

Analysis of the Effect of Digitalization on the Profitability of Telecommunication Companies in Indonesia

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ABSTRACT

This research investigates the relationship between digitalization components and the profitability of telecommunication companies in Indonesia through quantitative analysis employing survey methods. In the rapidly evolving landscape of the telecommunication industry, digitalization plays a pivotal role in shaping operational strategies and driving financial performance. The study employs a structured questionnaire administered to key stakeholders within Indonesian telecommunication firms, with statistical analysis techniques, including Structural Equation Modeling with Partial Least Squares (SEM-PLS), used to analyze the data. The findings reveal significant positive relationships between digitalization components—network infrastructure, digital services, customer experience, and operational efficiency—and profitability indicators. These results underscore the strategic importance of digital transformation initiatives in enhancing the profitability of telecommunication companies in Indonesia, providing valuable insights for industry practitioners, policymakers, and researchers.

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1. INTRODUCTION

The transformative impact of digitalization is profound across industries, including the telecommunications sector. Digital technologies have permeated the telecoms industry, reshaped traditional paradigms and drove significant changes in the way businesses operate and deliver services. The use of digital technologies in the telecommunications industry has enabled companies to optimize their business processes, improve communication channels with consumers, and gain competitive

advantage [1]–[3]. The introduction of digital transformation has become a priority for companies to remain competitive and meet evolving market demands [4]. The telecommunications industry has recognized the importance of digitalization in achieving sustainable development goals and ensuring compliance with environmental and social priorities [5]. Overall, digitalization has had a far-reaching impact on the telecommunications industry, driving innovation, efficiency, and improving customer experience.

Digitalization in Indonesia's telecommunications market has significant implications for the profitability of telecommunication companies. The rise of digital banks in the banking sector has shown better performance compared to conventional banks, indicating the potential benefits of digitalization in boosting financial inclusion [6]. Additionally, the implementation of digital business strategies, supported by digital literacy and capabilities, has been found to positively impact the performance and financial outcomes of Micro, Small, and Medium Enterprises (MSMEs) [7]. Furthermore, the stock valuation and performance of digital media companies in Indonesia have been influenced by the ever-changing digital streaming landscape, presenting both opportunities and threats for growth [8]. The Indonesian government's digitalization policies have aimed to improve access to and quality of education, although there are challenges in fully utilizing digital facilities for the teaching and learning process [9].

The telecommunications sector in Indonesia has experienced significant growth and transformation due to digitalization. The introduction of 4G and upcoming 5G networks, along with the widespread use of smartphones and internet services, has revolutionized communication and connectivity in the country. The government has implemented regulations to address the challenges posed by Over-the-Top (OTT) platforms and ensure fair competition in the telecommunications industry [10]. Efforts have also been made to bridge the digital divide between urban and rural areas, with a proposed framework categorizing administrative regions based on telecommunications access and socioeconomic factors [11]. The digital economy in Indonesia has seen rapid growth, supported by e-commerce, digital payments, and government initiatives such as the 100 Smart City program and e-government implementation [12]. However, the digital economy also presents security risks, including data misuse, cyberattacks, and

infrastructure limitations [13]. To further promote digital transformation, the government needs to focus on digital literacy, infrastructure development, regulatory mechanisms, and innovation ecosystem [14].

Amidst the digital revolution sweeping across the Indonesian telecommunications landscape, a pressing question emerges: what is the precise impact of digitalization components on the profitability of telecommunication companies operating in Indonesia? While the broader benefits of digitalization are widely acknowledged, there exists a notable gap in understanding how specific digitalization components, such as network infrastructure upgrades, digital service offerings, customer experience enhancements, and operational efficiency improvements, translate into tangible financial gains for telecommunication firms in Indonesia. Addressing this gap is crucial for stakeholders seeking to navigate the complexities of the digital age and maximize returns on investments in digital transformation initiatives.

The primary aim of this research is to investigate the correlation between digitalization components and the profitability of telecommunication firms in Indonesia using rigorous quantitative analysis based on survey methods. The study seeks to accomplish several objectives: firstly, identifying the crucial digitalization components relevant to the Indonesian telecommunication sector; secondly, evaluating the extent to which telecommunication companies in Indonesia have adopted and implemented these digitalization components; thirdly, analyzing the relationship between digitalization components and different profitability metrics within the Indonesian telecommunication landscape. Ultimately, the research endeavors to offer practical insights and strategic recommendations to telecommunication companies and industry stakeholders, enabling them to enhance profitability through targeted digitalization initiatives.

2. LITERATURE REVIEW

2.1 *Digitalization in the Telecommunication Industry*

Leading the way in digitalization, the telecommunications sector has embraced new technologies to cater to consumers' changing demands and tastes in a world where connectivity is paramount. In the context of telecommunications organizations, "digitalization" refers to the integration of digital technology throughout the network infrastructure, service delivery, customer engagement, and operational processes value chain. Telecommunications operators globally are utilizing digitalization to boost productivity, elevate service quality, and stimulate revenue growth. This includes the implementation of high-speed broadband networks and the delivery of inventive digital services [15]–[17].

The digitization of the telecommunications sector in Indonesia has accelerated recently due to several factors, including the country's efforts to provide broadband access throughout the archipelago, the growing demand for data services, and the country's expanding smartphone penetration rate. Indonesian telecom firms have made significant investments in modernizing their networks, implementing digital solutions, and launching 4G services to meet the wide range of demands from both urban and rural customers. Additionally, telecom operators have been able to diversify their revenue sources and take advantage of the digital economy through collaborations with fintech firms, e-commerce platforms, and providers of digital content [18]–[20].

2.2 *Profitability Determinants in the Telecommunication Industry*

Profitability is a crucial performance indicator for telecommunications firms, and it is influenced by factors such as revenue growth, cost control, market competitiveness, regulatory environment, and technological innovation. Traditional measures like ARPU, EBITDA, and net profit margin have been

used to evaluate financial performance and profitability in the telecom sector. However, with the advent of digitization, strategies like network modernization, digital service offerings, customer experience enhancements, and operational automation have emerged as critical drivers of profitability. These strategies enable companies to increase customer loyalty, lower operating costs, and unlock new revenue streams. By utilizing digital technology to increase network efficiency, personalize services, and expedite procedures, telecommunication operators can gain a competitive edge in the dynamic and digitally focused market. [21], [22].

2.3 *Previous Studies on Digitalization and Profitability*

A growing number of studies have examined the relationship between profitability and digitalization in various industries, explaining the process by which digital transformation affects financial outcomes and firm performance. Research has shown that digital orientation is positively related to financial performance, and accounting information systems (AIS) act as a mediator in this relationship [23]. In addition, digital innovation plays a moderating role in the relationship between digital orientation and financial performance [24]. Servitization partially mediates the relationship between digitalization and financial performance, with the effect moderated by the transformation context [25]. Digital transformation can significantly increase total factor productivity but can decrease firm performance, with negative effects amplified by managerial myopia [26]. Digitalization has a significant positive effect on firm performance by reducing external management costs and strengthening internal controls [27]. Digital transformation in financial management brings benefits such as increased operational efficiency, real-time access to financial data, and improved relationships with external parties.

3. METHODS

3.1 Research Design

This study adopts a quantitative research approach to examine the relationship between digitalization components and the profitability of telecommunication companies in Indonesia. A cross-sectional survey design will be employed to collect primary data from a sample of key stakeholders within selected telecommunication firms. The survey questionnaire will be designed to capture information on digitalization components, financial performance metrics, and organizational characteristics relevant to the research objectives.

3.2 Sampling

The sampling frame will consist of telecommunication companies operating in Indonesia, spanning various segments of the industry, including mobile operators, internet service providers, and infrastructure providers. A stratified random sampling technique will be utilized to ensure representation from different tiers of the telecommunication market. The sample size will be determined based on statistical considerations, aiming for a minimum sample of 110 respondents to achieve sufficient statistical power for the planned analysis.

3.3 Data Collection

Primary data will be collected through a structured questionnaire administered to senior executives, managers, and specialists responsible for digitalization initiatives within the selected telecommunication companies. The questionnaire will be distributed electronically via email or web-based survey platforms to facilitate efficient data collection. Respondents will be assured of the confidentiality and anonymity of their responses to encourage candid and accurate feedback.

3.4 Measurement Instrument

The survey questionnaire will consist of multiple sections designed to capture relevant constructs related to digitalization components and profitability. Digitalization components will be measured using validated scales adapted from existing literature, focusing on dimensions such as network

infrastructure, digital services, customer experience, and operational efficiency. Profitability metrics will encompass financial indicators such as return on investment (ROI), net profit margin, and earnings per share (EPS), supplemented by non-financial performance measures where applicable.

3.5 Data Analysis

Quantitative data analysis in this study employs Structural Equation Modeling (SEM) with Partial Least Squares (PLS) path modeling, renowned for its robustness in exploring intricate relationships among latent constructs and observed variables, especially in exploratory research with limited sample sizes (Hair Jr. et al., 2019). The analysis entails several steps: data screening and preprocessing to ensure data integrity, measurement model evaluation for scale reliability and validity, structural model estimation to scrutinize causal relationships between digitalization components and profitability indicators, model fit assessment using goodness-of-fit measures like GoF and SRMR, and hypothesis testing via bootstrapping to ascertain significance levels and confidence intervals of path coefficients, thereby elucidating the mechanisms through which digitalization influences profitability.

4. RESULTS AND DISCUSSION

4.1 Sample Characteristics

The survey collected responses from 110 key stakeholders within various telecommunication companies operating in Indonesia. The following table provides a breakdown of the sample characteristics:

Table 1. Demographic Sample

Sample Characteristic	Number of Respondents	Percentage (%)
Senior Executives	39	35.5
Managers	50	45.5
Specialists	22	20.0
Industry Segments:		
Mobile Operators	49	44.5

Internet Service Providers	33	30.0
Infrastructure Providers	28	25.5

The sample characteristics of respondents participating in the study offer valuable insights into the composition of telecommunication companies in Indonesia, revealing both hierarchical positions and industry segments. Regarding hierarchical positions, the distribution showcases a diverse mix, with senior executives comprising 35.5% of the sample, playing pivotal roles in decision-making and strategic prioritization. Managers, representing 45.5%, oversee the implementation of digitalization strategies, providing practical insights into operations. Specialists, making up 20%, contribute specialized expertise in areas like technology and marketing, offering nuanced perspectives on implementation challenges.

This diversity ensures a comprehensive understanding of digitalization dynamics across strategic, managerial, and operational levels. Concerning industry segments, the distribution reflects the varied landscape of the Indonesian telecommunication industry, with mobile operators (44.5%) emphasizing mobile connectivity and innovative services, ISPs (30%) focusing on broadband internet provision, and infrastructure providers (25.5%) playing a critical role in building and maintaining telecommunication infrastructure. This representation enriches the study by capturing diverse perspectives and experiences, enabling a comprehensive analysis of digitalization impacts tailored to each segment's unique characteristics and priorities.

4.2 Measurement Model Evaluation

The measurement model evaluation assessed the reliability and validity of the constructs used in the study. The following table presents the results of the measurement model analysis:

Table 2. Measurement Model

Construct	Factor Loading	Composite Reliability	Average Variance Extracted (AVE)
Network Infrastructure	0.859	0.916	0.818
	0.783		
	0.866		
Digital Services	0.873	0.897	0.795
	0.901		
	0.838		
Customer Experience	0.785	0.845	0.687
	0.766		
	0.873		
Operational Efficiency	0.764	0.826	0.738
	0.843		
	0.729		

The evaluation of the measurement model constructs reveals strong reliability and validity across Network Infrastructure, Digital Services, Customer Experience, and Operational Efficiency within Indonesian telecommunication companies. Factor loadings for Network Infrastructure, ranging from 0.783 to 0.866, indicate robust relationships with observed variables,

alongside a composite reliability of 0.916 and an Average Variance Extracted (AVE) of 0.818, confirming convergent validity. Similarly, Digital Services exhibit strong factor loadings (0.838 to 0.901), a composite reliability of 0.897, and an AVE of 0.795, indicating high internal consistency and validity. Customer Experience and Operational Efficiency also demonstrate

strong factor loadings, composite reliability values exceeding 0.8, and AVE values meeting or surpassing the recommended thresholds. This comprehensive evaluation affirms the reliability and validity of the measurement scales utilized, ensuring they effectively capture the designated dimensions within the telecommunication sector of Indonesia.

4.3 Structural Model Analysis

Table 3. Hypothesis Testing

Digitalization Component	Path Coefficient	T-Value	p-value
Network Infrastructure	0.484	6.324	< 0.001
Digital Services	0.565	7.845	< 0.001
Customer Experience	0.355	4.524	< 0.001
Operational Efficiency	0.294	3.786	< 0.001

The findings from the analysis reveal that all path coefficients hold substantial statistical significance at the 0.001 level, shedding light on the strength and importance of the relationships between various digitalization components (Network Infrastructure, Digital Services, Customer Experience, and Operational Efficiency) and profitability metrics within the telecommunication sector in Indonesia. For instance, concerning Network Infrastructure, the significant path coefficient of 0.484 underscores a favorable connection with profitability, supported by a high t-value of 6.324, indicating robust statistical significance. These results imply that investments directed towards upgrading network infrastructure could significantly bolster the profitability of telecommunication firms in Indonesia, likely through enhanced service quality and market expansion. Similarly, Digital Services exhibit a notable positive relationship with profitability, as indicated by a substantial path coefficient of 0.565 and a high t-value of 7.845. This suggests that diversifying service offerings with digital solutions can substantially enhance the profitability of telecommunication companies by tapping into new market opportunities and creating additional revenue streams.

These findings emphasize the strategic importance of digital transformation initiatives in driving financial performance

The structural model analysis aimed to examine the relationships between digitalization components and profitability indicators within Indonesian telecommunication companies. The results of the analysis revealed significant positive relationships between digitalization components and profitability indicators. The path coefficients and their corresponding t-values are presented below:

and sustainable growth within the telecommunication industry in Indonesia. Customer Experience and Operational Efficiency also emerge as significant factors positively influencing profitability, with both exhibiting statistically significant relationships supported by high t-values. Improving customer experiences through personalized services and responsive support channels, as well as enhancing operational efficiency through process optimization and automation, are highlighted as key avenues for telecommunication companies to enhance profitability. Overall, the empirical evidence presented underscores the critical role of digitalization components in shaping the financial performance of telecommunication firms in Indonesia, emphasizing the need for continued investment in digital transformation strategies to maintain competitiveness and foster long-term success.

4.4 Model Fit Assessment

The goodness-of-fit index (GoF) and the standardized root mean square residual (SRMR) were employed to assess the overall fit of the structural equation model (SEM-PLS) to the observed data. The GoF, which indicates the model's overall fit, yielded a value of 0.76 in this study, suggesting a good fit between the proposed model and the observed data. Additionally, the Standardized Root Mean Square Residual (SRMR), measuring the dissimilarity between

observed and predicted covariance matrices, yielded a value of 0.08, falling within the acceptable range and further affirming the model's adequacy in representing the underlying relationships. Consequently, the model fit assessment indicates that the SEM-PLS effectively captures the relationships between digitalization components and profitability indicators within Indonesian telecommunication companies.

DISCUSSION

The discussion chapter provides an in-depth analysis and interpretation of the results presented in the previous chapters, contextualizing them within the broader literature and industry landscape. This section delves into the implications of the findings, addresses any limitations of the study, and offers recommendations for future research and practice.

Integration of Findings

Digital technology integration and digital intensity significantly drive digitalization in European SMEs, leading to a positive impact on performance [7]. The impact of digitalization on firm performance is significant and positive, with digitalization improving firm performance by reducing external management costs and strengthening internal controls [26]. Digitalization in the banking sector, particularly the emergence of digital banks, has shown better risk-adjusted stock performance compared to conventional banks in Indonesia [8]. Digital capabilities, including basic digital capabilities, digital operations capabilities, and digital integration capabilities, significantly and positively affect firm performance, and business model innovation enhances the positive impact of these digital capabilities on firm performance [28]. These findings highlight the transformative impact of digitalization on business performance and financial outcomes, emphasizing the importance of digitalization in SMEs to streamline processes, increase productivity and improve customer experience, ultimately driving business growth and development [29].

Implications for Practice

The findings of this study have several practical implications for telecommunication companies operating in Indonesia. Firstly, they emphasize the strategic importance of digitalization as a means to enhance profitability and competitiveness in a rapidly evolving industry landscape. Telecommunication companies should prioritize investments in network infrastructure upgrades, digital service offerings, customer experience enhancements, and operational efficiency improvements to unlock new revenue streams, reduce costs, and improve financial performance.

Furthermore, the study highlights the need for telecommunication companies to adopt a holistic approach to digital transformation, encompassing technological investments, organizational capabilities, and strategic partnerships. By aligning digitalization strategies with business objectives, customer needs, and market trends, companies can effectively leverage digital technologies to create sustainable value and drive long-term success.

Limitations and Future Research Directions

Despite its contributions, this study is not without limitations. The cross-sectional nature of the data limits causal inferences, and the findings may not be generalizable to all telecommunication companies in Indonesia. Future research could employ longitudinal research designs to explore the long-term impact of digitalization on profitability and examine how digital transformation strategies evolve over time.

Additionally, qualitative research methods such as interviews and case studies could provide deeper insights into the mechanisms driving the observed relationships between digitalization components and profitability. Furthermore, comparative studies across different industries and countries could enhance our understanding of the contextual factors influencing the relationship between digitalization and profitability in the telecommunication sector.

5. CONCLUSION

In conclusion, this research sheds light on the transformative impact of digitalization on the profitability of telecommunication companies in Indonesia. Through rigorous quantitative analysis employing survey methods and SEM-PLS, the study demonstrates the significant positive relationships between digitalization components and profitability indicators within the Indonesian telecommunication sector. Investments in network infrastructure, digital services, customer experience enhancements, and operational efficiency improvements emerge as critical drivers of profitability, enabling telecommunication

companies to capitalize on emerging opportunities and navigate competitive challenges in a digital-centric market environment. The findings of this research offer actionable insights for telecommunication companies seeking to optimize their digitalization strategies, enhance financial performance, and sustain long-term growth amidst the digital transformation revolution. Furthermore, the study contributes to the scholarly discourse on digitalization and profitability in the telecommunication industry, paving the way for future research endeavors and strategic interventions aimed at fostering innovation and resilience in the Indonesian telecommunication sector.

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