


# Chapter 21

## The Critical Role of Data Utilization in Achieving Sustainable Success for Medium-Sized Manufacturing SMEs in Pathum Thani Province, Thailand

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### ABSTRACT

*This quantitative study investigated the impact of data utilization on the competitive advantage and performance of 131 medium-sized manufacturing SMEs in Pathum Thani, Thailand. Data was collected through a validated questionnaire administered to a convenience sample. The study employed a multi-method approach to data analysis. Exploratory factor analysis (EFA) was used for dimensionality reduction, followed by partial least squares structural equation modeling (PLS-SEM) to assess the hypothesized relationships. Covariance-based structural equation modeling (CB-SEM) was subsequently used for model validation. The results identified four key constructs: data capability, data utilization, competitive advantage, and firm performance. The developed structural model exhibited a good fit with the empirical data, demonstrating that data capability significantly influenced firm performance both directly and indirectly through competitive advantage. Data utilization demonstrated an indirect impact on performance, acting as a mediator between data capability and competitive advantage.*

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## INTRODUCTION

The rapid proliferation of technological resources over the past several decades has become pivotal in enhancing the competitive capabilities of Small and Medium-sized Enterprises (SMEs). The utilization of Data-related technologies have empowered SMEs to gather and analyze data in support of daily business operations. One such technology, business analytics, has seen increasing adoption across various industries. In the era of Industry 5.0, Data has emerged as a critical organizational asset, even for SMEs, which now collect vast amounts of data that can present unique challenges, particularly in the manufacturing sector. Business analytics offers numerous organizational benefits, including agility, innovation, and competitive efficiency. By Leveraging data analytics and insights, SMEs can improve business. decision-making, identify problems or issues, assess market trends, and uncover new opportunities (Wienbruch, Leineweber, Kreimeier, & Kuhlenkötte, 2018).

As Basanta (2024) mentioned, data utilization plays a key role in creating sustainability and developing Industry 5.0. Data utilization allows businesses to analyze and improve production processes to be more efficient and reduce resource usage and waste. In the Industry 5.0 era, human-machine collaboration will be the key to innovation and increased production efficiency (Paramita, 2024). Data from sensors and IoT devices can be used to monitor and predict machine maintenance, reduce downtime, and increase business competitiveness (Gustavo, 2025). In addition, data utilization allows businesses to respond to customer needs more quickly and accurately (Jins, 2025). Sustainable data management also reduces environmental impacts and creates transparency in operations (Sabareesh, 2025). Therefore, data utilization is a key factor in enabling businesses to grow sustainably in the Industry 5.0 era (Sumeet, 2025).

In today's competitive landscape, data-driven decision-making is crucial for businesses, particularly SMEs (Grover et al., 2018). However, SMEs often face challenges in leveraging data analytics due to resource constraints and limited access to relevant research. While existing literature primarily focuses on large organizations (Llave, 2019), studies on the impact of data analytics on SME performance remain limited (Song et al., 2020). Furthermore, a comprehensive understanding of how data analytics create value for businesses is still evolving (Dong & Yang, 2020). Mikalef et al. (2018) emphasize the dynamic nature of data analytics capabilities and the need to address the challenges associated with their development.

The current situation of Thailand's Gross Domestic Product (GDP) consists of contributions from large businesses (64.8%) and SMEs (35.2%), where SMEs themselves are divided into three tiers: micro-SMEs with 2.6% of GDP, small SMEs with 14.4% of GDP, and medium SMEs with 18.2% of GDP (Office of Small and Medium Enterprises Promotion (OSMEP), 2025). This data shows that among SMEs, medium-sized enterprises account for the largest share of GDP at 18.2%. Therefore, it would be interesting to study whether the largest contribution of medium-sized enterprises to SMEs' GDP is data-driven.

The study will provide valuable insights for developing effective strategies to support the growth of SMEs in Thailand. Aims to proof these gaps by investigating how SMEs, particularly medium-sized enterprises, can leverage data skills to gain a competitive advantage and drive business performance. The findings will inform the development of practical guidelines to enhance data analytics capabilities among SMEs.

The recognizing the significance of robust statistical methodologies for research, this study aims to develop a Structural Equation Modeling (SEM) to investigate the impact of data utilization skills on business performance. Currently, there are two primary approaches to parameter estimation in SEM

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