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The Role of Organizational Agility and Customer Participation in Enhancing Company Performance during Digital Transformation

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ABSTRACT

This research examines the factors that drive digital transformation and investigates the roles of organizational agility and customer participation in the transformation as key drivers of enhancing company performance. Using a quantitative method, data was collected from companies that have implemented digital transformation through an online survey. This study employed a partial least squares (PLS) structural equation model (SEM) to examine the proposed model using Smart PLS. The results indicate that technological, human, and environmental factors significantly influence a company's digital transformation. Furthermore, this research contributes to theory by integrating organizational agility and customer participation within the framework of digital transformation and its impact on company performance, as measured through operational efficiency, innovation performance, and profit growth. The findings highlight the importance of organizational agility amplifies its positive effects on operational efficiency, innovation performance, and profit growth, while customer participation plays a pivotal role, particularly in enhancing innovation performance.

SARI PATI

Penelitian ini menguji faktor-faktor yang mendorong transformasi digital serta menyelidiki peran agilitas organisasi dan partisipasi pelanggan dalam transformasi tersebut sebagai pendorong utama untuk meningkatkan kinerja perusahaan. Dengan menggunakan metode kuantitatif, data dikumpulkan melalui survei daring dari perusahaan-perusahaan yang telah menerapkan transformasi digital. Studi ini menggunakan model persamaan struktural partial least squares (PLS-SEM) untuk menguji model yang diusulkan dengan perangkat lunak Smart PLS. Hasil penelitian menunjukkan bahwa faktor teknologi, manusia, dan lingkungan berpengaruh signifikan terhadap transformasi digital perusahaan. Lebih lanjut, penelitian ini berkontribusi secara teoretis dengan mengintegrasikan agilitas organisasi dan partisipasi pelanggan ke dalam kerangka transformasi digital dan dampaknya terhadap kinerja perusahaan, yang diukur melalui efisiensi operasional, kinerja inovasi, dan pertumbuhan laba. Temuan ini menyoroti bahwa agilitas organisasi memperkuat dampak positif transformasi terhadap efisiensi operasional, kinerja inovasi, dan pertumbuhan laba, sementara partisipasi pelanggan memainkan peran krusial, terutama dalam meningkatkan kinerja inovasi.

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INTRODUCTION

Digital transformation has emerged as a catalyst for business growth, particularly as it drives improvement through technological advancements, operational efficiency, and profit growth. These improvements fundamentally streamline operations, increase the competitive edge, and transform the business model (Marr, 2023). However, successful digital transformation requires actions beyond adopting the latest technology to include embracing the right routines, structures, and company culture to adapt to the digital world (Goran et al., 2017; Konopik et al., 2022; Schuchmann & Seufert, 2015). Although digital transformation offers greater business opportunities, 60-85% of companies have failed to seize these opportunities and initiate the transformation (Sailer et al., 2019).

According to Forbes Councils (2021), this failure is due to "unclear organizational objectives, ineffective technology implementation, overestimation of benefits, and limited customer involvement". As a result, digital transformation efforts aimed at improving productivity, innovation, efficiency, and company profits fail to impact company performance. Hence, companies must address several critical dimensions, which include technology, people, and the environment (Ghobakhloo & Iranmanesh, 2021), to minimize the failure of digital transformation. One study emphasizes that ICT, retail, and finance sectors have already become part of the Digital Mastery enterprise category, which includes companies with advanced technological knowledge and a strong digital vision (Nasution et al., 2020). This is closely related to the effects of using digital technologies, such as blockchain, AI, and big data analytics, which drive rapid growth within those sectors (S. Gong, 2023).

A critical strategy for success in digital transformation and survival amid intense competition is to instill organizational agility within the company (D'Aveni & Gunther, 1994), as it helps them navigate the rapidly changing digital landscape. By fostering a culture of innovation, risk-taking, and adaptability, agile organizations can respond quickly to challenges, seize opportunities, and achieve a competitive advantage (Tsourveloudis & Valavanis, 2002). Agility enables firms to implement digital transformation strategies effectively, manage unpredictable changes, and foster a flow of ideas and information. This leads to more innovative decision-making, faster responses, and ultimately an increased competitive advantage, which enhances company performance (Gong & Ribiere, 2023).

The company's observation of consumers, particularly in identifying their unmet needs, also contributes to this transformation (Sun, 2020). Customer participation has enormous potential in creating innovations that enhance company value by satisfying customer needs, reducing costs, and increasing profits (Cui & Wu, 2017). Other studies also stated that the existence of customer participation can provide new knowledge and encourage the company's innovation process (Zhou et al., 2014). These elements are driven by customer participation in value co-creation, which plays a crucial role in understanding the positive collaboration between companies and customers (Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004).

Earlier research has failed to sufficiently examine the exploration of digital transformation's impact on company performance, particularly as influenced by organizational agility and customer participation. Most studies emphasize capabilities that support the adoption of digital transformation and its direct influence on performance, yet there is a lack of nuanced investigation into the factors that drive successful transformation and their broader performance implications. Additionally, while prior studies commonly explore organizational agility in relation to financial outcomes, efficiency, or innovation, few examine its role in enhancing company performance through digital transformation. This study addresses that gap by positioning organizational agility not merely

as an outcome, but as a strategic capability that strengthens the relationship between digital transformation and performance. This suggestion is supported through interviews conducted by researchers with several company leaders in Indonesia. Furthermore, the role of customer participation is underexplored, despite its potential to accelerate digital initiatives by influencing technology adoption through trust, engagement, and adaptability to innovation. Studies have shown that the inability to involve consumers in the digital transformation journey is a key reason for failure. By actively involving key stakeholders, companies can discern the viability and relevance of technology solutions, thereby fostering a more successful transformation process (Rosen, 2022).

Another key research gap lies in the geographical and industrial scope of existing research, which has been predominantly conducted in developed countries and often within a single industry. In contrast, this study examines the phenomenon across multiple sectors (ICT, finance, and retail), or the «Short Fuse, Big Bang» category, whose transformation increasingly focuses on customer experience and the personalization of needs (Lane Martin et al., 2021; McKinsey & Company, 2022). This study also specifically transitions from an emerging market perspective by taking Indonesia as a sample of a developing country with rapidly growing digital momentum (Chakravorti et al., 2020). This research offers insights into the drivers, mechanisms, and outcomes of digital transformation from a developing country perspective, providing a broader understanding of how digital capabilities, organizational agility, and customer participation collectively shape company performance. The research questions are as follows:

1. Which factors drive a company to conduct digital transformation?
2. Does digital transformation affect company performance?
3. Does digital transformation with organizational agility affect company performance?
4. Does consumer participation strengthen the link between digital transformation and company performance?

THEORITICAL FOUNDATION

Diffusion of Innovation

In 1962, E.M. Rogers developed the theory of diffusion of innovation, which examines how information communicated to people or organizations over time can lead to innovations and their utilization (Bass, 1969; Rogers, 1983). Closely related to technological innovation, the diffusion of innovation can be understood from various perspectives. In contrast, the limitation theory asserts that the essence of diffusion is the widespread adoption of technological innovations (Schumpeter & Backhaus, 2003). Previous research also provides another perspective, suggesting that diffusion is a process of technology transfer. This transfer process emphasizes the fact that the occurrence of digital technology innovations will depend on whether users can fully adopt digital technology without external assistance. In recent decades, the diffusion of various digital technologies, ranging from cloud computing, data analytics, and artificial intelligence (AI), has dramatically affected how companies operate and compete in the market as well as how they deal with consumers.

Changes brought about by the technology diffusion process can be explained by the digital transformation process. Digital transformation refers to the company's strategic response to trends and disruptions from the emergence of various digital technologies. Further definitions include the process of transforming business processes, culture, and various other aspects of the organization to meet changes in the market that are influenced by digital technology (Nasiri et al., 2020). Therefore, digital transformation is not just about digitizing the current business; rather, it includes utilizing products and services that have been transformed into digital assets to redefine the company's business (Govindarajan & Immelt, 2019). The success of the diffusion process in the context of digital transformation will be closely related

to two elements: factors that affect technology adoption and the potential of the organization to adopt technology. Studies have categorized this idea into three factors: technology, people, and the environment (Ghobakhloo & Iranmanesh, 2021)
Dynamic capabilities

The literature has widely applied the dynamic capability theory to clarify the importance of a company's strategic capabilities and their impact on company performance (Teece, 2007). In an environment of uncertainty and limited resources, companies with inadequate dynamic capabilities have limited opportunities to survive and grow. Therefore, dynamic capabilities are needed to increase the speed, effectiveness, and efficiency of the company in responding to business changes and turbulence (Fredrich et al., 2019; Roig-Tierno et al., 2018). One form of dynamic capability is organizational agility (Guo et al., 2023), defined as the company's ability to sense and respond rapidly to dynamic environmental changes and capture available opportunities (Ravichandran, 2018)

Based on the dynamic capability view, a high level of organizational agility can contribute to company performance (Teece et al., 1997), which can be reflected by the effect of organizational agility on the speed of the company to adapt to market changes, increase product customization capabilities, improve delivery performance, and reduce reaction time (Chen et al., 2014). In addition, amidst the ongoing digital transformation that continues to accelerate and strengthen uncertainty, volatility, and complexity, organizational agility is also considered a necessary capability to perceive and capture opportunities to support the success of the implemented digital transformation process (Hutter et al., 2023).

Service Dominant Logic

According to the service-dominant (S-D) view, companies prioritize a customer-centric approach by collaborating and learning from consumers to remain adaptive to the dynamic individual needs. In addition, the focus on the output produced by the company is not limited to creating the most optimal product but includes how the company continues to learn from the process. This enables the company to better meet the needs of consumers and thereby improve its performance (S. L. Vargo & Lusch, 2004). In its development, the S-D logic also explains that companies cannot form or provide values but can only provide a value proposition. This is because value creation requires collaboration. Value co-creation is also the result of an interactive process, so companies and consumers must be approached in a relational context. Furthermore, the focus of the S-D logic is that values will always be created uniquely and phenomenologically by the beneficiaries (S. L. Vargo & Lusch, 2008)

One of the differences between the S-D logic and goods-dominant (G-D) logic is the role of consumers. Consumers, who were previously seen as passive contributors, become active contributors by participating in sharing various inputs to produce better product outputs (Cook, 2008). In practice, value co-creation is closely related to open innovation by companies. Companies open themselves to co-creation efforts of their external customers, both current and potential. In other words, value creators outside the company have greater potential than those within the company. This phenomenon occurs because consumers, as the end users of products, often possess insights and knowledge that producers may not be aware of (Zwass, 2010). The two-way exchange of information and knowledge illustrates the importance of the balance between the information conveyed and received between consumers and companies (Yi et al., 2013).

Technology factors and digital transformation

Digital infrastructure development is a critical enabler of successful digital transformation. With adequate investment in technology infrastructure, companies can unlock the full potential of digital transformation (Gołąb-andrzejak, 2023). Proper and adequate investment in digital technology

infrastructure will also help to improve the value creation process through which the company maintains its competitiveness (Vial, 2019). Other than preparing the appropriate infrastructure, companies also need to obtain capabilities in managing data. In today's data-rich environment, however, companies only utilize a fraction of their data to generate insights. To support digital transformation, companies need better data quality and analysis. Previous studies (Bérubé et al., 2022; Konopik et al., 2022) have demonstrated that the company's ability to manage available data will have a positive impact on its digital transformation. The proliferation of data has shaped the way companies research, develop, and manufacture products.

To maintain a competitive advantage during digitalization, companies increasingly pursue active and rapid experiments and innovation (Goran et al., 2017). Through the R&D and learning process, companies acquire better knowledge to improve the quality of the technology used (Mukoyama, 2003). Giotopoulos et al. (2017) stated that companies with good R&D capabilities tend to better adopt new digital technologies, such as Artificial Intelligence, IOT, and Big Data Analytics. R&D activities can improve a company's technical capabilities and help the company process and integrate its internal knowledge effectively, thereby promoting the innovative use of digital technology (Berchicci et al., 2016).

H1: Technology factors have a positive effect on the digital transformation process.

People factors and digital transformation

While strategy and organizational structure are paramount to the digital technology adoption process, people are equally important. Previous research has found that the most important enabler of digital transformation is human resources. These include not only employees in the IT department, but all employees, because all need to be prepared with the appropriate digital skills and competencies to contribute to the company's ability to carry out digital transformation (Oliveri et al., 2023).

Digital leadership, defined as the leadership capabilities required to drive digital transformation within an organization, is critical for the success of the transformation. Leaders instill a work culture that maximizes the use of technology in analyzing much information (Sainger, 2018). Companies also need to pay attention to the capacity of their human resources, as inadequate abilities to navigate changes can contribute to the failure of the transformation process. Individual digital skills differ from those within a company context (Nasution et al., 2020).

Besides focusing on technical skills, companies also need to instill digital behavior, such as digital entrepreneurship, in their human resources. This finding is closely related to the observation that successful digital transformation is influenced by mindset changes occurring at the organizational and individual levels (Kane, 2019). Therefore, digital entrepreneurship is becoming increasingly crucial, as many industries are being affected by digital disruption (Mir et al., 2023). In this sense, digital entrepreneurship competencies can be associated with an individual's desire to manage a digital business. This competency can bring successful digital transformation due to the mindset and deep understanding of individuals in seeing and seizing opportunities, demonstrating agility, and solving challenges (Singh et al., 2023).

H2: The people factor positively influences the digital transformation process.

Environmental factors and digital transformation

The success of digital transformation is shaped by both internal and external factors. To navigate the uncertainties arising from social constraints curtailing company-consumer interactions, businesses increasingly rely on robust business ecosystems to deliver optimal services. Through collaboration, companies can adopt digital technology as a

channel to create new products and service values through the newly established business ecosystem (Tsou et al., 2019). By developing digital platforms and integrating them into the ecosystem, companies can also deliver innovative digital products and services to meet the growing demand for online orders (Hanelt et al., 2021). The technological dimension affecting the success of digital transformation is linked to digital competition in the market. Changes in the market create difficulties for companies to survive, and pressure from competitors is among the triggers for companies' increased adoption of digital technology (G. Nicoletti et al., 2020). Intense competition has compelled companies to accelerate their responsiveness and adopt more innovative and creative approaches to maintain their competitive advantages (Leão & da Silva, 2021; Orji, 2019). Another external dimension influencing the success of digital transformation in improving companies is public policies (W. Zhang et al., 2021). In developing countries, however, the absence of adequate incentives and streamlined regulatory frameworks continues to hinder progress. Evaluating the impact of public policies on the success of digital transformation across ICT, finance, and retail remains essential as these policies play a crucial role in encouraging the adoption of digital technologies (J. Zhang et al., 2023).

H3: Environmental factors have a positive influence on the digital transformation process.

Digital transformation and operational efficiency

Operational efficiency can be defined as a process to maximize the output produced and minimize the use of inputs, such as the amount of resources and capital, while maintaining the quality of the products and services offered (Al Yami et al., 2022). In this context, digital transformation enables companies to integrate and streamline their business processes through digital means. The growing availability of big data and artificial intelligence (AI) allows organizations to harness both structured and unstructured information more effectively (Peng & Tao, 2022). By leveraging digitalized data in decision-making, companies can enhance operational workflows and drive greater efficiency. Moreover, the adaptability and agility fostered by digital transformation significantly strengthen a company's competitive advantage. This enhanced capability is closely tied to management efficiency, which is achieved through the effective transmission of information and knowledge across the organization. As a result, digital transformation contributes to improved business development by optimizing scale, technical, and allocative efficiencies (Tajudeen et al., 2022).

H4: Digital transformation has a positive impact on operational efficiency.

Digital transformation and innovation performance

Innovation performance refers to the evaluation of a company's innovation activities and their outcomes, particularly in relation to innovations in products and services, processes, and management practices. This performance is typically measured through various indicators, including the development of new products and services, the number of patents filed, the adoption of new equipment and technologies, and the implementation of novel work organization methods (Hong et al., 2019; Xie et al., 2023). Companies that strategically integrate digital technologies into their business processes are more likely to enhance innovation and facilitate the emergence of new business models by improving product functionality and extending product life cycles (Akpan & Ibidunni, 2021; Bouwman et al., 2019). A mature understanding and application of digital technologies contributes to a more efficient product development process, helping to shorten development cycles, lower innovation costs, and enhance the overall quality of new offerings (Huesig & Endres, 2019). Furthermore, the integration of digital tools and data analytics empowers companies to better capture and respond to evolving consumer needs, allowing innovation efforts to be more aligned with market preferences (Tambe & Hitt, 2012).

H5: Digital transformation has a positive impact on innovation performance.

Digital transformation and profit growth

The enhancement of company performance resulting from digital transformation extends beyond non-financial aspects; it also emphasizes financial considerations. One of the financial performance indicators is the growth in profits generated by the company. Profit growth influenced by digitalization is closely related to decreasing costs and energy in various processes, both in terms of production and company management (B. Lin & Xie, 2023). Digital transformation contributes to profit growth by enhancing corporate governance systems and internal efficiency (Wu et al., 2023). Within the supply chain, digital technology facilitates the resource sharing among companies, thereby reducing transaction costs and optimizing resource allocation (Agostini et al., 2020). Furthermore, digital transformation can accelerate information exchange and responsiveness to business changes, improving product life cycle monitoring, ensuring profit growth, and maintaining financial stability (Steiber et al., 2020).

H6: Digital transformation has a positive impact on profit growth.

Digital transformation and organizational agility

Digital transformation is not merely about technology, but also about the role digital technology plays in developing organizational agility, making companies increasingly reactive and proactive in responding to emerging changes (Appelbaum et al., 2017; Qin, 2023). The integration of organizational agility into strategic planning also helps maintain the company's competitive market advantage (Nejatian et al., 2019).

A crucial concept in this context is digital transformation ambidexterity, referring to an organization's ability to balance the exploitation of existing resources with the exploration of new opportunities through digital technology (Liu et al., 2023). This dual capacity, when supported by adequate data coordination, enhances organizational agility, ultimately helping to achieve a competitive advantage (Irfan et al., 2019; Lee et al., 2015). The relationship between these two variables becomes increasingly significant as digital technology drives organizational agility, impacting company performance (Scuotto et al., 2017).

H7: Digital transformation has a positive effect on organizational agility.

Organizational agility and operational efficiency

Digital transformation has significantly enhanced companies' capacity to understand, allocate, and manage their resources more effectively. A key variable that supports this capability is organizational agility, which enables firms to develop flexibility at both the operational and strategic levels (Haider et al., 2021). Amid accelerating digital transformation, organizational agility is increasingly recognized as a critical capability for identifying and seizing emerging opportunities, thereby ensuring the success of digital initiatives (Hutter et al., 2023). Agility allows organizations to streamline internal processes and accelerate areas such as product development, supply chain management, and logistics, leading to greater operational efficiency and responsiveness (Ngai et al., 2011). Agile organizations are better positioned to adapt to market changes, enabling businesses to navigate competitive landscapes more effectively (Susanty et al., 2022). With digital technology as the enabler, companies can develop renewable digital services, thereby increasing their efficiency in providing services (Qin, 2023).

H8: Organizational agility has a positive effect on operational efficiency.

Organizational agility and innovation performance

Agility affects a company's openness to various innovative ideas, allowing it to develop an array of successful and innovative products, processes, and business models (Brand et al., 2021;

Chakravarty et al., 2013). In addition to boosting the development of innovative products, strong agility in customer responsiveness enables companies to create customized products and services to suit consumer needs (Crocitto & Youssef, 2003; Tallon & Pinsonneault, 2011).

The willingness of a company to embrace new ideas is closely linked to organizational agility, which enables efficient searching and retrieval of relevant knowledge. This process allows companies to develop products and services of the highest quality, thereby maintaining their competitiveness (Gong & Ribiere, 2023). Knowledge gained through strong agility also encourages companies to be more creative and proactive in responding to dynamic market changes (Darvishmotevali et al., 2020).

H9: Organizational agility has a positive effect on innovation performance.

Organizational agility and profit growth

Organizational agility in the digital context can be defined as a company's ability to leverage agility in digital transformation for faster product development and low-cost service delivery (Salmela et al., 2022). One benefit is that companies can improve financial performance through transparent innovations and collaboration with consumers. By using digital platforms that foster consumer engagement, companies can be more agile in developing targeted products, albeit at a lower cost (Qin, 2023). Moreover, more agile companies have a greater capability to shift towards suppliers offering lower costs and better quality, contributing to the company's profit growth and revenue (Tallon, 2008).

H10: Organizational agility has a positive effect on profit growth.

The moderating effect of customer participation on digital transformation and operational efficiency

Digital transformation strengthened by consumer engagement can improve company performance. A strong relationship with consumers forms mechanisms for collaborative knowledge sharing and joint problem-solving (Ritter et al., 2002). This co-creation process with consumers impacts the company's processes, leading to more effective and efficient operations (M. J. J. Lin & Huang, 2013). However, the process requires consumer trust so that the company's agility can be appropriately adopted (Altuwaijri & Ferrario, 2022).

From the perspective of operations management, customer participation can also lead to inefficiencies in company operations. Although it provides valuable input information, it can also increase uncertainty and risk (Frei, 2006). To address the issue, consumers are allowed to explore and experiment with the most suitable product development by emphasizing the general outputs. It will then focus more on the product development and achieve efficiency improvements (Dong & Sivakumar, 2017).

H11: Customer participation has a positive impact on the effect of digital transformation on improving operational efficiency.

The moderating effect of customer participation on digital transformation and innovation performance

Consumers are key players, with the potential to influence new product development and service innovation processes (Rasool et al., 2020). In this era of digital transformation, consumers play a more active and influential role in shaping the future of business. Previous studies have found that consumer involvement during product development enhances the company's innovation performance (Dong & Sivakumar, 2017; Yan et al., 2021) and improves the performance of new product offerings (Smets et al., 2013). Continuous interaction with consumers can facilitate various aspects of the innovation process, from helping companies identify opportunities to increasing the speed of product development and improving product quality (Coviello & Joseph, 2012; H. Zhang & Xiao, 2020).

H12: Customer participation positively strengthens the influence of digital transformation on Innovation performance.

The moderating effect of customer participation on digital transformation and profit growth

By exchanging information with consumers, companies can mitigate the financial and performance risks associated with digital product failures. Information obtained through value co-creation with consumers can help companies develop more targeted and personalized products (Sun, 2020) and improve financial performance by utilizing cost savings (Yuk & Garrett, 2023). Each form of customer participation can have a different impact on an organization's financial performance, including its relationship to profit growth (Cui & Wu, 2017; Yuk & Garrett, 2023). By utilizing customer participation as an information provider, the company gains more control, enabling it to overcome the uncertainty inherent in consumer input. This form allows organizations to optimize the knowledge gained from internal and market research, allowing the information obtained from consumers to be integrated to the maximum extent to reduce costs significantly (Kim & Atuahene-Gima, 2010). Another form of customer participation is as an innovator. In this role, consumers have higher autonomy, resulting in a reduction in the cost of innovation (Cui & Wu, 2016).

H13: Customer participation positively strengthens the effect of digital transformation on profit growth.

METHODS

This study employs a quantitative research method to examine companies in the retail, ICT, and finance industries that have conducted or performed digital transformation. The informants are the management professionals directly involved in the implementation of digital transformation, including the chief transformation officer (CTO), chief information technology officer (CIO), and the senior leader in IT strategy and operations. The sampling technique applied is the proportionate stratified random sampling technique, using specific individuals meeting certain criteria to participate in the research (Sekaran & Bougie, 2016).

The primary data were collected through a questionnaire distributed to targeted respondents via email and WhatsApp from April to May 2024. The data collection process spanned four months, during which the questionnaire was distributed to 900 potential respondents. Ultimately, responses from 207 individuals, limited to one respondent per company, were collected and processed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method via SmartPLS software. SmartPLS is well suited for exploratory research, particularly in cases in which the theoretical framework is not yet fully developed, unlike Covariance-Based SEM (CB-SEM). Furthermore, PLS-SEM is more appropriate than CB-SEM for exploratory studies due to its ability to handle smaller sample sizes and its effectiveness in evaluating interactions between variables (Ullman & Bentler, 2012).

The questionnaire was developed based on a review of relevant academic journals and further refined through wording and pilot testing with four experts from the ICT, financial, and retail industries and another 10 respondents to ensure that the framework and questions were understandable. All questionnaire items used a five-point Likert scale ranging from 1 to 5, where 1 indicates 'strongly disagree' and 5 represents 'strongly agree.' Higher values reflect stronger agreement with each statement.

RESULT AND DISCUSSION

Measurement

A measurement model is considered reliable when the Cronbach's alpha exceeds 0.6 and the Composite Reliability surpasses 0.7 (Hair et al., 2017). In the test results, all variables met these minimum threshold requirements, with values ranging from 0.887 to 0.961. A Cronbach's alpha value above 0.9 may

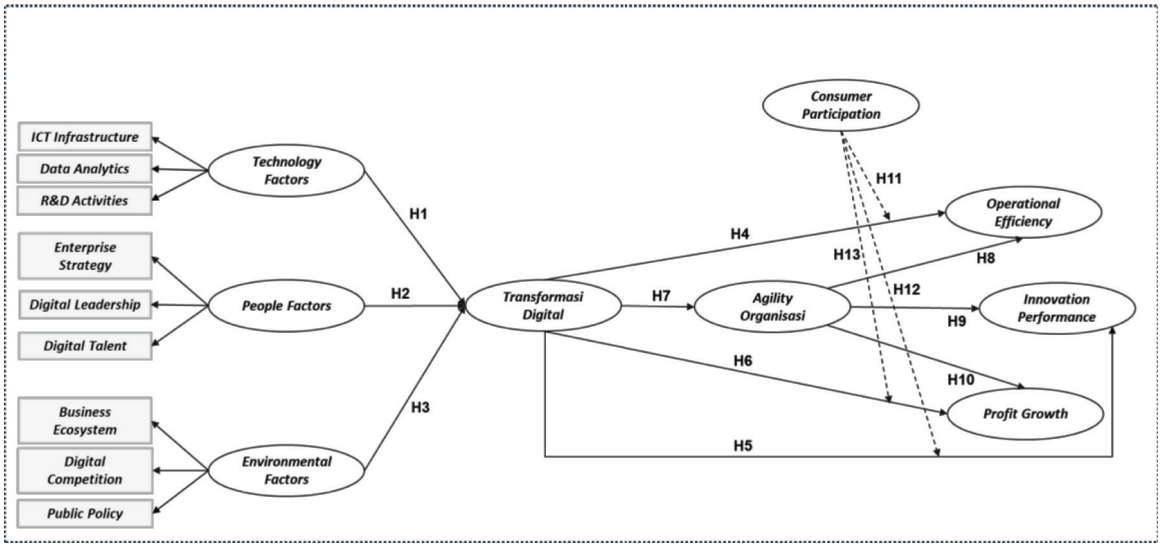

Figure 1. Research Model

suggest potential redundancy, but it can also indicate that the scale is designed to measure a very specific, well-defined construct, with items closely related and consistently reflecting the same underlying dimension (Nunnally & Bernstein, 1994). In such cases, a high Cronbach's alpha indicates that the items are working together cohesively to measure the construct and that the scale has strong internal consistency. Consequently, we can conclude that all variables are reliable.

Convergent validity in a model is established when the Average Variance Extracted (AVE) exceeds 0.5, and outer loading values are greater than 0.7 (Hair et al., 2017). All variables met these minimum threshold requirements, with values ranging from 0.600 to 0.847. However, based on the test results, three indicators in environmental factors have an outer loading value less than 0.7. Nevertheless, the researcher chose to include these related question items because outer loading values between 0.6 and 0.7 are still considered acceptable and important for research validity. This is especially true with exploratory research, small data indicators, and complex constructs (Hair et al., 2014, 2019; Yudha et al., 2024). The subsequent test assesses discriminant validity, measuring the empirical distinctness of the constructed constructs from one another. Testing with the Fornell-Larcker criterion revealed that the root of the AVE of a variable has a greater value than a variable with other variables. Furthermore, all HTMT correlation ratios fall below the recommended threshold of 0.90, confirming the model's validity. Additionally, the variance inflation factor (VIF) was used, which is a measure of the amount of multicollinearity. The acceptable threshold for the VIF is 3.3 (Kock & Lynn, 2012), as the computed VIFs for the present study ranged from 1 to 3.1. Thus, the measurement model demonstrates satisfactory characteristics, showing no indications of common method bias.

In the R-Square test, the value ranges from 0 to 1, with higher values indicating

greater prediction accuracy. However, the study reveals that the R-Square and Adjusted R-Square values for other variables tend to be medium higher, with the values ranging from 0.467 to 0.758. This discrepancy may arise because there are additional unmeasured factors that could further influence the related variables. The F^2 test is used to measure the relevance of exogenous constructs in explaining the variance of endogenous latent constructs within a structural model. The criteria for F^2 results typically fall within the ranges of 0.02, 0.15, and 0.35, corresponding to small, medium, and large effect sizes, respectively. The SRMR criteria, with results below 0.1, explain the model fit and indicate an acceptable fit (Hair et al., 2017).

Table 1. Respondent Profiles

Category	Group	N	%
Company Industry	Retail	67	32%
	Information & Communication Technology	90	43%
	Finance	50	24%
Company Scale (in number of employees)	<1000	88	43%
	1000 – 4999	76	37%
	5000 – 10000	21	10%
	>10000	22	11%
Position/Title in the Company	Director	54	26%
	Senior Manager (Head of Division or Group, VP, General Manager)	124	60%
	Middle Level Manager (*Kepala Departemen* or Section)	19	9%
	Other	10	5%
Work Experience	< 5 years	12	6%
	5 - 10 years	63	30%
	11 - 15 years	41	20%
	> 15 years	91	44%

Table 2. Reliability Test Results

Variables	Cronbach's alpha	Composite reliability	AVE	Conclusion
Organizational Agility (OA)	0,949	0,950	0,832	Reliable
Customer Participation (CP)	0,940	0,940	0,847	Reliable
Digital Transformation (DT)	0,898	0,906	0,713	Reliable
People Factors (PF)	0,943	0,945	0,663	Reliable
Environmental Factors (EF)	0,904	0,921	0,568	Reliable
Innovation Performance (IP)	0,908	0,921	0,786	Reliable
Operational Efficiency (OE)	0,927	0,929	0,820	Reliable
Profit Growth (PG)	0,887	0,892	0,816	Reliable
Technology Factors (TF)	0,935	0,940	0,609	Reliable

Table 3. Outer Loading

Operational Variable	Outer loadings	Conclusion
DA1 <- Technology Factors	0,830	Valid
DA2 <- Technology Factors	0,896	Valid
DA3 <- Technology Factors	0,843	Valid
DA4 <- Technology Factors	0,735	Valid
ICT1 <- Technology Factors	0,769	Valid
ICT2 <- Technology Factors	0,711	Valid
ICT3 <- Technology Factors	0,768	Valid
ICT4 <- Technology Factors	0,837	Valid
RD2 <- Technology Factors	0,703	Valid
RD3 <- Technology Factors	0,757	Valid
RD4 <- Technology Factors	0,713	Valid
BE1 <- Enviromental Factors	0,838	Valid
BE2 <- Enviromental Factors	0,880	Valid
BE3 <- Enviromental Factors	0,847	Valid
BE4 <- Enviromental Factors	0,771	Valid
DC2 <- Enviromental Factors	0,696	Valid
DC3 <- Enviromental Factors	0,748	Valid
PP1 <- Enviromental Factors	0,600	Valid
PP3 <- Enviromental Factors	0,708	Valid
PP4 <- Enviromental Factors	0,649	Valid
DE1 <- People Factors	0,747	Valid
DE2 <- People Factors	0,781	Valid
DE3 <- People Factors	0,782	Valid
DL1 <- People Factors	0,828	Valid
DL2 <- People Factors	0,856	Valid
DL3 <- People Factors	0,860	Valid
DL4 <- People Factors	0,853	Valid

Operational Variable	Outer loadings	Conclusion
DT1 <- People Factors	0,756	Valid
DT2 <- People Factors	0,820	Valid
DT3 <- People Factors	0,849	Valid
TD1 <- Digital Transformation	0,866	Valid
TD2 <- Digital Transformation	0,873	Valid
TD3 <- Digital Transformation	0,876	Valid
TD4 <- Digital Transformation	0,727	Valid
TD5 <- Digital Transformation	0,870	Valid
AO1 <- Organizational Agility	0,903	Valid
AO2 <- Organizational Agility	0,917	Valid
AO3 <- Organizational Agility	0,899	Valid
AO4 <- Organizational Agility	0,937	Valid
AO5 <- Organizational Agility	0,904	Valid
CP1 <- Customer Participation	0,900	Valid
CP2 <- Customer Participation	0,929	Valid
CP3 <- Customer Participation	0,925	Valid
CP4 <- Customer Participation	0,926	Valid
IP1 <- Innovation Performance	0,762	Valid
IP2 <- Innovation Performance	0,920	Valid
IP3 <- Innovation Performance	0,928	Valid
IP4 <- Innovation Performance	0,926	Valid
OE1 <- Operational Efficiency	0,887	Valid
OE2 <- Operational Efficiency	0,925	Valid
OE3 <- Operational Efficiency	0,926	Valid
OE4 <- Operational Efficiency	0,883	Valid
PG1 <- Profit Growth	0,919	Valid
PG2 <- Profit Growth	0,886	Valid
PG3 <- Profit Growth	0,905	Valid

Table 4. HTMT Test Results

Variables	OA	CP	DT	PF	EF	IP	OE	PG	TF
OA									
CP	0,713								
DT	0,739	0,781							
PF	0,739	0,713	0,839						
EF	0,742	0,659	0,878	0,822					
IP	0,734	0,723	0,877	0,828	0,819				
OE	0,763	0,793	0,836	0,770	0,736	0,862			
PG	0,803	0,743	0,828	0,790	0,727	0,878	0,872		
TF	0,738	0,687	0,875	0,810	0,804	0,764	0,802	0,749	
CP x DT	0,194	0,276	0,267	0,136	0,167	0,117	0,238	0,251	0,171

Organizational Agility	OA
Customer Participation	CP
Digital Transformation	DT
People Factors	PF
Environmental Factors	EF
Innovation Performance	IP
Operational Efficiency	OE
Profit Growth	PG
Technology Factors	TF
Customer Participation x Digital Transformation	CP x DT

Table 5. Fornell-Larcker Criterion Test Results and Multicollinearity Test

Variables	OA	CP	DT	PF	EF	IP	OE	PG	TF
OA	0,912								
CP	0,673	0,920							
DT	0,685	0,719	0,844						
PF	0,705	0,675	0,779	0,814					
EF	0,693	0,627	0,811	0,776	0,754				
IP	0,685	0,674	0,797	0,776	0,750	0,887			
OE	0,719	0,742	0,772	0,728	0,693	0,792	0,905		
PG	0,742	0,684	0,743	0,727	0,653	0,789	0,795	0,903	
TF	0,691	0,642	0,807	0,761	0,754	0,702	0,747	0,683	0,781

Organizational Agility	**OA**
Customer Participation	**CP**
Digital Transformation	**DT**
People Factors	**PF**
Environmental Factors	**EF**
Innovation Performance	**IP**
Operational Efficiency	**OE**
Profit Growth	**PG**
Technology Factors	**TF**

Multicollinearity Test

Construct	VIF
Technology Factors -> Digital Transformation	2,9
People Factors -> Digital Transformation	3,0
Enviromental Factors -> Digital Transformation	3,1
Digital Transformation -> Innovation Performance	2,5
Digital Transformation -> Operational Efficiency	2,5
Digital Transformation -> Profit Growth	2,5
Digital Transformation -> Agility Organization	1,0
Agility Organization -> Innovation Performance	2,2
Agility Organization -> Operational Efficiency	2,2
Agility Organization -> Profit Growth	2,2
Customer Participation -> Innovation Performance	1,1
Customer Participation -> Operational Efficiency	1,1
Customer Participation -> Profit Growth	1,1

The F^2 test results show that most relationships between variables exhibit medium effect sizes, with values exceeding 0.15. However, some large effect sizes were also observed, such as the influence of digital transformation on organizational agility and digital transformation on innovation performance, with values exceeding 0.35.

Table 6. Coefficient of Determination Test Result (R2)

Overview

Variables	R-square	R-square adjusted
Organizational Agility	0,470	0,467
Customer Participation	0,516	0,514
Digital Transformation	0,761	0,758
Innovation Performance	0,689	0,683
Operational Efficiency	0,700	0,694
Profit Growth	0,667	0,660

Table 7. Effect Size (F2) Test Results

No	Hypothesis	f-square
1	People Factors -> Digital Transformation	0,063
2	Enviromental Factors -> Digital Transformation	0,188
3	Technology Factors -> Digital Transformation	0,199
4	Digital Transformation -> Organizational Agility	0,886
5	Digital Transformation -> Innovation Performance	0,424
6	Digital Transformation -> Operational Efficiency	0,200
7	Digital Transformation -> Profit Growth	0,154
8	Organizational Agility -> Innovation Performance	0,069
9	Organizational Agility -> Operational Efficiency	0,104
10	Organizational Agility -> Profit Growth	0,202
11	Customer Participation x Digital Transformation -> Innovation Performance	0,036
12	Customer Participation x Digital Transformation -> Operational Efficiency	0,000
13	Customer Participation x Digital Transformation -> Profit Growth	0,003

The results of the hypothesis testing confirm that technology, people, and environmental factors all have a significant positive influence on digital transformation. Among these, technology and environmental aspects show the strongest direct impact, highlighting the importance of adopting the right technological tools and creating a supportive external environment for transformation success. However, all three factors are interrelated and collectively contribute to driving effective digital change within organizations.

The technology factor, encompassing dimensions such as technological infrastructure, data analytics, and R&D activities, underscores the need for businesses to adopt relevant technologies to enhance process efficiency and embrace agile principles in their operations (X. Zhang et al., 2023). While the future remains unpredictable, having the right technological readiness ensures that organizations transition to the most effective technology strategies to anticipate market changes and seize emerging opportunities. Using the right technology, not just the latest, plays a pivotal role in determining its effective application.

As digital transformation revolves around change, leaders play a crucial role as pioneers in implementing these transformative shifts. Their vision guides strategy development and adjustments to existing business models (Sainger, 2018). Additionally, digital talent plays a crucial role in

supporting a company's digital initiatives. Therefore, implementing various educational programs, such as reskilling and upskilling, is essential to equip the team with the necessary digital skills and expertise (Brunetti et al., 2020). These two variables are also supported by the Digital Entrepreneurship mindset to explore various opportunities in the digital world and leverage available digital technology (Upadhyay et al., 2023).

Besides internal factors, environmental factors including the business ecosystem, digital competition, and public policy also play a critical role in an organization's readiness to navigate external influences during the digital transformation process. In the digital transformation era, organizations must collaborate with various players in the business ecosystem, such as technology companies, cloud platform providers, and innovative startups, to accelerate the adoption of new technologies. This is supported by digital competition, which drives innovation and quick responses to change (B. Nicoletti & Appolloni, 2024) as well as public policies that act as key determinants in shaping the constraints and opportunities for companies (Wang et al., 2023). In this research, the influence of public policy is still not strongly perceived by companies, indicating that it is an area that requires further attention and development.

The findings of this study emphasize that digital transformation has a significant and positive impact on company performance, particularly when it is strategically aligned with organizational agility. Digital transformation can be considered successful when it contributes to enhanced operational efficiency, innovation performance, and profit growth. It plays a crucial role in optimizing business processes, improving employee productivity, and reducing transaction costs (Gun et al., 2024). Moreover, by integrating internal and external elements through digital technologies, companies can minimize information asymmetry with key stakeholders such as investors, suppliers, partners, and consumers. This not only promotes cost efficiency but also facilitates coordination across organizational boundaries, further strengthening innovation and driving continuous improvement (Appio et al., 2024; Hu et al., 2023).

The results also reveal that digital transformation, when combined with agile organizational practices, has a substantial influence on multiple aspects of business performance. For instance, operational efficiency significantly benefits from this synergy, as evidenced by the model's explanatory power (Q^2 = 0.597, RMSE = 0.642, R^2 = 0.694). The use of digital tools enables real-time data analysis, process automation, and faster decision-making, allowing firms to streamline operations and respond more effectively to evolving demands. Innovation performance also demonstrates strong support from digital transformation and agility (Q^2 = 0.624, RMSE = 0.619, R^2 = 0.683). Digital technologies foster a collaborative and dynamic environment that encourages experimentation, continuous learning, and adaptability as key characteristics of an agile culture essential for sustained innovation in competitive markets.

Additionally, the study highlights that the combination of digital transformation and organizational agility contributes meaningfully to profit growth (Q^2 = 0.530, RMSE = 0.690, R^2 = 0.660). By improving internal processes, enhancing customer experiences, and offering more responsive and tailored solutions, firms are better positioned to increase revenue and maintain long-term financial health. Overall, these findings reinforce the notion that digital transformation is not merely a technological upgrade but a strategic enabler of performance across operational, innovative, and financial dimensions.

The hypothesis testing results support Hypothesis 12 (significant at the 5% level). This indicates that customer participation significantly enhances the effect of digital transformation on innovation performance. This finding supports earlier research suggesting that active customer involvement in

Table 8. Predictive Relevance Test Result

Variables	Q^2predict	RMSE	MAE
Organizational Agility	0,540	0,685	0,506
Customer Participation	0,476	0,731	0,579
Digital Transformation	0,750	0,506	0,373
Innovation Performance	0,624	0,619	0,463
Operational Efficiency	0,597	0,642	0,497
Profit Growth	0,530	0,690	0,536

Table 9. Path Coefficient Test Results

Hypothesis	Path	Path Coefficient	Sample mean (M)	Standard deviation (STDEV)	T values	P values	Conclusion
Technology Factors -> Digital Transformation	TF - DT	0,367	0,367	0,059	6,258	0,000	Significant
People Factors -> Digital Transformation	PF - DT	0,215	0,220	0,067	3,219	0,001	Significant
Enviromental Factors -> Digital Transformation	EF - DT	0,367	0,363	0,060	6,130	0,000	Significant
Digital Transformation -> Organizational Agility	DT - OA	0,685	0,688	0,070	9,760	0,000	Significant
Digital Transformation -> Operational Efficiency	DT - OE	0,385	0,373	0,078	4,909	0,000	Significant
Digital Transformation -> Innovation Performance	DT – IP	0,570	0,557	0,087	6,535	0,000	Significant
Digital Transformation -> Profit Growth	DT - PG	0,355	0,351	0,081	4,401	0,000	Significant
Organizational Agility -> Operational Efficiency	OA - OE	0,260	0,283	0,096	2,700	0,007	Significant
Organizational Agility -> Innovation Performance	OA - IP	0,216	0,237	0,097	2,234	0,026	Significant
Organizational Agility -> Profit Growth	OA - PG	0,382	0,393	0,074	5,165	0,000	Significant
Customer Participation x Digital Transformation -> Operational Efficiency	CPxDT – OE	-0,009	-0,013	0,032	0,278	0,781	Insignificant
Customer Participation x Digital Transformation -> Innovation Performance	CPxDT – IP	0,106	0,098	0,044	2,389	0,017	Significant
Customer Participation x Digital Transformation -> Profit Growth	CPxDT – PG	-0,031	-0,036	0,036	0,858	0,391	Insignificant

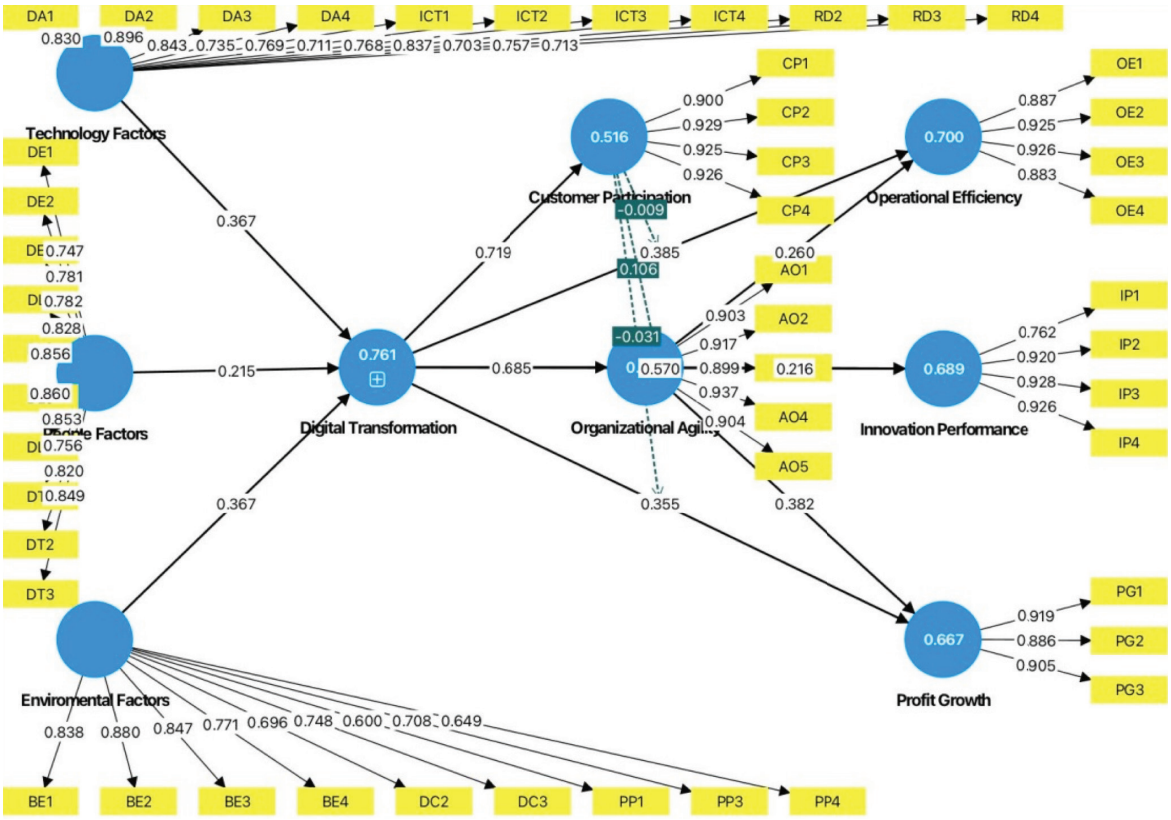

Figure 2. Research Path Coefficient

the product development process leads to more targeted and meaningful innovations (Blazevic & Lievens, 2008). Engaging customers allows for greater customization, ultimately improving the utility and experience they derive from products and services. Thus, while companies can innovate independently, involving customers increases the likelihood of innovation success.

Conversely, Hypotheses 11 and 13 are not supported. The path coefficients are -0.009 (p = 0.781) and -0.031 (p = 0.391), respectively, indicating that customer participation does not significantly moderate the relationship between digital transformation and either operational efficiency or profit growth. These results are in line with previous studies suggesting that, while customer involvement provides valuable insights, it can also introduce uncertainty and complexity into business processes. The need for additional resources, technical adjustments, or feature modifications may outweigh the operational and financial benefits in some contexts. As such, while customer participation can drive innovation, its role in enhancing efficiency and profitability may depend on how well it is managed and aligned with strategic goals (Morgan & Sergey, 2023).The hypothesis testing results support Hypothesis 12 (significant at the 5% level). This indicates that customer participation significantly enhances

the effect of digital transformation on innovation performance. This finding supports earlier research suggesting that active customer involvement in the product development process leads to more targeted and meaningful innovations (Blazevic & Lievens, 2008). Engaging customers allows for greater customization, ultimately improving the utility and experience they derive from products and services. Thus, while companies can innovate independently, involving customers increases the likelihood of innovation success.

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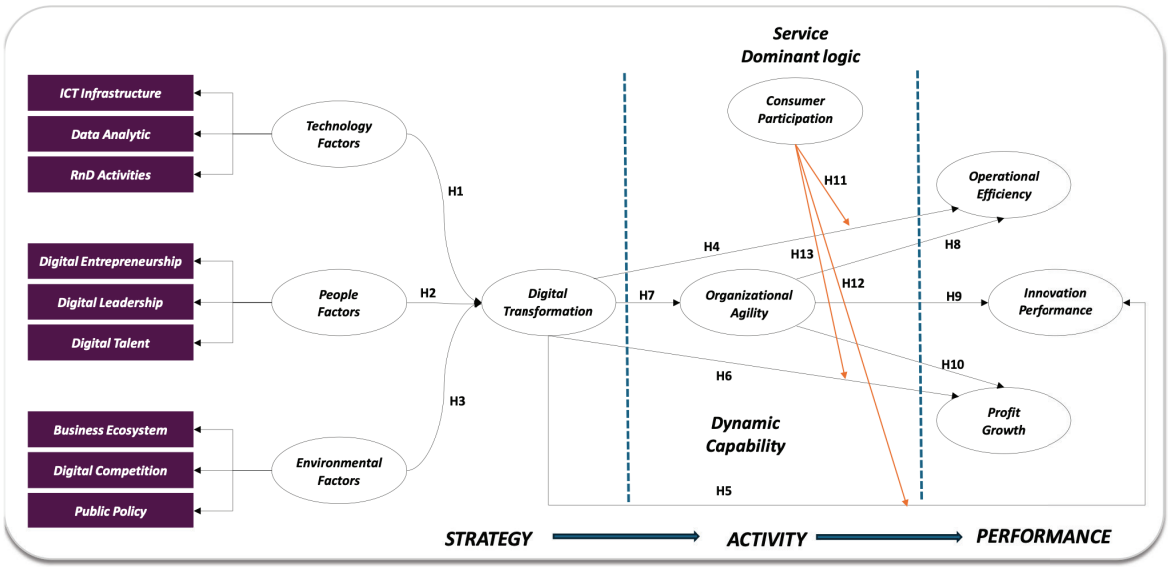

Figure 3. Model Estimation Performance

MANAGERIAL IMPLICATIONS

This study's finding proves that organizational agility is a crucial factor in the impact of digital transformation. The influence of organizational agility on company performance, which encompasses operational efficiency, profit growth, and innovation performance, suggests that management must ensure the organization's overall readiness and ability to change fast. This should start with top management, which must have a clear digital vision and integrate digital strategies with the company's business goals. To respond quickly to changes, companies must adopt more flexible organizational structures that enable information to flow more efficiently and make decision-making more effective. Moreover, companies need to enhance their human resources' capabilities by fostering strong digital competencies, high adaptability, and expertise in identifying new opportunities. By maximizing digital transformation, companies can become more innovative, quickly adapt to market changes, and be more competitive within their industry. This contributes to better performance and supports long-term business growth. Customer participation positively strengthens the influence of digital transformation on one of the observed organizational performance factors, i.e., innovation performance. Although customer participation is not found to play a role as a moderation factor in other company performance variables but emerges as a crucial factor for enhancing company performance. Companies should proactively develop tools and platforms to facilitate collaboration with consumers.

CONCLUSION

Focusing on Indonesia's retail, ICT, and finance sectors, this research explored how digital transformation unfolds and its impact on company performance by fostering organizational agility and customer participation. The study identified three key influences on the digital transformation process: technology (infrastructure, data analysis, and R&D), people (leadership with digital fluency, skilled workforce, and entrepreneurial spirit), and the environment (business ecosystem, digital competition, and public policies). The finding aligns with prior research showing that these three factors influence digital transformation, whether examined individually or collectively. Digital transformation requires an integrative approach that encompasses technological, strategic, organizational, and human resource factors (Höyng & Lau, 2023; Kans & Campos, 2024; Paul et al., 2023; Sadeghi et al., 2024). This implies that organizations should not solely concentrate on internal capabilities, but also consider the role of external factors such as partnerships and government support in driving the transformation process (Abbas et al., 2024; Ghobakhloo & Iranmanesh, 2021). While these three pillars are essential for achieving successful digital transformation, the study emphasizes that other key factors play a crucial role in determining the impact of digital transformation on overall company performance. Among these are organizational agility and customer participation that enhance the effectiveness of digital transformation efforts, as well as drive superior outcomes and long-term business success.

Previous studies have established agility as a key driver of digital transformation success. However, this study found that digital transformation can also serve as a catalyst for fostering agility. As digital transformation embeds a culture of continuous change and innovation, it empowers organizations to become more flexible and responsive to evolving market conditions. This enhanced organization agility not only reacts more quickly to customer demands but also refines and optimizes its internal processes, making operations more efficient. Additionally, it opens opportunities for entering new markets with greater ease and speed. This finding is also relevant to prior research demonstrating that the IT-driven capabilities developed through digital transformation can significantly enhance organizational agility, which positively impacts overall performance (Panichakarn et al., 2024). Ultimately, customer participation proves to be a factor that enhances the positive impact of digital transformation on innovative performance, but

not on operational efficiency or profit growth. Our findings appear to contradict prior research suggesting that digital co-creation with customers can lead to improved operational efficiency and profit growth (Auh et al., 2019; Shankaranarayana et al., 2025). However, this discrepancy may be explained by contextual factors such as the maturity of digital initiatives or the level of customer engagement in the co-creation process, which may not contribute directly to operational efficiency or profit growth, but rather to innovative performance. The two-way communication enabled by customer participation fosters a symbiotic relationship between companies and consumers, ultimately driving innovation and improved performance. By actively involving consumers in the innovation process, companies can develop products and services that are more precisely tailored to their needs. This targeted approach leads to more impactful innovations. Consumers then \ benefit from products that better align with their preferences and expectations, ultimately enhancing their satisfaction and loyalty.

Future research may consider several avenues for further exploration. First, while public policy related to environmental factors was found to have a significant influence, its overall impact remains limited. A deeper analysis of emerging markets that exhibit this characteristic could offer a broader understanding of digital transformation across various national economic contexts. Second, further investigation into specific variables is recommended. For example, distinguishing between product and service innovation under the broader umbrella of innovation performance may yield more detailed and meaningful insights. Additionally, expanding data collection to include employees beyond top management could enhance the depth of the study. Input from different organizational levels would provide a more holistic view of how digital transformation progresses within firms.

This study also revealed that customer participation did not act as a moderating variable in the relationship between digital transformation and improvements in profit growth or operational efficiency. Although moderation was not observed, future studies could continue to examine the role of customer participation as a potential mediating or contributing factor in linking digital transformation to organizational performance outcomes.

Moreover, as the current research employed a cross-sectional design, its ability to infer causality is limited. Longitudinal studies are encouraged to track developments over time, allowing for a more accurate identification of trends, changes, and potential causal relationships. Furthermore, the sample was restricted to three industries (retail, ICT, and finance) that are classified under the «short fuse, big bang» category. However, this classification was originally derived from a study conducted in the Australian context, and its applicability varies across countries. As such, future studies should consider revalidating industry categorizations to better reflect local conditions.

Companies need to be more proactive in creating channels and platforms that facilitate collaboration with consumers. Management should consider developing digital platforms, such as online forums, apps, or social media, which would allow consumers to provide feedback, share ideas, or engage in co-creation. By building a strong consumer community, companies can strengthen engagement and consumer loyalty, ultimately supporting long-term growth. While companies can manage the innovation process independently, involving consumers in the development of products or services will increase the likelihood of market success. Innovations driven by direct consumer input not only are more relevant to market needs but also accelerate the adoption of new products.
For future research, policymakers can utilize these findings to develop effective policies that speed up digital transformation and foster collaboration across industries within the digital ecosystem. Benchmarking successful policy frameworks from other countries can address the current limitations

in regulatory support. Furthermore, prioritizing infrastructure development, such as expanding 5G networks, is vital to support ongoing industry and business growth fueled by digital transformation.

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