managed state. Both companies fundamentally refined the view of TTF by treating fit as something that must be continuously achieved and re-achieved, rather than a static condition. In Company Y, for example, achieving fit was seen as a moving target. As new digital sales channels emerged or internal processes scaled up, the CEO and team continually revisited how well their current technologies supported the tasks at hand. Fit was actively monitored, and whenever misalignment was detected, the company took action, either by adjusting how tasks were done or by adjusting the technology. This dynamic view of fit aligns with recent theoretical arguments that TTF should be dynamic in turbulent environments (Vendramin, Nardelli, and Ipsen, 2021). Vendramin, Nardelli, and Ipsen (2021) specifically note that fit is not a one-time match, but an ongoing process that needs to be adjusted as conditions change. Both companies' experiences exemplify this. Fit was adjusted through what is identified as Tool Adaptation and rapid reconfiguration when disruptions occurred, such as a social media algorithm change affecting marketing tasks. This ongoing adjustment of fit is enabled by the organisational mechanisms identified in this study, including leadership-driven alignment, tool adaptation, hybrid practices, and client-driven adjustments. It reflects the concept of fit as an ongoing conversation between company, task and technology (Howard and Rose, 2019), rather than a one-off systems implementation. This dynamic view of fit reflects how the underlying TTF dimensions, such as compatibility, timeliness, reliability, and ease of use, are continuously adjusted through organisational practices to maintain alignment between tasks and technologies. These dimensions therefore act as the means through which fit is constructed and maintained in practice.

A major theoretical implication from these cases is that organisational actors actively construct fit; it does not just happen. In both companies, leadership acted as a fit enabler. This extends the TTF framework by adding a new element, which is the process of alignment carried out by people over time. Traditional TTF models considered task and technology characteristics as variables that statistically determine

fit (Goodhue and Thompson, 1995). The extended view from this study suggests adding a process perspective, where fit is something that can be managed. This echoes the view from strategic technology alignment literature that alignment is a repeated process and involves continuous adjustment (Tallon and Pinsonneault, 2011). Moreover, Company Z introduced the idea that fit can be externally defined to some extent. Because the client's needs dictated certain task changes and tech acquisitions, the task-technology fit was partly shaped together with external partners. This implies fit is not purely internal; it may depend on how well technology enables the company to meet external demands (Matarazzo et al., 2021). The TTF construct thus expands to include alignment with a company's environment, not just its internal tasks, aligning with the view that fit arises through interaction between internal capabilities and market demands (Li et al., 2023).

Another extension is the idea of hybrid fit logic, which both companies practised. In theoretical terms, this means recognising that task-technology fit might sometimes be partial yet sufficient. Companies Y and Z demonstrated that they did not always wait for a perfect alignment between every task and technology. Instead, they achieved a good overall fit by addressing minor misfits through process adjustments or manual workarounds. This observation adds depth to the TTF concept. Fit is not simply perfect or imperfect, but a matter of degree and scope. Howard and Rose (2019) note that TTF arises from the interaction between tasks and technology. They also stress that recognising different levels of misfit is important for a realistic understanding of fit. This study shows that pragmatic fit, a fit that is good enough to get the job done, can drive performance, even if some extra tasks are handled outside the main system. As a theoretical implication, this study proposes that TTF includes the idea of adaptive fit, where the focus is on the company's capacity to realign the task-technology fit continuously and pragmatically, rather than assuming an optimal static fit must be reached (Vendramin, Nardelli, and Ipsen, 2021; Wirtz, Weyerer, and Heckeroth, 2022). This perspective aligns with dynamic capability theory because the ability to maintain fit can be seen as a capability itself, a meta-fit capability (Teece, 2007; Kraft, Lindeque, and Peter, 2022). In summary, the cases extend the task-technology fit construct to be dynamic, actively constructed, and contextually contingent. Fit is something a company does repeatedly, not just a state it observes. This active, evolving conceptualisation of fit better captures the realities of DT in SMEs as demonstrated by Companies Y and Z.

5.4.4 Utilization

The experiences of Company Y and Company Z add to the idea of utilisation in TTF. Both companies showed that how technology is used can vary in form, not just in how much it is used, and that effective utilisation may involve hybrid approaches. A key mechanism observed is hybrid synchronisation, which refers to the blending of digital tools with manual or non-digital processes to complete a workflow. In both SMEs, users either used the system 100% of the time or did not use it at all. Instead, they selectively used the technology where it fit well and added it with manual steps where needed. This hybrid utilisation ensured continuity of operations even when the technology did not cover every possible situation. The theoretical implication is that utilisation is not an all-or-nothing phenomenon. Partial use of technology, combined with non-technology work processes, can still lead to high overall task performance. Howard and Rose (2019) argue that TTF emerges from task-technology interaction. This study shows that interaction may also include users actively deciding when to rely on the technology and when to use manual effort if needed. Indeed, this supports the work of Vendramin, Nardelli, and Ipsen (2021), who point out that users evaluate not only a technology's features but also its fit with their own skills and the task context, which can lead to adaptive behaviour. In practice, Company Y and Z's employees engaged in situational utilisation, using the system in ways that maximised benefits and intentionally added it in situations of misfit. These patterns of use are enabled by organisational mechanisms such as hybrid synchronisation and tool adaptation, which allow users to manage partial misfits in practice.

This hybrid approach to utilisation highlights an important theoretical refinement: pragmatic fit and usage. The companies demonstrated that it is possible to achieve strong performance without fully utilising technology, as long as users intelligently compensate for what the system lacks. A previous study by Strong and Volkoff (2010) has noted that when enterprise systems do not fully meet user needs, individuals create additional processes or use add-on tools to get the job done. In these findings, it shifts from an informal observation to a purposeful strategy. Both SMEs essentially established a degree of flexibility in utilisation. Rather than requiring new technology for every micro-task, they allowed mixed usage patterns. From a TTF perspective, this means the framework should account for hybrid utilisation patterns as part of fit. The original TTF model assumed a mostly linear path: a better fit leads to

more usage, which in turn leads to better performance. The extended view suggests a more conditional path: a better fit enables more complete use, but even when the fit is not perfect, companies can still achieve good performance by using the technology flexibly where it adds value, while relying on other methods for the rest. This suggests that utilisation reflects how task–technology fit is enacted in practice, where users actively adjust their use of technology to maintain alignment with task requirements.

Additionally, the mechanism of Tool Adaptation intersects with utilisation. This adaptation is often triggered by digital disruptions, where external changes such as platform updates or system shifts require users to adjust how technologies are used in practice. As the environment changed, both companies adapted how they used their tools, not just which tools they had. This dynamic utilisation is a form of organisational learning. Over time, the company learned to make better use of the technology's features or to use it in new areas as fit improved. At the same time, the company also learned when not to rely on it. Through hybrid synchronisation and continuous adaptation, both cases challenge the simplistic view that utilisation is just frequency of use. Instead, they show that utilisation is a creative and flexible process in which both companies decide how best to use the technology and when other solutions are necessary. In practice, it highlights that successful digital adoption in SMEs may not mean replacing all old processes, but intelligently combining new technology with proven manual practices (Merín-Rodrigáñez, Dasí, and Alegre, 2024). Both Company Y and Z show that effective utilisation can include hybrid workflows and that performance can be maintained through this pragmatic use of technology. This refines TTF by asserting that it is not just about using it or not, but how companies use it that matters for realising the benefits of task-technology fit.

5.4.5 Performance Impacts

The cross-case study shows that in a DT context, performance impacts can manifest as new organisational capabilities, particularly agility and flexibility, that go beyond simple measures of task efficiency. Both Company Y and Company Z demonstrate clear performance improvements, but these were less about faster tasks or labour savings and more about gaining higher-level capabilities that made the companies more competitive. These capabilities emerge from the continuous alignment between tasks and technologies and, in turn, shape the performance outcomes observed in both companies.

A key capability developed through DT is Fusion Digital Agility, which drives performance outcomes in Company Y. This term captures how the company achieved an agile operating model by integrating digital tools with adaptive processes. This agility drives performance by enabling Company Y to scale revenue in a changing market where rigid competitors struggled. Theoretically, this extends TTF by suggesting that the ultimate performance impact of good task-tech fit is not just static efficiency but the sustained enablement of agility. Agility, the capacity to sense and respond quickly to opportunities or threats, has been identified as a critical factor for success in dynamic markets (Sambamurthy, Bharadwaj, and Grover, 2003; Tallon and Pinsonneault, 2011). Kraft, Lindeque, and Peter (2022) argued that agility is essential for SMEs to remain competitive in rapidly changing digital environments. In essence, Company Y's performance gains were not a one-time boost in productivity. There were gains in dynamic performance, meaning the company's ongoing ability to perform well under changing conditions, driven by the agility enabled by technologies. This can be seen as an extension of TTF to fit-in-practice, meaning the organisation's ability to keep its technology aligned with tasks over time becomes a source of performance (Wirtz, Weyerer, and Heckeroth, 2022). The concept of Fusion Digital Agility highlights that performance impacts in DT are measured by how well the organisation can continually leverage technology for new tasks and challenges, rather than just how much faster it completes existing tasks.

A key capability developed through DT is Versatile Production Capability, which drives performance outcomes in Company Z. By using various advanced machines and digital systems aligned with their tasks, Company Z greatly increased the range and efficiency of what it could produce. The company became capable of handling highly customised orders, switching production lines quickly, and scaling output up or down to meet demand, all without sacrificing cost or quality. This versatility directly translated into tangible performance impacts. In theoretical terms, this extends TTF by showing that a good fit between technology and tasks can lead to capability-building rather than just task productivity. Company Z's case aligns with the operations and IS literature, which shows that the flexible use of advanced manufacturing technologies leads to greater production agility and firm performance (Wan et al., 2020). This versatility delivers scalable, durable performance. It is something the company can use in many situations, giving it a competitive advantage.

Traditional TTF might measure performance by immediate output gains. The extended view recognises versatility as a higher-level benefit, where the company can handle changes efficiently, which is crucial in custom manufacturing markets (Leipzig et al., 2017).

Despite sector differences, both companies highlight a common pattern. The performance impacts of extended TTF are strongly related to responsiveness. In Company Y, it was market responsiveness through digital business agility, and in Company Z, it was operational responsiveness through versatile production. These are complementary aspects of the broader concept of organisational responsiveness or flexibility, which is seen as vital for sustained performance in the digital age (Teece, 2018). The theoretical implication is that the idea of performance in the TTF model should be broadened. It is not just immediate task performance, but the accumulation of capabilities that allow the company to perform in different conditions. Combining concepts like digital agility and production versatility as performance outcomes aligns TTF with modern competitive priorities. Tallon and Pinsonneault (2011) argue that technology value often manifests as capabilities such as agility, which helps explain how technology leads to company success. In addition, the mechanisms of tool adaptation and digital disruption play a critical role in sustaining performance by enabling continuous alignment between tasks and technologies under changing conditions. Wirtz, Weyerer, and Heckeroth (2022) describe how dynamic alignment helps organisations avoid performance degradation in disruptive environments. Both SMEs established such dynamic alignment through mechanisms such as tool adaptation and digital disruption, which enabled them to sustain performance and scale revenue over time.

Taken together, this elaboration does not displace the original TTF framework so much as elaborate how its core constructs are constituted and sustained in practice within SMEs undergoing DT. Table 23 summarizes this theoretical contribution by juxtaposing the original TTF constructs with the revised and case-grounded constructs developed in this study. Read in this way, the table clarifies both the continuity with the original model and the specific points at which the present study extends it.

Table 23. Summary of the Extended TTF Framework

Original TTF construct	Revised/Elaborated construct	Key differences/novel contributions
Task characteristics: the requirements and activities the technology must support (Goodhue & Thompson, 1995).	Leadership-Orchestrated Strategic Tech Selection: leaders actively define, prioritise, and redesign tasks as part of achieving task–technology fit, while selecting technologies to support them	Task requirements are no longer treated as fixed inputs; instead, they are actively shaped by managerial agency as part of task–technology fit formation
	Client-Centric Adaptation: client demands and feedback shape which tasks matter and how they are executed, especially in Company Z.	The task boundary extends beyond internal workflows, with external market expectations shaping task definition and influencing task–technology fit.
Technology characteristics: the features and support capabilities offered by technology for task accomplishment (Goodhue & Thompson, 1995).	Leadership-Orchestrated Strategic Tech Selection: leaders deliberately choose and configure technologies with the characteristics required by priority tasks.	Technology characteristics are strategically shaped, not merely given; selection and configuration become part of task–technology fit creation.
	Client-Centric Adaptation: client requirements drive the modification, integration, or addition of technologies to ensure alignment with externally defined tasks, particularly in Company Z.	Technology characteristics are not only internally shaped but also influenced by external client demands, as companies continuously adjust functional capabilities to maintain task–technology fit with externally defined tasks.
Task–Technology Fit: the degree to which technology assists an individual in performing a portfolio of tasks, reflected through eight dimensions. (Goodhue & Thompson, 1995).	Fit is continuously monitored, re-achieved, and managed through ongoing alignment work. The eight TTF dimensions are not static attributes, but are dynamically shaped through organisational mechanisms in SMEs undergoing DT. These dimensions act as the means through which task–technology fit is constructed and maintained in practice.	Fit shifts from a static state to an ongoing alignment process, actively constructed through the dynamic shaping of its underlying dimensions.
Utilization: the behaviour of using technology to complete tasks (Goodhue & Thompson, 1995).	Hybrid Synchronisation: digital and manual processes are intentionally combined within one workflow when full digital coverage is not feasible.	The form of use matters as much as the amount of use, as hybrid utilisation enables users to enact task–technology fit despite partial misfits.
	Tool Adaptation and Digital Disruption users continuously adjust how technologies are used in response to changing tools, features, and external disruptions, enabling evolving usage patterns over time.	Utilisation is dynamic, with users continuously adapting how and when technologies are used to maintain task-technology fit in response to changing tools and external conditions.

Performance impacts: the outcomes obtained when technology is used to accomplish tasks (Goodhue & Thompson, 1995).	Tool Adaptation and Digital Disruption: continuous adjustment of digital tools and processes in response to technological changes and external disruptions, enabling organisations to maintain performance under evolving conditions	Performance is sustained through continuous tool adaptation and responsiveness to digital disruptions, enabling ongoing alignment between tasks and technologies.
	Fusion Digital Agility (Company Y): digitally enabled responsiveness and scaling capacity created by integrating digital tools with adaptive processes.	Performance is driven by digitally enabled responsiveness and the ability to scale operations in dynamic market conditions.
	Versatile Production Capability (Company Z): the ability to customize, switch, and scale production without sacrificing cost or quality.	Performance is driven by enhanced operational flexibility, enabling customised, scalable, and efficient production across varying demands.

5.5 Organisational and Managerial Reflections

This section presents organisational and managerial reflections derived from the empirical findings, focusing on how the dynamics of task-technology fit shaped decision-making, adaptation, and performance within the two SMEs studied. By analysing the dynamic evolution of task-technology fit in two Indonesian SMEs, the findings provide lessons on how companies can approach DT adoption, utilisation, and alignment to enhance performance. DT should not be treated as a one-time adoption of tools, but as a continuous process that requires deliberate orchestration, hybrid adaptation, and responsiveness to both internal and external factors.

First, leadership plays a critical role in technology selection and in shaping digital fit. The cases show that leaders do not simply adopt available tools but actively define tasks, evaluate technological options, and direct integration to align with strategic priorities. At Company Y, managers addressed mismatches between stock records and physical inventory by integrating Jubilio with Zahir, demonstrating how leadership decisions improved data quality. At Company Z, leadership carefully assessed machinery investments, considering depreciation against long-term sustainability to ensure compatibility with production requirements. These examples indicate that leaders act as fit constructors rather than passive adopters. From an organisational perspective, this suggests that digital investments should be based on long-term goals rather than short-term convenience. Leaders must take an upstream role in shaping both tasks and technologies, supporting the view that managerial agency is central to DT

outcomes. This finding aligns with Kuo and Lee (2011), who highlight the importance of top management support and vision in technology adoption, and with Maruping and Agarwal (2004), who emphasise the need to evaluate platform richness and communication synchronicity carefully.

Second, SMEs need to develop dynamic capabilities to adapt task–technology fit in contexts of disruption. Both cases show that digital systems and processes are often affected by external factors such as platform updates, regulatory changes, or market volatility. Company Y's reliance on TikTok Live, which the government suddenly banned, illustrates how revenue streams can be disrupted overnight. The company responded by creating backup sales channels through its own website, highlighting the importance of resilience in maintaining timeliness. Company Z's marketing teams also demonstrated adaptability by experimenting with CRM systems and online platforms, refining workflows when initial solutions proved ineffective. These examples show that fit is not static but must be continuously reconfigured in response to disruption. From a managerial standpoint, this implies that SMEs should build organisational agility to realign fit rather than seeking alignment only once. This requires a culture of experimentation, contingency planning, and the development of capabilities for sensing and responding to external shocks. This finding supports Wirtz, Weyerer, and Heckeroth (2022), who emphasise the need for ongoing adaptation, and Kraft, Lindeque, and Peter (2022), who highlight agility as essential for SMEs in volatile digital environments.

Third, SMEs should recognise the organisational value of hybrid synchronisation. DT does not always require full automation or seamless integration. Both cases show that performance can still be achieved through partial digital fit supported by manual adaptation. At Company Y, managers combined Trello and Notion with manual warehouse checks to ensure data consistency, acknowledging that full reliance on systems was not always possible. At Company Z, workflows were layered, blending digital payroll and KPI monitoring with family-style practices during the transition to a professionalised HR structure. These examples illustrate a hybrid-fit logic, in which human judgment and manual processes bridge technological limitations. From an organisational practice view, this suggests that SMEs should not delay digital initiatives while waiting for perfect integration but should design hybrid processes that enhance performance despite misfits. This finding supports Vendramin, Nardelli, and

Ipsen (2021), who argue that fit is not all-or-nothing, and Howard and Rose (2019), who observe that different degrees of fit or even misfit can still lead to effective outcomes.

Fourth, performance gains from DT arise less from efficiency alone and more from the development of organisational capabilities such as agility and versatility. Company Y illustrates this through Fusion Digital Agility, achieved by adapting tools and workflows to scale revenue and remain competitive in volatile markets. Employees adapted quickly to digital systems, enabling faster coordination across departments, while leadership encouraged continuous experimentation with new tools. This shows that agility is not a one-time outcome but a capability built through repeated cycles of alignment and adjustment. Company Z, in contrast, achieved performance through Versatile Production Capability, leveraging advanced machinery and CRM integration to expand its capacity to manage diverse, customised orders. This versatility enhanced client satisfaction and repeat business, supporting Wan et al. (2020), who argue that intelligent manufacturing systems increase production flexibility and scalability. From a managerial reflection perspective, DT should be pursued not only for cost reduction or efficiency but also to build capabilities that ensure long-term resilience.

Lastly, practitioners should recognise that DT reshapes relational dynamics inside and outside the organisation. At Company Y, integrated systems reduced shipment errors and improved accuracy, but also weakened informal communication among employees, raising concerns about reduced social interaction. At Company Z, HR transformation shifted the culture from family-style to professionalised management, creating culture shock among staff. At the same time, competitors became collaborators by sharing knowledge about new machinery, showing how digital adoption can create unexpected opportunities for cooperation. These findings suggest that organisational leaders must manage the social consequences of digital tools alongside their technical implementation. Companies should support digital adoption by sustaining organisational culture, promoting open communication, and building trust with external stakeholders. This reflects Matarazzo et al. (2021), who argue that SMEs succeed in DT when they embed sensing and learning capabilities into their organisational culture.

In sum, these organisational and managerial reflections point to a central insight: DT in SMEs should be understood as a dynamic, actor-driven, and contextually

negotiated process. Leaders need to orchestrate technologies, build organisational agility, apply hybrid-fit approaches, invest in capability development, and manage social dynamics. From an organisational perspective, successful DT depends less on achieving static alignment and more on developing the capacity to continually reconfigure fit as tasks, technologies, and environments evolve. SMEs that adopt this perspective are better positioned to enhance performance, scale revenue, and remain competitive amid digital disruption.

CHAPTER 6: CONCLUSION

This final chapter presents the study's conclusion. The study begins with a summary of the context, followed by an overview of the main findings. The discussion then outlines the theoretical contributions and practical implications of the research, before addressing its limitations and suggesting directions for future research. By tying together key insights and reflections, this chapter highlights the study's significance for both academic and practical domains and sets the stage for further scholarly exploration.

6.1 Summary of the Study Context

DT has become a critical research area in Operations Management and Information Systems, with studies gaining significant traction (Hovorka and Mueller, 2025; Müller et al., 2024; Vial, 2019; Kraus et al., 2021; Hanelt et al., 2021). Despite being widely recognised as essential, DT remains a concept without a clear, universally accepted explanation of how it actually occurs within an entity (Piccoli, Grover, and Rodriguez, 2024; Warner and Wäger, 2019; Hanelt et al., 2021; Nadkarni and Prügl, 2021). DT is not a simple process; it disrupts existing activities, processes, and capabilities, thereby increasing the risk of failure (Correani et al., 2020). Moreover, scholars widely recognise DT as a multi-level phenomenon (Dąbrowska et al., 2022; Markus and Rowe, 2021; Trenerry et al., 2021; Vial, 2019), including the organisational level (Hansen and Sia, 2015). This study specifically focuses on the organisational level, with particular attention to SMEs.

Despite significant challenges in adopting digital technologies, such as financial constraints, limited knowledge, and limited technological awareness (Masood and Sonntag, 2020), SMEs remain the backbone of global economies, contributing substantially to GDP and job creation (Eggers, 2020). This is particularly true in developing countries like Indonesia, where SMEs play a vital role, especially during times of crisis. Indonesian SMEs have successfully navigated major global crises, including the 1998 and 2008 economic downturns and the Covid-19 pandemic (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2021; Sulastri, 2022; Junaidi, 2024).

However, much of the existing DT literature focuses on large firms, leaving a gap in understanding how SMEs, particularly in developing countries, navigate DT

(Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018). The DT process in SMEs differs significantly from that in larger firms, yet the literature offers limited insight into how it unfolds in SMEs (Ghobakhloo et al., 2022). Another critical gap lies in the lack of sectoral diversity in SMEs-focused DT research. Most studies concentrate on the manufacturing sector (Mittal et al., 2018; Ghobakhloo et al., 2022), overlooking how SMEs in non-manufacturing sectors implement DT. Therefore, DT research remains open for further exploration, particularly from diverse organisational and sectoral perspectives, potentially leading to the development of new conceptual insights (Nadkarni and Prügl, 2021).

Additionally, this study employed the theory elaboration approach, where the phenomenon is examined not only from the perspective of empirical research but also through the lens of general theory (Ketokivi and Choi, 2014), specifically the TTF theory adopted in this study. Initially introduced by Goodhue and Thompson (1995), TTF argues that an information technology's impact on performance depends on the fit between technology characteristics and task characteristics. TTF has been broadly used by many researchers (Furneaux, 2012).

Nevertheless, TTF has several limitations. One major limitation is its static nature, capturing fit at a single point in time but lacking exploration of how fit evolves as tasks and technology change (Vendramin, Nardelli, and Ipsen, 2021). Another limitation is the oversimplification of TTF, in which many studies focus only on direct effects, overlooking the factors that shape relationship strength and the underlying processes that connect them (Howard and Rose, 2019). Through a theory elaboration approach, this study seeks to refine, expand, or adapt the theory based on new insights from empirical research (Ketokivi and Choi, 2014).

This study, therefore, seeks to address multiple gaps: understanding how SMEs navigate DT (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018); expanding SME-oriented DT research beyond the manufacturing sector (Mittal et al., 2018; Ghobakhloo et al., 2022); challenging the static nature of TTF (Vendramin, Nardelli, and Ipsen, 2021); and responding to the oversimplification of TTF (Howard and Rose, 2019). By examining DT within SMEs in a developing country, using Indonesia as a case study, and analysing it through a TTF perspective, this study contributes to a deeper understanding of the mechanisms through which SMEs adopt DT to enhance their

performance. Specifically, the study investigates the impact of DT on SMEs' performance, particularly in scaling revenue, while exploring the differences and similarities in the mechanisms adopted by two SMEs from different sectors.

To address this, the central research question is posed: *"What are the mechanisms through which SMEs leverage DT to enhance performance?"* This research employs a qualitative multiple-case study design, with the cases represented by the retail sector (non-manufacturing, Company Y) and the manufacturing sector (Company Z).

6.2 Summary of findings

This study addressed the central research question: *"What are the mechanisms through which SMEs leverage DT to enhance performance?"* The findings indicate that a combination of leadership-driven strategy, adaptive technology use, and agility-focused practices contributed to significant performance improvements in two Indonesian SMEs. The research examined two illustrative cases, Company Y (retail sector) and Company Z (manufacturing sector), which are notable for their success in DT despite the resource and capability constraints that typically hinder SMEs in similar developing-country contexts (Ministry of Communication and Informatics of Indonesia, 2024; Setiawan, Marzal, and Fitri, 2024; Suhayati, 2023; Kearney, 2022; Wicaksono and Simangunsong, 2022). The rarity and distinctiveness of these cases provide valuable opportunities for in-depth analysis.

Both companies achieved substantial revenue growth through DT, illustrating that SMEs can overcome resource limitations to achieve scalability. Each case experienced extensive changes in processes, organisational structure, culture, and resource allocation, suggesting that effective SME DT constitutes a comprehensive organisational evolution rather than a limited IT initiative. This reinforces that DT extends beyond digitalisation and requires coordinated, organisation-wide change across processes, structures, and organisational practices, rather than isolated technological implementation. Company Y utilised third-party tools, e-commerce platforms, and social media to establish a data-driven operation, integrating online channels with physical retail locations. Digital initiatives transformed daily processes into analytics-informed workflows and introduced hybrid work structures that combined digital and manual practices. Despite limited resources, the CEO's leadership was crucial: top management strategically selected technologies, invested in employee

upskilling, and fostered a technology-oriented culture centred on continuous learning and experimentation. This leadership approach enabled Company Y to respond rapidly to digital disruptions such as changes in platform algorithms or regulations, ensuring ongoing alignment between new technologies and evolving tasks.

In contrast, Company Z advanced DT by professionalising and modernising its production-focused operations. The company invested in advanced machinery, developed custom digital systems, including an in-house finance application, and adopted third-party tools to enhance its manufacturing capabilities. Concurrently, it shifted from an informal, family-run structure to a formal, professional organisation, fostering a client-centric culture that prioritised customer needs in digital initiatives. Leadership in Company Z employed a consultative yet decisive approach, coordinating technology integration to achieve a task–technology fit aligned with production workflows and growth objectives. Employee adaptability and training were promoted to integrate new digital processes with existing expertise, enabling the company to offer product customisation and improved quality, thereby differentiating itself from traditional competitors. These case-specific pathways demonstrate that successful SME DT does not follow a single trajectory. Each firm leveraged DT in ways that aligned with its sectoral requirements and strategic objectives. Despite differing approaches, cross-case analysis identified a set of standard mechanisms through which both SMEs enhanced performance via DT.

First, active leadership was identified as a primary driver. In both cases, top managers served as digital champions, aligning technology adoption with organisational goals and capabilities. This leadership-driven alignment ensured that technologies addressed actual task requirements and that employees received support throughout the transition. Second, continuous adaptation of technology proved essential. Both firms treated technologies as evolving resources, iteratively adjusting and reconfiguring digital tools and processes to transform potential disruptions into opportunities for innovation. Company Y maximised the features of third-party platforms, while Company Z integrated third-party tools with in-house developments and machinery upgrades. This adaptive approach sustained a high level of task–technology fit over time in both cases.

Third, both SMEs adopted a hybrid implementation approach. Rather than entirely replacing legacy processes, they synchronised digital and manual workflows to address operational gaps and reduce risks. For example, Company Y maintained manual checks alongside digital sales systems to manage platform limitations, while Company Z kept paper-based records as backups to its digital production systems. This hybrid synchronisation enabled each company to achieve a sufficient task–technology fit and performance improvements without complete automation. Fourth, both firms developed organisational agility and learning capabilities, or what can be termed digital agility, as a cumulative outcome of their DT efforts. Rather than viewing DT as a one-off project, Company Y and Company Z established practices for continuous sensing, learning, and responsiveness to change. Company Y encouraged experimentation with new platform features and rapid adaptation to market shifts. At the same time, Company Z enhanced its production flexibility, enabling swift product customisation and scalable output in response to client feedback.

Finally, client-centric innovation emerged as a key mechanism. Company Z utilised digital tools to better understand client needs and customise its offerings, resulting in revenue scaling. While Company Y did not explicitly label its approach as customer-centric, it adopted similar practices by using e-commerce data and online interactions to guide product and inventory decisions. This client-focused adaptation ensured that technology investments led to increased customer value and improved performance outcomes. The findings indicate that achieving an effective task–technology fit (TTF) in these SMEs was a dynamic and ongoing process, rather than a single event. Both companies continuously realigned tasks and technologies as conditions changed, demonstrating that fit is iterative and must be renegotiated through experimentation, feedback, and adjustment. This dynamic perspective challenges the traditional static view of TTF (Goodhue and Thompson, 1995) and shows that, in practice, fit is actively constructed over time by organisational actors. An unexpected but insightful observation was that both SMEs accelerated DT by utilising third-party digital platforms instead of developing systems internally. By leveraging readily available technologies, Company Y and Company Z implemented advanced digital functions rapidly despite limited IT resources. This reliance, however, required ongoing flexibility to adapt to platform changes and to integrate platform data with internal systems, further highlighting the importance of agility and hybrid solutions.

In summary, five mechanisms explain how SMEs leverage DT to enhance performance: strategic leadership, adaptive tool use, hybrid integration, organisational agility, and client-centric adaptation. Through these mechanisms, both Company Y and Company Z overcame resource constraints and dynamic market challenges, achieving revenue scaling and increased competitiveness as outcomes of their DT efforts. These findings address the central research question by demonstrating how DT drives performance in SMEs and emphasise that the process is highly context-dependent, requiring a continuously negotiated fit between technology and tasks.

6.3 Theoretical Contribution

This research offers a significant theoretical advancement by elaborating and refining the Task–Technology Fit (TTF) framework (Goodhue and Thompson, 1995) within the context of DT in SMEs. The original TTF framework posits that performance outcomes depend on the alignment between technology characteristics and the tasks they support. The present findings extend this theory by demonstrating that fit is a dynamic construct shaped by ongoing interactions between managers and their environment. In both case studies, task characteristics were found to be malleable and co-created; tasks were continually redefined through internal decisions and external influences rather than being fixed requirements. Top managers actively shaped work tasks to align with their digital strategy, for example, by redefining roles, workflows, and skill sets to leverage new technological capabilities. This positions managerial involvement as an upstream factor in task formation, supporting prior assertions that leadership influences task–technology alignment through top management support and strategic guidance (Kuo and Lee, 2011; Maruping and Agarwal, 2004). However, previous TTF research has not accounted for how such alignment is practically constructed over time during DT. While TTF identifies the importance of achieving fit, it does not explain the underlying mechanisms through which organisations actively create and maintain this alignment. This study highlights the need to examine fit as an evolving outcome.

External forces, such as client expectations (Li et al., 2023; Matarazzo et al., 2021), also played a critical role in shaping tasks. Both SMEs adjusted their task requirements in response to client demands and market feedback, demonstrating that the organisation and its environment jointly determine the task dimension of fit. By

conceptualising tasks as dynamic and externally informed, this research broadens the TTF framework beyond the original assumption of static task sets, emphasising that tasks evolve during DT in response to consumer trends and competitive pressures. Similarly, technology characteristics were not treated as fixed; instead, the SMEs proactively adapted and configured digital tools to meet evolving needs, including modifying technologies through custom add-ons or creative feature use. This demonstrates that technologies function as flexible resources (Vendramin, Nardelli, and Ipsen, 2021; Pascucci, Savelli, and Gistri, 2023), with their effective characteristics shaped by user adaptation and configuration. Thus, fit is actively constructed through ongoing alignment between changing tasks and adaptable technologies. By documenting the continual redefinition of tasks through leadership intervention and client input, as well as the responsive adaptation of technologies, this study introduces new constructs into TTF, such as leadership as a "fit constructor" and client-centric task reconfiguration, and confirms that fit is an evolving target rather than a one-time achievement.

This study further refines the core concept of "fit" by providing empirical evidence that fit should be understood as a continuous, people-driven process. In both Company Y and Company Z, achieving a high level of task–technology fit was not the endpoint of DT, but rather a moving target that required frequent adjustments. The cases revealed repeated cycles of experimentation, where employees and managers implemented tools, learned from shortcomings or new opportunities, and subsequently refined technology use or altered task processes. This iterative pattern aligns with emerging theoretical arguments that fit is dynamic and ongoing (Howard and Rose, 2019; Vendramin, Nardelli, and Ipsen, 2021). Both companies engaged in ongoing tool adaptation, hybrid technology utilisation, and responsive adjustments to disruptions, such as sudden platform policy changes or unpredictable algorithms, indicating that their fit was continually re-optimised. This evidence directly addresses critiques that classic TTF models are overly static (Strong and Volkoff, 2010; Wirtz, Weyerer, and Heckeroth, 2022). The findings show that even when an initial fit was achieved, it was often only sufficient and required further refinement as conditions evolved, supporting a more nuanced view that varying degrees of fit, rather than a binary fit or misfit, can yield positive performance. Notably, both cases demonstrate that partial fit, supplemented by human ingenuity such as manual workarounds or process adjustments,

can sustain performance outcomes. This challenges the assumption in early TTF work that perfect alignment is necessary, aligning with scholars who argue that organisations often operate with suboptimal fits, which are compensated for by flexibility and learning (Strong and Volkoff, 2010; Wirtz, Weyerer, and Heckeroth, 2022). By illustrating that fit evolves through continuous human agency, with employees and leaders iteratively bridging gaps between task demands and technological capabilities, this study reinforces the call for a dynamic perspective on TTF and provides concrete examples of this process in SME settings.

This research also advances the TTF framework's treatment of technology utilisation and performance outcomes. Traditional TTF studies often conceptualise technology use as a binary or straightforward outcome, where a tool is either used or not, and its use directly yields performance. The present findings complicate this view by revealing that SME technology utilisation is often hybrid in nature (Merín-Rodríguez, Dasí, and Alegre, 2024). Both firms combined digital tools with complementary manual processes, adopting a pragmatic mix of established and new practices to accomplish tasks. This selective and partial use of information technology is a deliberate strategy in resource-constrained environments, where users actively determine which technology functions to employ and when to rely on human effort, aiming for a feasible fit that meets organisational needs. By documenting these hybrid utilisation patterns, this study highlights utilisation as a flexible, user-driven process rather than a simple transition from non-use to full use. This extends TTF by suggesting that the degree and manner of technology use, including parallel manual processes, should be considered when assessing fit and its impact. Furthermore, this study broadens the notion of performance impacts in the TTF model. Rather than measuring performance solely in terms of immediate efficiency or individual productivity, the cross-case findings demonstrate that successful DT can generate new organisational capabilities that underpin long-term performance. Both SMEs developed strategic capabilities, such as digital agility in operations (Sambamurthy, Bharadwaj, and Grover, 2003; Tallon and Pinsonneault, 2011) and versatile production capacity (Wan et al., 2020; Teece, 2018), as a result of achieving and continuously improving task–technology fit. For example, Company Y's increasing digital agility enabled the rapid launch of new online campaigns and business model adjustments. At the same time, Company Z's flexible production capability facilitated entry into new markets and large-

scale product customisation. These outcomes extend beyond short-term task efficiency, representing enhancements in dynamic capabilities and competitive positioning, ultimately leading to sustained revenue scaling and market responsiveness. By incorporating capability-oriented performance outcomes into TTF, this study addresses calls to move beyond narrow definitions of performance in information systems research. In summary, the findings suggest that the primary performance benefit of task–technology fit in DT lies in enabling adaptability and innovation, which are essential for SME survival in turbulent environments.

Collectively, these insights reposition the TTF framework as a more dynamic and context-sensitive approach for understanding DT in SMEs. This research introduces new theoretical elements, including the influence of leadership and client market forces on fit, the acceptance of iterative and partial fits, hybrid usage patterns, and long-term capability development, thereby addressing key theoretical gaps identified in the literature (Vendramin, Nardelli, and Ipsen, 2021; Howard and Rose, 2019; Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018; Ghobakhloo et al., 2022). Notably, this work challenges the static and oversimplified portrayal of TTF by demonstrating that fit unfolds as an ongoing trajectory rather than a singular event. The study also expands TTF's relevance beyond its traditional applications by applying it to SMEs in a developing country and across two distinct industry sectors, providing evidence that the refined TTF framework can accommodate the realities of resource-constrained and diverse environments. This extension is significant, as prior research on SME DT has focused primarily on manufacturing contexts and developed economies, often overlooking the nuanced ways fit is achieved in other settings (Matt, Modrák, and Zsifkovits, 2020; Mittal et al., 2018; Ghobakhloo et al., 2022). This study begins to address that gap, suggesting that the core premise of TTF, aligning technology with tasks to drive performance, remains valid across varied contexts, but is realized through mechanisms such as leadership orchestration, client-centric adaptation, hybrid synchronisation, fusion agility, and versatile production, all of which are deeply influenced by context. In this way, the study provides an explanation of *how* task–technology fit is formed, sustained, and adjusted in practice, thereby filling a core theoretical gap in existing TTF research. The theoretical contribution of this research is the articulation of task–technology fit as a mechanism-driven, dynamic alignment

process rather than a static condition, offering greater explanatory power for understanding DT in SMEs.

6.4 Practical and Policy Contribution

The findings of this study provide several practical insights for SMEs and inform policy recommendations for supporting DT in similar contexts. The cases highlight the central role of leadership in driving successful digital initiatives (Kuo and Lee, 2011; Maruping and Agarwal, 2004). Rather than relying on technology to deliver value independently, SME leaders must actively orchestrate DT by defining a clear digital vision and strategically aligning technology with business objectives from the outset. In both Company Y and Company Z, top management carefully selected technologies that matched organisational needs and guided their implementation, resulting in a high initial task–technology fit. This leadership involvement aligns with broader evidence that top management support and vision are essential for effective SME innovation. Therefore, SME owners and executives should invest time in understanding digital options and direct their organisation's adaptation process by championing new systems, allocating resources for employee training, and consistently communicating how digital changes support the firm's long-term strategy. For policymakers, this suggests the importance of empowering SMEs through training programs and advisory services that enhance digital leadership capabilities. Developing managerial digital literacy and strategic expertise can have a multiplier effect, as informed leaders are more likely to plan and execute transformations that improve organisational performance.

Another key insight is the importance of building organisational resilience and agility as integral components of the DT process. SMEs operate in turbulent environments characterized by market shifts and technological disruptions, making adaptability essential for successful DT. Both case companies benefited from developing dynamic capabilities (Wirtz, Weyerer, and Heckeroth, 2022; Kraft, Lindeque, and Peter, 2022), enabling them to reconfigure processes, realign tools, and pivot business models in response to unexpected events such as platform policy changes or economic shocks. This finding indicates that SMEs should view DT as an opportunity to foster agility and continuous learning within their teams, rather than as a one-time IT upgrade. Managers should promote a culture of ongoing improvement and

responsiveness, empowering staff to adjust processes or explore alternative solutions when challenges arise. Regular evaluation of the alignment between tools and tasks can facilitate early detection of misalignments and prompt timely adjustments. From a policy standpoint, supporting agility may require shifting assistance programs beyond technology provision or funding. While financial incentives are beneficial, policy support should also emphasize soft capabilities, such as offering change management workshops, establishing SME peer learning networks, or subsidizing digital coaches to help firms develop rapid response strategies. Strengthening managerial capacity and digital skills within the workforce is as important as capital investment, as it enables SMEs to withstand and capitalize on disruptions. In developing countries, where external shocks are frequent, cultivating resilience is crucial to ensure that DT development efforts yield improved performance.

The cases also demonstrate that SMEs do not require fully optimized digital solutions to achieve substantial improvements. Both firms succeeded by employing a hybrid approach that combined digital and manual processes, which proved more practical and cost-effective than pursuing complete automation (Vendramin, Nardelli, and Ipsen, 2021; Howard and Rose, 2019). This challenges the assumption that DT necessitates the full replacement of human labor with technology. Company Y and Company Z achieved positive outcomes by implementing partial digital solutions and addressing remaining gaps through human intervention or simple workarounds. For instance, Company Y utilized existing online platforms for sales and marketing, compensating for their limitations with manual data reconciliation and personalized customer engagement. Company Z adopted digital production planning while maintaining hands-on oversight and paper backups to ensure accuracy on the factory floor. These examples illustrate that a combination of digital tools and human adjustments can deliver high performance. SME managers should therefore be encouraged to begin with affordable digital tools and integrate them into existing operations, rather than waiting for comprehensive systems. Incremental improvements can accumulate to produce significant performance gains over time. For policymakers, this suggests that initiatives should support incremental and modular adoption, such as facilitating access to reliable digital platforms and providing guidance on integrating these platforms into business processes. Developing guidelines that highlight hybrid process designs can help SMEs effectively combine digital and manual methods. By

recognizing the value of partial DT, this study recommends a nuanced approach that avoids a uniform push for costly, full automation and instead supports broader digital adoption tailored to SMEs' specific contexts.

The human and cultural dimensions of DT require careful management, as highlighted by both case studies. DT is not solely a technical upgrade; it fundamentally reshapes organisational culture, work structures, and external relationships (Matarazzo et al., 2021). If not managed inclusively, these changes may result in employee resistance, loss of tacit knowledge, or misalignment between new technologies and established work practices. Company Y and Company Z addressed these challenges by actively involving employees, investing in training, clarifying new roles and expectations, and fostering openness to change throughout the workforce. Managers should similarly prioritise communication and change management during digital initiatives by explaining the purpose of new tools, seeking employee feedback, and emphasising how technology complements employees' roles. Technology adoption should reinforce, rather than undermine, organisational cohesion and culture. Practical measures include appointing internal digital ambassadors to mentor peers, aligning incentives to reward adaptability and digital skill development, and preserving familiar routines or values to maintain continuity during transitions. From a policy perspective, supporting the human aspect may involve providing SME-specific change management resources or facilitating partnerships with consultants to guide organisations through people-centred aspects of DT. Additionally, sectoral and local contexts must be considered in both practical and policy measures. The two cases demonstrate that the digitalisation path for a retail SME, often involving online marketplaces and marketing analytics, differs significantly from that of a manufacturing SME, which focuses on machinery and production. Support programs and industry guidelines should therefore be tailored to sector-specific needs and conditions. Policymakers might design distinct digital upskilling courses for non-manufacturing and manufacturing SMEs or ensure that infrastructure investments address the unique requirements of different SME sectors. The Indonesian context of this study further illustrates that developing-country SMEs face unique institutional and resource challenges, making it essential for policies to address issues such as access to affordable technology, basic digital literacy, and trust in digital platforms to create an enabling environment for DT.

In summary, the practical and policy contribution of this research is to demonstrate that successful SME DT depends less on achieving a static, optimal alignment at a single point in time and more on fostering continuous adaptability. SMEs that integrate a clear strategic vision with a flexible, learning-oriented implementation approach are better positioned to translate digital investments into performance improvements. For practitioners, this entails leading with vision, adopting adaptive and hybrid practices, and consistently aligning technology with evolving business needs. For policymakers, it involves creating conditions that enable SMEs to develop adaptive capacities through education, infrastructure, and targeted support, rather than prescribing specific technologies. Ultimately, SMEs can enhance performance and maintain competitiveness in the digital era by becoming adaptive organisations that use digital tools as evolving instruments in an ongoing process of innovation and growth.

6.5 Limitations

This study has several limitations. First, the findings are based on two case studies of Indonesian SMEs: one in the non-manufacturing sector (retail) and one in the manufacturing sector. While this multiple-case design provides in-depth insights into the mechanisms of DT, it naturally limits the extent to which the results can be generalised to other sectors. Secondly, the study is contextually bound to SMEs in Indonesia as a developing country. Specific institutional, cultural, and resource conditions in Indonesia shape the mechanisms identified. Although these findings enrich the understanding of DT in resource-constrained environments, they may differ in other developing countries and in developed economies as well.

Thirdly, the research employs a qualitative multiple-case study approach. While this method is well-suited for exploring processes and generating theoretical insights, it does not provide quantitative evidence of the strength or generalisability of the observed relationships. Fourthly, the theoretical framing of this study centres on TTF. Although this lens allowed for meaningful elaboration and refinement, it naturally narrows the scope of interpretation. Finally, the analysis is time-bound, capturing the development of DT as it unfolded during a specific research period. Yet DT is an ongoing, evolving process that continues to change as technologies and contexts evolve.

6.6 Future Research

Building on these limitations, several directions for future research can be identified. Firstly, further studies could broaden the scope by including a larger number of SMEs across both manufacturing and non-manufacturing sectors, such as agriculture, transportation, accommodation, and food services. This would provide richer insights and greater sectoral variety.

Secondly, comparative research across countries could deepen understanding of how institutional, cultural, and resource conditions shape DT. Studies across developing countries in Asia, Africa, and Latin America, as well as comparisons with SMEs in developed countries, would provide more nuanced perspectives on contextual differences. Thirdly, future research could adopt quantitative or mixed-method approaches to test and validate the mechanisms identified in this study on a larger scale. Expanding the number of cases in multiple-case designs would also strengthen the robustness of findings.

Fourthly, theoretical integration represents another promising path. While this study elaborated TTF, combining it with perspectives such as dynamic capabilities, the resource-based view, or institutional theory could enrich the analysis of how SMEs navigate DT. Finally, longitudinal studies would be valuable for examining how DT unfolds over time, providing insights into how the mechanisms of fit and performance outcomes evolve as technologies, strategies, and environments continue to change.

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APPENDICES

i. Appendix A. Research Ethics Approval Letter



University of Nottingham
UK | CHINA | MALAYSIA

Faculty of Social Sciences
Nottingham University Business School
University of Nottingham
Jubilee Campus
Nottingham
NG8 1BB

1 December 2023

To whom it may concern,

Ethics Application No.: 202324014 - A Roadmap Towards Digital Transformation for SMEs: The Case in Indonesia - Muhammad Rijal Ramdani

I am writing as chair of the Nottingham University Business School Research Ethics Committee (NUBS REC) to confirm a favourable ethical opinion for the above research on the basis of the documentation submitted below. This opinion was given on the above stated date.

The School REC operates according to the University of Nottingham's *Code of Research Conduct and Research Ethics, and the Economic and Social Research Council (ESRC) Framework for Research Ethics.*

The documents reviewed and approved are:

- NUBS REC Ethics Review Checklist
- Research Participant Information Sheet
- Research Participant Privacy Notice
- Research Participant Consent Form

The following conditions apply to this favourable opinion:

1. The research must follow the protocol agreed and any changes will require prior NUBS REC approval.
2. Poor writing style is bad for the reputation of the university: The researcher needs to put the participant information sheet through a grammar checker such as Grammarly: https://www.grammarly.com/.

For further information about the School's Research Ethics Committee or approval process, please contact the Research Ethics Officer, Dr Gerardus Lucas, by

emailing gerardus.lucas@nottingham.ac.uk or calling +44 (0) 115 9515278.

Yours faithfully,



Dr Gerardus Lucas
Research Ethics Officer and Chair of Nottingham University Business School
Research Ethics Committee

ii. Appendix B. Research Participant Information Sheet



Information for Research Participants

Thank you for agreeing to participate in the research project. Your participation in this research is voluntary, and you may change your mind about being involved in the research at any time, and without giving a reason.

This information sheet is designed to give you full details of the research project, its goals, the research team, the research funder, and what you will be asked to do as part of the research. If you have any questions that are not answered by this information sheet, please ask.

This research has been reviewed and given favourable opinion by the Nottingham University Business School Research Ethics Committee.

What is the research project called?

A Roadmap Towards Digital Transformation for SMEs: The Case in Indonesia

Who is carrying out the research?

I am carrying out the research as A PhD student, with the details: Primary Researcher: Muhammad Rijal Ramdani Supervisor: Prof. Kim Hua Tan and Dr Lin Wu Institution: University of Nottingham Department: Operation Management and Information System

What is the research about?

In the revolution industry 4.0, large companies have stepped forward to deal with digital transformation (DT). However, small-medium enterprises (SMEs) are slow to react to this modern business. It expects that SMEs will have more obstacles in implementing DT than large companies. In fact, SMEs have been giving benefits to many countries, such as reducing unemployment, encouraging innovation, improving the quality of human resources, giving a source of state foreign exchange, and many more. SMEs are the backbone of economies in many countries, including developing countries. If there is a suitable roadmap, SMEs will quickly adopt toward DT paradigm. Hence, this paper aims to explore the roadmap toward DT for SMEs, focusing on the case in Indonesia. Specifically, the following research question is proposed: The following overall research question is proposed: "What are DT processes?". This study aims to answer this main question empirically and with SMEs' context. Several sub-questions are therefore defined: - What are the primary factors influencing the implantation of DT, and what benefits and challenges do SMEs face in this regard? - To what extent do the technologies fit the SMEs' characteristics? - What is the outcome of the process of DT within SMEs?

What groups of people have been asked to take part, and why?

The participants being invited to take part in this research are individuals who are actively involved in the implementation of DT within their companies. This includes a range of roles, such as CEOs, managers, and members of the management team who oversee areas like marketing, product development, operations, technology development and other employees who play a significant role in the integration of technologies within their respective companies. These groups have been selected because they possess valuable insights into the adoption and impact of DT within SMEs in Indonesia. Participants are identified based on their roles and responsibilities within their organisations, which make them key stakeholders in the DT process.

What will research participants be asked to do?

Research participants will play a crucial role in contributing to the understanding of DT within SMEs in Indonesia. The participant involvement will include three main components:
Firstly, interview. Research participants will be invited to take part in individual interviews, which are expected to last between 30 to 60 minutes. During these interviews, you will be asked to share your insights and experiences related to the implementation of DT within your organisation. Secondly, the research will involve participant observation. This means that the researcher will directly participate in activities of participants such as project meetings, workshops, and other events related to the implementation of DT within your SME. Thirdly, the researcher also analyse technical documentation, system documents, visualization diagrams, and other materials related to implementing DT within your SMEs.

Benefits: Participating in this research will give you an opportunity to contribute to a better understanding of DT in SMEs in Indonesia. Your input will help inform strategies for DT that can benefit SMEs in the future.
Risks: There are minimal risks associated with participating in this research. You may discuss sensitive information about your organisation, but we will ensure that your responses are anonymized and treated with the utmost confidentiality. The interviews will be recorded and transcribed to ensure accurate data collection. Rest assured that your personal information will be kept confidential and anonymized to protect your privacy and the confidentiality of your organisation's data.

What will happen to the information I provide?

The information you provide will be anonymized in the research outputs will be in full compliance with data protection and privacy regulations. To protect confidentiality, any potentially identifying characteristics, such as names, specific geographic locations, and unique identifiers, will be replaced with pseudonyms or removed. Additionally, any information that could be used to deduce the identity of participants or organisations will be carefully excluded. The primary aim is to ensure that the data is presented in a way that safeguards the privacy and anonymity of all involved parties while still preserving the integrity of the research findings.

What will be the outputs of the research?

The primary output of this student research, which is part of my PhD dissertation. I aim to publish the research findings in journals, and there is a possibility of presenting the work at relevant conferences in the future.

In addition, this research will be designed to provide practical guidance to SMEs seeking to navigate the challenges and opportunities of digital transformation. Furthermore, I plan to actively engage in knowledge exchange activities, which may include sharing the research outcomes with practitioner journals, industry associations, and SME support organisations. This will help ensure that the research's insights reach a wider audience, especially those directly involved in SME management.

While I cannot guarantee the outcomes, I am committed to making the knowledge generated through this research accessible and beneficial to SMEs and the academic community. Participants interested in obtaining copies of the research outputs will be provided with relevant information on how to access them once they are available.

Contact details

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Complaint procedure

If you wish to complain about the way in which the research is being conducted or have any concerns about the research then in the first instance, please contact the supervisor:

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Or contact the School's Research Ethics Officer:

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iii. Appendix C. Research Participant Privacy Notice

Privacy information for Research Participants

For information about the University's obligations with respect to your data, who you can get in touch with and your rights as a data subject, please visit: https://www.nottingham.ac.uk/utilities/privacy.aspx.

Why we collect your personal data

We collect personal data under the terms of the University's Royal Charter in our capacity as a teaching and research body to advance education and learning. Specific purposes for data collection on this occasion are for my research study on 'A Roadmap Towards Digital Transformation for SMEs: The Case in Indonesia.' The primary objective of data collection for this study is to explore the roadmap toward digital transformation (DT) for SMEs, focusing on the case in Indonesia.

Specifically, the purposes are to empirically examine the primary factors that influence the adoption of Industry 4.0 technologies within SMEs and to assess the associated benefits and challenges, to evaluate the alignment between SME characteristics and the adoption of I4.0 technologies, thereby determining the extent to which these technologies fit within the SME context and to investigate the outcomes of the DT processes within SMEs, with a focus on understanding the tangible results and impacts of these initiatives, and to contribute valuable knowledge to the academic community and business stakeholders regarding the DT of SMEs in Indonesia.

We want to provide transparency about the personal data that may be collected, which may include details such as names, contact information, job titles, and other relevant information. We acknowledge the sensitivity of this data and are committed to its secure handling.

To ensure the highest level of data protection, we will employ industry-standard security measures, including encryption, strict access controls, and secure storage methods. The data collected will be anonymized to protect the privacy of participants and handled in strict compliance with data protection regulations.

Legal basis for processing your personal data under GDPR

The legal basis for processing your personal data on this occasion is Article 6(1a) consent of the data subject.

How long we keep your data

The University may store your data for up to 25 years and for a period of no less than 7 years after the research project finishes. The researchers who gathered or processed the data may also store the data indefinitely and reuse it in future research. Measures to safeguard your stored data include the application of encryption protocols to ensure the confidentiality and security of the data. Personal identifiers will be pseudonymized to protect the anonymity of the SMEs and individuals participating in the research. The data will be securely stored in controlled environments with restricted access, and only authorized personnel will have permission to handle and manage the data. These measures are in place to guarantee the privacy and security of your data throughout its retention period and any potential future use in research.

iv. Appendix D. Research Participant Consent Form

University of Nottingham
UK | CHINA | MALAYSIA

Nottingham University Business School
Participant Consent Form

Name of Study: A Roadmap Towards Digital Transformation for SMEs: The Case in Indonesia

Name of Researcher(s): Muhammad Rijal Ramdani

Name of Participant:

By signing this form I confirm that (please initial the appropriate boxes)**:**	**Initials**
I have read and understood the Participant Information Sheet, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	
Taking part in this study involves an interview, observations, and archival data completed by the participant that will be recorded using audio. [For audio recordings, these will be transcribed as text, and the recording will be destroyed.]	
Personal information collected about me that can identify me, such as my name, contact information, or location, will not be shared beyond the study team. This information will be securely stored and handled in compliance with data protection regulations to ensure my privacy. My personal information will only be used for the purposes of this research and will not be disclosed to any third parties.	
My words can be quoted in publications, reports, web pages and other research outputs.	
I give permission for the de-identified (anonymised) data that I provide to be used for future research and learning.	

I agree to take part in the study

Muhammad Rijal Ramdani		1 December 2023
Name of Participant	Signature	Date
Researcher's name	Signature	Date

2 copies: 1 for the participant, 1 for the project file

v. Appendix E. Interview Guideline

Semi-Structured Interview Guideline of Company Y and Company Z

Introduction

1. Can you briefly tell me about this company? What products or services do you provide?
2. Since when has the digital transformation process been carried out? How far has it progressed so far?

Task Characteristics

3. What is your role and your main responsibilities?
4. In your department, do you depend on other departments, or can it operate independently?
5. Could you give an example of a task that requires coordination with other departments?
6. What are the routine tasks you usually perform?
7. Are there also changing or non-routine tasks you often need to handle? Can you give an example?

Technology Characteristics

8. What technologies or digital tools do you usually use?
9. What features of these tools are most useful for your work?
10. Is the technology you use the same as the one used in other departments? If different, why?

Task–Technology Fit

11. Do you feel that the technology you use fits with your tasks? In what ways?
12. Has the technology ever been replaced, or are you still using the same one? If replaced, what were the reasons?
13. How do you assess whether the technology really fits with your tasks? Do you rely on your own judgment, feedback from colleagues, or your manager?
14. Does the technology affect aspects such as data quality, data locatability, authorisation, compatibility, timeliness, reliability, ease of use, or relationships with users? Could you share examples?

Utilization

15. Do you feel the use of this technology is important, or do you sometimes find traditional/manual ways easier?
16. Can you share an example of when you preferred manual work over digital tools?
17. What factors motivated you (or your department) to adopt digital transformation?

Performance Impacts

18. What impacts have you experienced from the digital transformation process?
19. Are there any achievements you or your department have contributed to the company?
20. What challenges have you faced during the process?
21. SMEs usually face many limitations compared to large companies. Why do you think your SME has managed to grow compared to competitors? What makes your company different?

Closing

22. Is there anything else you would like to share?

Thank you very much for your participation.

We really appreciate your support and cooperation!

vi. Appendix F. Empirical Evidence of Company Y

F.1 Thematic Analysis Process of Company Y

Table 24. Thematic Analysis Process of Company Y

Quotes Interview	Codes	Sub-theme	Themes
"We can't afford to invest in all platforms. The ones we use must align with our financial constraints and offer strong ROI. Every year, we re-evaluate the tools we subscribe to, and if they don't deliver sufficient value, we switch to alternatives." (Head of Finance)	ROI Focus	Deliberate Tech Fit	Leadership-Orchestrated Strategic Tech Selection
"As a CEO, I always weigh whether a new technology is worth adopting. It's not just about trends but also long-term sustainability. We look at cost-benefit analysis, integration feasibility, and whether the team can quickly adapt." (CEO)	Sustainability		
"A mix of top-down and bottom-up." (CEO)	Dual Approach	Dialogic Leadership	
"For us, skill development is a must. Even if we automate tasks, the team must know how to manage the tools. We regularly update our SOPs to reflect technological advancements." (HR)	Skill Growth		
"I push the team to explore new digital tools, ensuring they're comfortable with changes. Without this, we'll be left behind. I encourage self-learning, attending webinars, and internal training sessions to ensure the team stays updated." (CEO)	Proactive Learning	Action-Oriented Support	
"As a leader, I don't just assign tasks. I personally test new tools before integrating them into our processes, making sure they match our needs." (Head of Sales)	Hands-on Leadership		
"We need to understand platform algorithms, whether it's Shopee, TikTok, or Instagram. It's unpredictable, but we have to adapt. One day, an ad strategy works, and the next, it doesn't, so we constantly test and iterate." (Head of Marketing)	Continuous Testing	Navigating Unpredictable Algorithms	Tool Adaptation and Digital Disruption
"The TikTok algorithm once favored certain video formats, but now it's different. We adjust our content strategy monthly to ensure maximum engagement." (Head of Sales)	Content Adjustment		
"When TikTok Shop was suddenly banned, we had to move all our customers to Shopee Live. It wasn't easy, but we prepared backup strategies, ensuring that our live sales team was ready to pivot instantly." (Head of Sales)	Rapid Pivot	Adaptive Platform Transition	
"Our ads budget allocation changes depending on platform performance. When TikTok Shop shut down, we immediately reallocated funds to Shopee and Instagram ads, making sure we didn't lose revenue momentum." (Head of Finance)	Budget Reallocation		
"Not all team members are in the office all the time, including myself as the CEO. But we have deadlines for reports. The solution lies in digital tools that can unify these elements, such as cloud-based platforms like Notion. With Notion, we can structure workflows, assign responsibilities, and monitor execution even when not physically present." (CEO)	Workflow Alignment	Digital Systems Dependence	Hybrid Synchronisation

"We rely on Notion, Google Drive, and Telegram for daily operations. If one fails, we have alternatives, but without digital tools, it would be impossible to maintain our operational speed." (Head of Marketing)	Tool Reliance		
"We can't rely on just one platform. TikTok, Shopee, Lazada, each contributes differently. When TikTok Shop was suddenly banned, we quickly shifted our focus to Shopee Live and our internal website promotions." (Head of Sales)	Platform Diversification	Multiple Platforms	
"For marketing, we have multiple Instagram accounts with different purposes: main branding, product catalogs, and audience engagement. This diversification ensures we don't lose reach due to algorithm changes." (Head of Marketing)	Account Segmentation		
"For Jubelio, I check stock and daily sales reports. Every sale at the offline store is recorded in Jubelio, which is crucial for meeting my targets. But since Jubelio does not integrate seamlessly with our finance system, I still have to reconcile data manually between Jubelio and Zahir." (Retail Growth)	Manual Reconciliation	Gaps in Technology	
"For warehouse management, we still do manual double-checks because digital systems sometimes don't update in real-time. If we fully depend on digital tools, we risk stock misalignment." (Head of Warehouse)	Stock Checking		
"Changes are rapid and massive, with sales platforms constantly evolving, new platforms emerge, and some shut down suddenly." (CEO)	Rapid Response	Flexibility and Adaptability	Fusion Digital Agility
"For the sales team, adapting quickly is crucial. When one platform updates its algorithm, we must adjust our strategy immediately. That's why we always monitor market trends and customer behavior daily." (Head of Marketing)	Quick Adjustment		
"With Notion, we can track processes, create structured timelines, and ensure tasks across departments are aligned without unnecessary delays. We don't waste time on unnecessary meetings anymore since updates are all visible in real-time." (Marketing)	Process Tracking	Operational Efficiency and Systemization	
"Production timelines are critical. We integrate Jubelio for inventory, Zahir for finance, and a separate tracking sheet for quality control. The system is not perfect, but by aligning digital tools with our operations, we maintain efficiency." (Head of Production)	System Integration		
"We push employees to learn new systems continuously. We don't just implement digital transformation, we train them to be comfortable using multiple platforms, so when changes happen, they are not lost." (HR)	Continuous Training	Employee Development and Productivity	
"In the creative department, we regularly conduct training on new AI-powered design tools. This ensures the team remains efficient and doesn't get stuck using outdated methods." (Art Director)	AI Training		

F.2 Rich Participant Data: Company Y

Table 25. Rich Participant Data: Company Y

Participant	Quotes
Y1	*"… We aim for flexibility. Why is flexibility crucial? Because if we aren't flexible, we won't survive. Changes are rapid and massive, with sales platforms constantly evolving, new platforms emerge, and some shut down suddenly. The pace of change is unpredictable. For example, TikTok has disrupted all marketplaces. Second, our business model itself influences this. We operate a hybrid model, so while some decisions and planning must involve people, many tasks can be streamlined with digital tools".*
Y2	*"So, it's very helpful for attendance, salary, and other matters. Where if we didn't use an automated payroll system, I would definitely be overwhelmed. So, the essence of digital transformation is very significant in helping my work at Company Y. The benefits are really felt. And then, it definitely changes habits or organisational culture".*
Y3	*"…there are, specifically for checking stock and catalogs, through the Jubilio software. So, every catalog and stock on each platform needs to be constantly updated, and Jubilio really helps with that, so the stock is always accurate. And it's customizable, so I can change and modify it more easily. It can even help with promotions across all platforms, so it's truly integrated. And Jubilio is actually used in other departments too, like the warehouse department. So, overall, from the sales team's perspective, we're already highly digitized, there's nothing manual".*
Y4	*"Maybe it's because Company Y is really tech-savvy, because we use technology all the time. The proof is, earlier we were tracking job descriptions, right, using technology, namely Notion. Maybe in the past, it was just Google Sheets. However, as time goes on, we think about how to manage and structure it well inside. So, we tried out several digital platforms. For me, there's no problem, just need to get used to it. Maybe at the beginning, sometimes people, because they're not used to it yet, when they try a system like that, it seems so complicated, yeah, it felt like that at first. But after trying it, oh, it's actually okay and very easy".*
Y5	*"Company Y isn't hesitant to invest in its human resources. It's very selective in choosing top-quality personnel, which I find very helpful. Even though we're an SME, professionalism is always maintained here. Also, in terms of general management systems, we've gone digital and it's quite good".*
Y6	*"Everything becomes more organized because everything is digitally recorded, transparent too. So, with just one click, I can see what my team is working on. It's immediate, updated; I know exactly what they are working on at any given moment, without needing to be on-site".*
Y7	*"I agree that it's influenced by digital transformation. It's evident from the digitalization of administration, payroll, and regulations, which, in my opinion, is quite impressive for a company that's only been around for 5 years. It's significant progress. If I compare it to other SMEs, we're ahead".*
Y8	*"Because here we have several systems like Zahir for the finance and accounting division, we had to find a system that could integrate with Zahir. Google Spreadsheets is still used up to now, specifically for field use, because it's easier for my team in the field. We just structured the format so that it fits the template that can be imported into Zahir. Then, long story short, we eventually found a suitable system, which is Jubilio".*
Y9	*"Overall, compared to other SMEs in the field, I think Company Y is more advanced. In the sense that its system is more proper compared to competitors out there. For example, there are systems specifically for accounting, for sales, and then there's a system for production as well, so it's quite comprehensive. That's why Company Y is one of the top SMEs in Indonesia, especially in the fashion industry".*
Y10	*"We use multiple platforms because each fulfills specific needs. For Jubilio, I check stock and daily sales reports. Every sale at the offline store is recorded in Jubilio, which is crucial for meeting my targets. It involves checking reports and stock to identify fast-moving and slow-moving products. Additionally, we use Zahir for importing sales data. I download data from Jubilio and upload it to Zahir".*
Y11	*"Since last year, we started using a digital platform called Notion. All tasks, assignments, monitoring, and scoring are now done through Notion, which makes things easier. Previously, we used Google Sheets, which was quite complicated with formulas that I sometimes didn't understand. But with Notion, I find it much easier for task assignments and monitoring. It's*

	convenient for checking processes, and I can push for incomplete tasks. With Notion, I can track work better, and it has made my job significantly easier compared to Google Sheets".
Y12	*"For the spreadsheet, it helps organize tasks more effectively because I can see forecasts in it. This allows me to prioritize which tasks need to be done first. I also use the spreadsheet for inventory management, making it easier to track where the items I need are located. For Notion, it provides detailed visibility of each process. For example, you can see the entire process for Article A, from start to finish. It shows whether Sample A is still in processing, whether it's in sampling, review, grading, or ready for production. The timeline is very clear".*
Y13	*"I took the time to learn them. Before jumping into the actual work, there was training, so they definitely taught us how to use the tools first. Then, we practiced. If there's anything I didn't understand, I would just ask how to do it. So, I took the initiative, and if something wasn't clear, I would simply ask. In the end, I was able to make the most of the features on these platforms. So, I've been maximizing the use of these tools".*
Y14	*"Using spreadsheets really makes things easier. Before, at other companies, I never worked with the kind of digital flow that Company Y has now. It never happened before. Here, everything from A to Z can be completed in a day because the to-do list is more organized. At my previous jobs, I had to handle everything myself. But here, the division of tasks is clear".*
Y15	*"From the beginning, we had reports with before-and-after photos of what we worked on, so we could see if there were changes. Additionally, the spreadsheet is very effective; it helps me track work and evaluate performance. We also update revenue comparison data daily. It's truly helpful and the benefits are noticeable".*
Y16	*"When I first joined, it wasn't as advanced. But it has continued to progress over time, and I believe one of the reasons for this is the digital transformation process. Company Y is very adept at leveraging digital technology, which maximizes results, especially in my current work".*
Y17	*"My previous company used Accurate Online, but it wasn't as detailed as the Zahir platform we use at Company Y. We really utilize the features in Zahir here. Initially, it wasn't so much difficult as it was a learning process. It was more about getting used to it. The basic accounting workflow is similar, regardless of the platform".*
Y18	*"Company Y is very tech-savvy. Most of us are Gen Z and Millennials, so there's hardly anyone in our team who isn't familiar with technology. The digital systems in place help us keep up with current trends".*

F.3 Documentation: Company Y

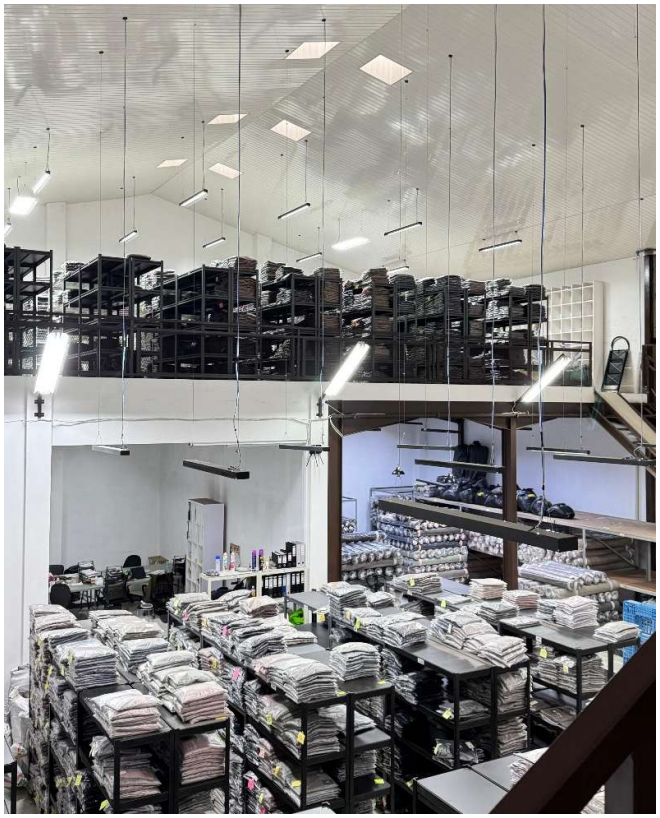


Figure 9. Warehouse



Figure 10. Digital Marketing Studio

vii. Appendix G. Empirical Evidence of Company Z

G.1 Thematic Analysis Process of Company Z

Table 26. Thematic Analysis Process of Company Z

Quotes (Interview)	Codes	Sub-Theme	Themes
"I analysed my weaknesses. Oh, my weakness was actually in technology... All this time, I was a middleman, consumers saw me as a broker, not as a producer." (CEO)	Producer Identity	Strategic Tech Investment	Leadership-Orchestrated Strategic Tech Selection
"In 2017, a machine arrived from overseas... using ultrasonic technology instead of heat. It's more advanced, especially in terms of quality." (Operational Manager)	Tech Upgrade		
"When we bought new machines, I was the one taught by the machine seller, and then I taught all the employees in this company," (Operational Manager)	Step-by-step Training	Hands-On Leadership	
I've been minimizing the number of employees to focus more on technology. If I can handle the work myself, I do it." (CEO)	Lean Staffing		
"Some staff resisted changes. They said: why not just use the old machines? I gave bonuses to those who were willing to learn." (Operational Manager)	Learning Incentives	Incentivising Change Adoption	
"There were debates with my CEO because he didn't believe in online at first. But after online sales hit 200 million, he trusted me." (Sales Manager)	Evidence Buy-in		
"It all started with complaints about tracking work... the digital marketing team proposed CRM. Now, we can evaluate who performs and who needs coaching," (Sales Manager)	CRM Adoption	Data-Driven Management	Tool Adaptation and Digital Disruption
"We didn't have clear data before... now we track how long the machine runs, how much material is used, all using Google Sheets." (Operational Manager)	Data Visibility		
"We use Meta ads, Instagram, even podcasts. Branding is now a process, from visibility to lead handling." (Digital Marketing)	Multichannel Branding	Digital Marketing and Branding	
"Instagram isn't just to show products. I use it to educate: what's cotton, its benefits, etc. That's branding now." (Sales Manager)	Educational Content		
"Previously, it wasn't very professional, for example, due to familial relationships, some employees were paid differently. But now, we've moved to a professional approach. Pay and evaluations are based on performance and skills, not family connections." (HR)	Performance Pay	Growing Professionalism	Hybrid Synchronisation
"This system makes the effectiveness and transparency of each staff member's role in the process visible." (Operational Manager)	Role Transparency		
"They send us their designs... I forward them to the graphic design team... then to the setting team or operators" (Front Office Marketing)	Handover Flow	Integrated Workflow	

"I receive SPKs from marketing, then I process everything with estimated lead time. After printing and cutting, we pass it to the warehouse." (Head of Printing Production)	Leadtime Control		
"With this new machine, the process is faster... and productivity is also higher," (Finishing)	Productivity Boost	Digital Machines	
"With ultrasonic cutting, the new machine can achieve higher speeds," (Printing Operator)	Speed Increase		
"Currently, operations only use basic apps for input. Full system integration across divisions is still my goal." (Operational Manager)	Partial Integration	Gaps in Technology	
"This data is also available in manual hardcopy as a backup." (Front Office Marketing)	Manual Backup		
"Initially, we only had 4 woven machines; now we've added 3 more." (Head of Woven Production)	Capacity Expansion	Comprehensive Production Range	Versatility Production
"We have a lot of printing machines here... especially the hot cut machines." (Head of Label Printing)	Equipment Breadth		
"If clients want a design with unusual colors, we offer alternatives… we don't order new threads immediately without analysis." (Head of Woven Production)	Design Alternatives	Customised Production Solutions	
"Customers said the satin caused itching... so we bought an ultrasonic machine that solved the issue." (Operational Manager)	Quality Fix		
"I've managed to take on several small brands that have experienced rapid growth. These brands, which initially only ordered one roll, have now experienced significant growth, with orders reaching tens of thousands of rolls, and they continue to exclusively produce with us." (Sales Manager)	Brand Scaling	Consultative Growth Partnership	Client-Centric
"We used to go door to door. Now, customers come to us through our content. That's the power of DT." (CEO)	Inbound Growth		
"We follow what the consumers want… whatever they ask for, we try to provide. If we can't, we research until we can." (CEO)	Customer Obsession	Client-First Commitment	
"We never reject any customer orders... The important thing is that the customer gets the result." (Head of Offset Printing)	Order Acceptance		
"If the design exceeds 8 colors, we either make adjustments or ask for redesigns while maintaining quality." (Head of Woven Production)	Scope Control	Transparent Expectation Management	
"We simply inform them that it's not possible... It's better to be clear about our machine's limitations rather than struggling." (Head of Label Printing)	Clear Limits		

G.2 Rich Participant Data: Company Z

Table 27. Rich Participant Data: Company Z

Participant	Quotes
Z1	*"Digital transformation is dynamic, very dynamic indeed. For example, in the past, we relied entirely on word-of-mouth bookings, right? Now people just come, caused by ads on our social media. That's an example from the marketing side. Then, there's a saying, if we have a misunderstanding with a customer and win, but we will lose that one customer. So we just have to admit defeat, so we don't need to be too sensitive. And digital transformation also plays a role in maintaining good relationships with customers".*
Z2	*"Well, the general benefit is definitely increased sales. But now, it's even more flexible. Meaning like this, when we perhaps weren't using CRM and other tools before, there was no transparency of data, no QPI, no success analysis, and the growth from month to month. Now, we track all of that. Starting from incoming chats, then who the customers are, their types, how much the growth or decline in orders from last month to the next month. That data is already being used".*
Z3	*"So, eventually, Company Z became the leading market on the Instagram platform. Starting from observing Instagram in this industry, I realized that Instagram isn't just for showcasing product photos, but also for education. Like creating content about what cotton material is like, what its advantages are, and so on. Previously, such content might have been underestimated. But now, it's proven that revenue can be generated through social media".*
Z4	*"We can track how long a machine runs and when it stops. For example, if it only runs for 10 out of 12 hours, we can investigate why. Maybe a thread broke or there's some other issue affecting productivity. That's the benefit of digitalization. So, last year, I implemented a tracking system with around 15 links for various divisions like production, operators, finishing, etc. I created the entire system because previously, it was very conventional and we didn't have clear data on what each operator produced".*
Z5	*"The performance of each employee has become more transparent. Although it's still relatively new, so the effects aren't fully visible yet, it's been very beneficial for me as an HR professional. Employees are more aware of their tasks, and the KPIs help them feel monitored. Moving forward, we plan to use HRIS, a specialized HR software, and we're already using Talenta for payroll. There have been significant developments in HR in this company. The digital transformation process is indeed noticeable, with ongoing progress in the HR division".*
Z6	*"We use an app developed by external programmers. This app can be customized according to our needs. Previously, we subscribed to an online app called Accurate, but there were many mismatches, so the company took the initiative to develop its own application. As we know, our business is made-to-order, unlike retail or typical businesses".*
Z7	*"We simply inform them that it's not possible. We are straightforward with our clients. It's better to be clear about our machine's limitations rather than struggling to complete something beyond its capabilities. We maintain high quality here, so everything has to follow the procedure".*
Z8	*"For data archiving, we have specialized software that helps us keep track of the various threads we have. There are many types of red alone, for example, and all of this is archived digitally with specific codes for each color. If there's a repeat order, we can easily check the digital archive. Before, the archiving was manual, which was quite cumbersome. We've been using the software for almost 5 years now, which has significantly simplified the process".*
Z9	*"It's easier to use the new machines. But in terms of comfort, whether it's the new or old machine, it's about the same since I'm used to both. However, for productivity and efficiency, the new machines are faster. We only have one new machine here, while the rest are older models. So, the older machines don't pose a significant issue. In other buildings, everything is already using the new digital machines".*
Z10	*"The differences are that the machines here are faster but don't allow speed adjustments, whereas the digital machines have adjustable speeds, either fast or slow. The older machines also have a more complicated input process, while the digital ones are much simpler and easier. Overall, using the new digital machines is more comfortable".*
Z11	*"Each production head maintains digital archives, so each department has detailed records for their customers. For instance, there are specific archives for woven fabrics and hang-tags. All files are well-organized and digitized. We have many repeat customers, which helps with production as we already have data on materials and colors. We also have data for one-time orders, like events*

	such as New Year's or Independence Day on August 17. This data is also available in manual hardcopy as a backup".
Z12	*"I use some of the features in WhatsApp Business. For instance, the catalog feature allows us to upload product photos, which I use for product knowledge. However, we don't display prices there; customers need to ask me for them because prices vary depending on the size, design, and customer needs. I also use quick replies, which are very helpful, especially when dealing with a high volume of orders and messages. There's also an automated response feature for messages outside office hours, informing customers that we will respond the next business day. These features significantly enhance productivity and efficiency".*
Z13	*"One of the main factors is definitely our awareness of technology, like the new machine in my area. Also, the quality at Company Z is prioritized. So, if something doesn't meet our standards, we fix it right away. We don't do things carelessly".*
Z14	*"It also depends on the human resources; even if the technology is advanced, it's useless if the personnel are not capable…. Our data is tracked digitally using specific software we use, so all the data is securely stored there".*
Z15	*"With our current setup, even if we need fast production, we prioritize maintaining good quality. It's better to work at a standard pace and ensure high quality than to rush and compromise on it. We're realistic about it. Quality is crucial, and overall, I'm confident that one reason we've advanced is our awareness of technology, like the advanced machines we now have".*

G.3 Documentation: Company Z

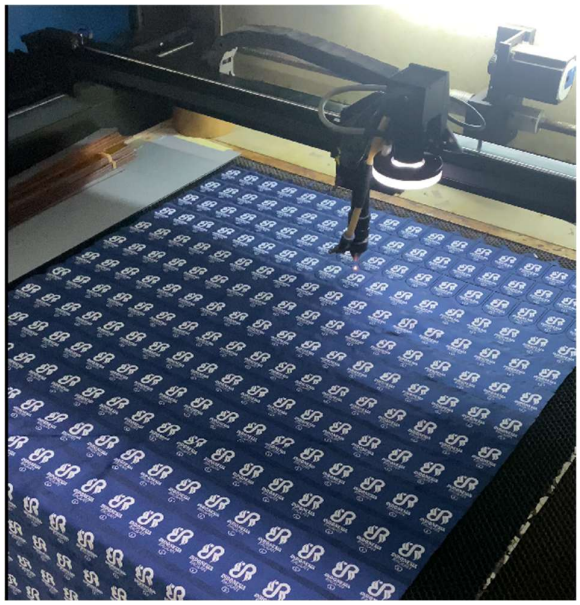


Figure 11. Cutting Machine



Figure 12. Woven Machine



Figure 13. Printing Machine