THE ROLE OF DIGITAL INNOVATION IN ENHANCING FIRM VALUE: A STUDY OF INDONESIAN STATE-OWNED BANKS

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Abstract

This study aims to examine the effect of digital innovation on firm value as measured by four indicators: Price to Book Value (PBV), Price Earnings Ratio (PER), Earnings Per Share (EPS), and Tobin's Q. The Resource-Based View (RBV) Theory is used as the theoretical framework to understand how distribution channels such as ATMs, internet banking, and mobile banking services function as strategic resources in enhancing firm value. This study employs a quantitative approach using a census method, with the entire population of four state-owned banks serving as the sample. Secondary data was obtained from the banks' annual reports for the period 2019-2024. The analysis technique used is simple linear regression, with SPSS 26. The research results indicate that digital innovation influences PBV and Tobin's Q, but does not Influence PER and EPS. These findings support the notion that digital innovation, as a strategic asset within the RBV framework, can drive increases in firm value. However, this effect is not yet uniform across all financial indicators.

***Keywords**: Digital Innovation. Firm Value, Price to Book Value (PBV), Price Earnings Ratio (PER), Earnings Per Share (EPS), Tobin's Q.*

A. INTRODUCTION

Digital transformation has been one of the key drivers of changes in industrial structures and corporate value-creation mechanisms over the last two decades. In the banking sector, the adoption of digital technology, including service channels (internet banking, mobile banking, integrated ATM/CDM), electronic payment platforms, and digital platform strategies, has shifted the organization's focus from operational efficiency to long-term market value creation. International empirical studies show that digital technology innovations have the potential to increase market valuation through increased productivity, strengthening managerial signals to investors, and expanding digital market share (Ran, Zhang, & Li, 2024). In the context of banking, in particular, event-based research on digital platform strategy announcements indicates a generally positive market reaction, with a stronger effect on emerging-market banks, suggesting the relevance of digital strategies for state-owned banks operating in emerging economies. These results confirm that the announcement and implementation of digital innovations can increase investors' perception of the bank's growth prospects.

Research linking corporate digitalization to corporate value has also found that these effects can be moderated by institutional factors such as ESG integration, corporate innovation capacity, and organizational readiness, thereby rendering the results context-dependent (Li & Sutunyarak, 2024; Gao, Lin, & Zhai, 2022). In Indonesia, preliminary empirical evidence shows a heterogeneity of the impact of digital banking on enterprise value indicators: some studies have found positive influences on certain market indicators (e.g., PBV, Tobin's Q), while other studies show inconsistent impacts, especially on short-term profitability indicators (e.g., EPS, PER). Although the international literature is relatively abundant, important gaps remain in the academic study and practice of Indonesian banking. First, many studies use partial measures of company value, such as only PBV or Tobin's Q, so a comprehensive picture of how digital innovation affects various value dimensions (asset valuation, profit expectations,

profitability, and market perception) is limited. Second, empirical research in emerging markets, including Indonesia, that simultaneously examines the Influence of digital innovation on several indicators of corporate value for state-owned banks is still limited, even though these banks play an important role in the stability of the financial system and in providing inclusive digital services. Third, the mechanism by which digital innovation (as a strategic resource according to the Resource-Based View) translates into an increase in market value through productivity, new revenue channels, or reduced information asymmetry remains underdeveloped empirically in the Indonesian banking industry. The findings of Ran et al. (2024) and Schreieck et al. (2024) point to mechanistic pathways and relevant market signaling, but contextual verification in Indonesia is needed.

Based on the description above, this study takes the topic "The Role of Digital Innovation in Enhancing Firm Value: A Study of Indonesian State-Owned Banks" to fill empirical and conceptual gaps. The novelty of this research lies in: (1) the measurement of multidimensional company value (using PBV, PER, EPS, and Tobin's Q) simultaneously; (2) focus on state-owned banks as a full sample (census) so that the results are more relevant to public policy; and (3) the integration of RBV frameworks and the latest empirical evidence to elucidate the mechanisms of value creation through digital innovation. The urgency of this research is reflected in the need for state-owned banks and policies to develop efficient, market-accountable agricultural strategies for state-owned entities, especially as digital transformation requires significant resource allocation and heightens sensitive market expectations. In addition, the results of the study are expected to strengthen digital governance and digital information, thereby reducing information asymmetry between banks and investors.

B. LITERATURE REVIEW

Digital innovation has become a strategic element in the transformation of modern organizations and is seen as a key driver of corporate value creation. The latest literature defines digital innovation as the use of digital technology to transform products, services, processes, and business models sustainably (Namsustainably et al., 2010). From a financial perspective, digital innovation contributes to increased operational efficiency, strengthened relationships, and new revenue, which ultimately has the potential to increase the company's value in the eyes of investors. The Resource-Based View (RBV) theory is the theoretical foundation for explaining the relationship between digital innovation and company value. RBV emphasizes that sustainable competitive advantage arises from the management of strategic resources that are valuable, rare, difficult to imitate, and not easily replaceable (Barney, 1991). In the context of the digital economy, digital capabilities and integrated technology systems are categorized as intangible resources that meet these criteria. Empirical studies show that companies that effectively orchestrate digital innovation tend to have higher market valuations (Zhang et al., 2025; Ma et al., 2022).

Company value reflects market perception of a company's future performance and prospects, and is generated. It is measured using market-based and accounting indicators, such as Price-to-Book Value (PBV), Price-to-Earnings Ratio (PER), Earnings Per Share (EPS), and Tobin's Q (Brigham & Houston, 2021). The use of multidimensional indicators is important because the impact of digital innovation is not always reflected uniformly across all company value measures, especially in the short term, when the cost of digital investment is still relatively high. Global empirical evidence on the relationship between digital innovation and corporate value mixes. Several studies have found that digital technology innovation positively affects companies' market value and Tobin's Q as a signal of long-term growth prospects (Ran et al., 2024; Gao et al., 2022). However, other research shows that digital transformation does not always have a significant impact, or even a negative impact, in the short term due to increased business risk and the burden of implementation costs (Lu & Zhou, 2022; Zhang,

2024). These differences in results indicate that the organizational context and institutional environment play an important role.

In the banking sector, digital innovation has special characteristics due to high regulation and systemic risks. Research shows that digital platform strategies and digital channel development can increase bank value, especially if supported by good ESG governance and integration (Schreieck et al., 2024; Li & Sutunyarak, 2024). However, the impact is heterogeneous and highly dependent on organizational readiness, the complexity of the business model, and the scale of technology adoption. Empirical studies in Indonesia continue to show inconsistent findings and methodological limitations. Some studies have found a positive Influence of digital banking on company value, while other studies have shown an insignificant impact, especially in the early phases of digital transformation (Nuraini et al., 2022; Andrew & Murwaningsari, 2024). In addition, most studies use corporate value indicators only partially and rarely focus on state-owned banks. Therefore, there is a research gap that underscores the need for a comprehensive, multidimensional study of the role of digital innovation in enhancing the value of state-owned banks in Indonesia.

C. METHOD

This study uses a quantitative approach with the type of causality research (explanatory research) to examine the Influence of digital innovation on the value of state-owned bank companies in Indonesia. The research design is non-experimental and longitudinal, utilizing annual panel data for the 2019-2024 period. This approach was chosen because it can explain the cause-and-effect relationship between variables using objective, measurable historical data. The study population includes all state-owned banks (SOEs) listed on the Indonesia Stock Exchange, namely Bank Mandiri, Bank Rakyat Indonesia, Bank Negara Indonesia, and Bank Tabungan Negara. The research used the census method (saturated sampling), which ensures the entire population is sampled. The data used are quantitative secondary data obtained from audited financial statements, annual reports, and official capital market publications, to ensure the Reliability and replicability of the research.

The independent variable in this study is digital innovation, measured using the banking digital channel adoption index, while the. In contrast variable is the company' value which is measured by four indicators, namely Price to Book Value (PBV), Price Earnings Ratio (PER), Earnings Per Share (EPS), and Tobin's Q. The research instrument is in the form of a secondary data tabulation sheet, with validity and Reliability guaranteed through the use of indicators and formulas which has been validated in the academic literature as well as the consistency of measurement procedures across all units of analysis. Before analyzing relationships statistically, the researcher establishes the operational definition of each variable. The following table summarizes the variables, indicators, and measurement methods used to ensure consistency and measurability in the research design. The table functions as the core measurement guide for the statistical testing process.

Table 1. Operational Variables

Variable	Indicator	Measurement
Digital Innovation (X)	10 digital banking distribution channels (ATM, CDM, EDC, SMS Banking, Internet Banking, Phone Banking, Mobile Banking, E-Money, E-Payment, Bank Branch)	Ratio/Index
Firm Value (Y1)	Price to Book Value (PBV)	PBV = Stock Price / Book Value per Share
Firm Value (Y2)	Price Earnings Ratio (PER)	PER = Stock Price / Earnings per Share (EPS)

Firm Value (Y3)	Earnings per Share (EPS)	EPS = (Net Income − Preferred Dividend) / Outstanding Common Shares
Firm Value (Y4)	Tobin's Q	Tobin's Q = (Market Value of Equity + Book Value of Debt) / Book Value of Total Assets

Table 1, ensures that, after constructing the operational table, all indicators are measurable and comparable across banks and years. These formulas and measurements serve as the basis for computing the dataset values used in SPSS regression. Digital innovation is treated as an index based on channel availability, while firm value indicators are financial ratios derived from public annual report data. Data analysis was carried out using descriptive statistics and simple linear regression, preceded by classical assumption tests for normality, multicollinearity, heteroscedasticity, and autocorrelation, with standard test criteria. The research upholds academic ethics through the use of public data, the presentation of results objectively, and the transparency of data sources. To minimize bias, the research applied consistent operational definitions, audited data sources, and census methods, with the research's limitations recognized as the basis for further research development.

D. RESULTS AND DISCUSSION

The research findings and discussion on the Influence of digital innovation on the firm value of Indonesian state-owned banks (BUMN banks) during the 2019–2024 period. This chapter is structured around statistical results from SPSS 26 and is meant to answer whether digital innovation—conceptualized as the expansion of digital banking distribution channels—significantly affects firm value measured through four market and profitability indicators: Price to Book Value (PBV), Price Earnings Ratio (PER), Earnings per Share (EPS), and Tobin's Q. The chapter begins by describing the data used and the tests performed before regression modeling, continues with classical assumption test results, explains the simple linear regression outcomes for each dependent variable, and then provides interpretation and comparison with prior studies. The purpose of this chapter is not only to report statistical outputs, but also to interpret what those outputs mean from a financial, managerial, and theoretical perspective, particularly under the Resource-Based View (RBV) framework.

The empirical analysis in this chapter employs a simple regression approach for each firm-value indicator, meaning that digital innovations serve as a single independent variable across all models. Digital innovation is measured through a digital channel index that reflects the breadth of distribution and service channels adopted by each bank, such as ATMs, EDC networks, internet banking, mobile banking, SMS banking, phone banking, and related digital financial infrastructure. This approach assumes that broader and more intensive digital channel innovation improves accessibility, service efficiency, and market competitiveness, which, in turn,n may enhance investor perception and increase market valuation. The dataset consists of annual observations from four BUMN banks across six years (2019–2024), producing a limited but complete panel of firm-level data derived from annual reports and publicly available financial statements. This chapter reflects the bank-level market response and profitability changes that may be attributed to digital innovation.

Before discussing regression results, classical assumption tests were conducted to ensure the statistical Reliability of the regression models. The models were tested for multicollinearity, autocorrelation, and other standard assumptions used in linear regression diagnostics. The multicollinearity test results reveal that the tolerance values were above 0.10 and VIF values were below 10 across all regression models, indicating no multicollinearity problem. This is reasonable because the models use only one independent variable, but the study still provides evidence through SPSS output. The autocorrelation test was conducted

using the Durbin-Watson statistic. The PBV model produced a Durbin-Watson value of 1.954, while the PER model produced 1.823, and the EPS model produced 1.733. These results were interpreted by comparing the Durbin-Watson values against lower and upper bounds (dl and du), and the findings consistently suggest that no autocorrelation exists in the residuals, meaning residual errors are not systematically correlated across time. This indicates the models can be used for further regression-based hypothesis testing.

After confirming the assumptions, the chapter presents linear regression results for each firm value proxy. The first dependent variable examined is PBV, which reflects the price investors are willing to pay relative to a company's book value. In the PBV regression model, the coefficient for digital innovation is positive and statistically significant. The t-test result shows a t-value with a significance level p-value below the 0.05 threshold, indicating that digital innovation significantly affects PBV. The regression coefficient suggests that greater digital innovation corresponds to higher returns, associated with improved investor confidence and stronger market valuation relative to equity. The PBV model's coefficient of determination (R^2) is 0.439, meaning that 43.9% of the variation in PBV among BUMN banks across the study period can be explained by differences in digital innovation. The F-test further supports model significance; the model's F-statistic is 15.635, and the p-value of 0.001 confirms that the regression model is significant overall. These findings imply that investors value digital expansion as a strategic capability and interpret innovation investments as enhancing competitiveness, service reach, and long-term sustainability.

The second firm value indicator examined is PER, which reflects market expectations of earnings growth by comparing a stock's price to its EPS. A stock's price results for PER differ from PBV. However, the regression coefficient remains positive (indicating the direction is consistent with the theoretical prediction), but it is not statistically significant. The t-test shows t = 0.585 with sig 0.565, far above 0.05, meaning digital innovation does not significantly Influence PER during this period. The R^2 value for PER is only 0.018, implying that digital innovation explains only 1.8% of PER variation, while factors beyond the model determine 98.2%. Similarly, the F-test for the PER model is not significant (F = 0.342; sig = 0.565), confirming that the regression model fails to capture a meaningful relationship between digital innovation and PER. This outcome suggests that although digital innovation may increase service efficiency and improve customer experience, it does not automatically shift market expectations about future earnings growth, at least not strongly enough to be captured in PER. PER is often influenced by macroeconomic sentiment, interest rates, growth expectations, and profitability structure, making it more volatile and less directly tied to operational digital expansion.

The third indicator, EPS, measures profitability per share and is directly linked to net income performance. The EPS regression results show again that digital innovation does not significantly affect this profitability indicator. While the coefficient indicates a positive direction, the statistical significance is not achieved. The t-test yields a t-value of 1.223 (p=0.236), which exceeds the 0.05 threshold. The R^2 value for EPS is 0.073, meaning only 7.3% of EPS variation is explained by digital innovation, leaving 92.7% due to other determinants such as credit risk, interest income structure, operating costs, provisioning policies, and macroeconomic shocks. This result indicates that digital innovation may take time to produce tangible improvements in accounting earnings. Digital transformation typically demands substantial investment in technology infrastructure, human resources, cybersecurity, system integration, and digital adoption campaigns. Such costs may suppress short-term profitability, delaying EPS improvements. The chapter also aligns the findings with the supporting literature, suggesting that digitalization affects earnings only when banks implement effective cost-control and revenue-diversification strategies. Therefore, innovation may still be valuable strategically but not necessarily immediately profitable.

Digital innovation significantly impacts PBV and Tobin's Q, but not PER and EPS. PBV and Tobin's Q are market-based indicators that reflect investor perception and valuation. Because digital innovation is visible as a public strategic initiative (through annual reports, platform launches, distribution expansion, and financial inclusion programs), investors may reward banks that appear technologically advanced and future-ready. This is particularly relevant in the banking sector, where service quality, accessibility, and efficiency strongly Influence competitive strength. Furthermore, digital channels such as mobile and agent banking allow banks to reach more customers at lower marginal cost, enabling scale expansion and market penetration, thereby increasing investor confidence. In RBV, digital infrastructure becomes a unique organizational resource that can be valuable, difficult to imitate, and strategically leveraged; thus, it contributes to market value through better perceived future performance.

On the other hand, PER and EPS are more directly tied to earnings. These metrics may not respond quickly because profit generation through digital systems requires maturity. Digital innovation's benefits depend on internal operational integration, customer adoption rates, and cost efficiencies. During early transformation periods, banks may experience higher operating expenses from IT spending, platform maintenance, and training programs. Additionally, the 2019–2024 timeframe includes disruptions and adjustments driven by economic shifts and the accelerated digital transformation. Therefore, digital innovation might improve customer-facing competitiveness but not instantly translate into higher net income per share. This distinction supports the argument that digital transformation first strengthens market perception and strategic positioning, while accounting profitability lags.

Digital innovation in BUMN banks is not uniformly reflected across PBV, PER, EPS, and Tobin's Q, but I. Still, it has significant positive implications for overall market valuation, as captured by PBV and Tobin's Q. The results reinforce digital innovation as a strategic driver of firm value in state-owned banking institutions and support the RBV argument that intangible and technological resources create competitive advantage. However, the Influence across indicators shows that innovation affects firm value differently depending on whether the measure reflects investor valuation (market perspective) or realized profitability (accounting perspective). This nuanced outcome suggests that digital innovation should be interpreted not only as a financial performance tool but also as a strategic signal to markets, regulators, and investors that banks are adapting to the digital economy. Before presenting the summarized results, the following table consolidates the main statistical findings from the hypothesis testing. It shows the direction of Influence and significance outcomes across all dependent variables, including t-test results, significance values, and R-square levels. This table provides an overview of which firm value indicators respond most to digital innovation, most s 2. Summary of findings.

Table 2. Results

Firm Value Indicator (Dependent Variable)	Regression Direction	t-value	Sig. (p-value)	R^2	Conclusion
PBV (Price to Book Value)	Positive	3.954	0.001	0.439	Significant effect (H accepted)
PER (Price Earnings Ratio)	Positive	0.585	0.565	0.018	Not significant (H rejected)
EPS (Earnings per Share)	Positive	1.223	0.236	0.073	Not significant (H rejected)
Tobin's Q	Positive	4.211	0.000	0.470	Significant effect (H accepted)

After observing the table 2, it becomes clear that digital innovation consistently has a positive coefficient across all models, meaning the relationship direction supports RBV expectations. However, only PBV and Tobin's Q show statistically significant Influence, indicating that digital innovation is more strongly rewarded through market valuation rather than directly through profitability measures like EPS. This implies that investors may respond to innovation as a signal of future growth, while earnings indicators may require a longer adjustment time.

Finally, the cause-and-effect relationship emphasized in this chapter can be explained as follows: digital innovation increases banking accessibility, transaction speed, service efficiency, and customer engagement, thereby improving investor perception and reducing uncertainty about future competitiveness. As a result, markets value digitally advanced banks higher, thereby increasing PBV and Tobin's Q. However, the causal chain toward PER and EPS is weaker because it requires the operational benefits of digital transformation to translate into net income growth, and high technology investment costs, organizational adjustment, and transition periods constrain this translation. The study's limitations include a small sample size (only four BUMN banks), a limited observation period, and the use of a single-variable regression model without additional controls, such as profitability ratios, leverage, macroeconomic factors, or governance variables, which may explain much of the variation in PER and EPS. Nevertheless, this research contributes academically by simultaneously testing digital innovation impact on firm value using four different indicators, offering a more comprehensive measurement approach than many earlier studies, and practically, it provides insight for bank management and investors that digital channel innovation functions more clearly as a market valuation driver than as a short-term profitability driver.

E. CONCLUSION

The conclusion of this study aims to address the research objectives and problem formulation regarding whether digital innovation influences the firm value of Indonesian state-owned banks (BUMN banks) during the 2019–2024 period. The empirical findings show that digital innovation has a positive relationship with firm value, but the significance varies across measurement proxies. Specifically, digital innovation has a positive and statistically significant effect on firm value measured by Price to Book Value (PBV) and Tobin's Q, meaning that the expansion and availability of digital banking distribution channels contribute to stronger market valuation and investor confidence. These results indicate that the market tends to perceive digital innovation as a strategic asset that strengthens competitiveness, service efficiency, and long-term sustainability, thereby increasing the perceived worth of banks relative to their equity and asset base. In contrast, digital innovation has a positive but not significant effect on firm value, measured by Price, as well as Earnings per Share (EPS). This implies that while digital transformation initiatives are valued strategically, they do not immediately translate into improved per-share profitability or short-term earnings expectations. The results suggest that profitability-based indicators are influenced by broader determinants such as credit quality, interest rate environment, operating costs, and macroeconomic dynamics, and that digital innovation may require a longer time horizon to generate direct earnings benefits. Therefore, the study concludes that digital innovation mainly affects firm value through market-based perceptions and valuation mechanisms rather than through immediate improvements in accounting profits.

Based on these findings, several recommendations can be proposed for both bank management and future researchers. First, BUMN banks should continue strengthening digital innovation not only as a technological upgrade but as a long-term strategic capability that enhances customer experience, efficiency, and competitive differentiation. To ensure digital innovation also improves profitability indicators (EPS and PER), banks should focus on

integrating innovation into cost efficiency programs, improving digital customer adoption rates, and developing digital-based revenue streams such as fee-based services, ecosystem partnerships, and analytics-driven offerings. Second, banks should improve the transparency and quality of reporting on their digital innovation activities, including measurable outcomes such as active digital users, transaction volume, and operational cost reductions, as these disclosures can strengthen investor trust and market valuation. Third, investors may use digital innovation as a relevant signal in assessing future competitiveness and sustainability of banking firms, but should also consider profitability constraints and transition costs. For future research, it is recommended to expand the sample beyond BUMN banks and include private banks or Islamic banks to increase generalizability. Researchers should also incorporate control variables such as leverage, liquidity, governance, macroeconomic indicators, and bank size in more advanced panel regression models to better capture causal relationships. Overall, this study demonstrates that digital innovation influences firm value primarily through market-based valuation, while emphasizing the need for deeper operational alignment to yield stronger financial performance.

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