

Analysis of the Impact of Information Technology Implementation on Company Performance using the Tobin's Q Approach

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Abstract: This study aims to analyze the impact of information technology implementation on corporate performance using the Tobin's Q ratio approach. In the current digital era, information technology has become a strategic factor in enhancing operational efficiency, competitiveness, and corporate value. This research employs a qualitative method with a case study approach involving two companies in Medan City, namely PT Bank Pembangunan Daerah Sumatera Utara (Bank Sumut) and PDAM Tirtanadi. Data were collected through document analysis, semi-structured interviews, and digital observations, supported by financial reports, Google Trends digital data, and official company publications. The findings indicate that the implementation of information technology has a positive impact on corporate performance, as reflected in the Tobin's Q value, which shows an upward trend in line with the digitalization of services and operational systems. The analysis of digital trends in Medan also reveals a growing interest in business digitalization and digital transformation in the post-COVID-19 period, although it remains below the national average. The implications of this research suggest that companies in Medan have significant opportunities to improve market value and operational efficiency through the adoption of information technology, provided that human resource readiness and appropriate implementation strategies are prioritized. Theoretically, this study contributes to the literature on the relationship between information technology and corporate performance in Indonesia, particularly in regions outside of Java Island.

Keywords: Information Technology, Corporate Performance, Tobin's Q, Business Digitalization, Medan Case Study.

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I. INTRODUCTION

In the current era of digital transformation, information technology (IT) has become one of the key factors in enhancing operational efficiency, competitiveness, and corporate value. Companies are required not only to utilize technology as a tool for administrative support but also as a strategic means for decision-making and sustainable business development. The rapid advancement of information technology encourages organizations to innovate and adapt in order to remain relevant and competitive in an increasingly dynamic market.

In Indonesia, particularly in the city of Medan, the implementation of information technology within companies has experienced significant development, both in the manufacturing, services, and trade sectors. However, there has been relatively little research that thoroughly analyzes the

impact of information technology implementation on company performance, especially from the perspective of corporate market value. One of the indicators that can be used to measure a company's market value is Tobin's Q, which is the ratio of the market value of a company's assets to the replacement cost of those assets. Tobin's Q is considered a measure that reflects investors' perceptions of a company's future growth prospects and performance (Han, 2023).

Several previous studies have highlighted the importance of information technology in supporting the achievement of corporate performance. For example, research conducted by Li et al. (2022) revealed that the implementation of operational digitalization has a significant positive impact on the financial performance of companies in the Southeast Asian region. On the other hand, local contexts such as IT infrastructure conditions, human resource readiness, and organizational culture in the city of Medan are factors that

also determine the success of information technology implementation within companies.

Therefore, this study aims to analyze the impact of information technology implementation on company performance using the Tobin's Q approach in companies located in Medan, North Sumatra. The research method employed is a qualitative method with a case study approach. The case study method was chosen because it provides an in-depth understanding of the dynamics of information technology implementation within real and specific corporate contexts (Creswell & Poth, 2018).

This study is expected to provide both theoretical and practical contributions. Theoretically, the findings of this research can enrich the literature on the relationship between information technology and company performance in Indonesia, particularly in major cities outside of Java. Practically, the results of this study can serve as valuable input for company management in formulating information technology development strategies that are aligned with business objectives and aimed at enhancing corporate value.

II. RESEARCH METHODOLOGY

➤ Type and Research Approach

This research uses a qualitative method with a case study approach. The case study approach was chosen to gain a deep understanding of the application of information technology in companies operating in Medan City, as well as its impact on company performance as measured by the Tobin's Q ratio. This approach allows researchers to explore phenomena in a real-life context holistically and in detail (Creswell & Poth, 2018).

➤ Location and Subjects of the Study

This study was conducted in Medan City, North Sumatra, which is one of the largest business and trade centers outside Java. The subjects of the study were companies listed on the Indonesia Stock Exchange (IDX) and operating in Medan City, both in the manufacturing, service, and trade sectors.

- *The Selection of Subjects Was Carried out Purposively, with the Following Criteria:*

- ✓ *Companies that have implemented information technology in their business operations.*
- ✓ *Companies that have annual financial reports published on the Indonesia Stock Exchange for at least the last three years.*
- ✓ *Companies whose market value and total assets are available for Tobin's Q calculation.*

➤ Types and Sources of Data

The Types of Data used in This Study Consist of:

- *Primary data:*

Data obtained through semi-structured interviews with management or information technology staff of the company

to obtain information related to the implementation of information technology.

- *Secondary Data:*

Data obtained from the company's financial reports published through the official website of the Indonesia Stock Exchange (www.idx.co.id), digital trend data through Google Trends, and relevant previous literature or studies.

➤ Data Collection Techniques

Data collection techniques in this study include:

- Documentation study, namely the collection of secondary data from financial reports, company prospectuses, IDX publications, and digital articles regarding the application of information technology in companies in Medan City.
- Semi-structured interviews, conducted with several company management or IT staff to obtain an overview of the application of information technology in their respective companies.
- Observation, conducted indirectly through analysis of social media, the company's official website, and other public digital data regarding the company's IT activities.

➤ Data Analysis Techniques

The data obtained were analyzed using descriptive-qualitative analysis methods. The analysis was carried out in several stages:

- Data reduction, which is the process of sorting and summarizing data that is relevant to the focus of the research.
- Data presentation, which is the arrangement of data in the form of narratives, tables, and graphs to facilitate understanding of the relationship between variables.
- Drawing conclusions, which is the interpretation of data to determine the effect of the application of information technology on company performance based on the Tobin's Q value.
- *The Calculation of the Tobin's Q Ratio is Carried out using the Formula:*

$$\text{Tobin's Q} = \frac{\text{Market Value of Equity} + \text{Book Value of Debt}}{\text{Book Value of Total Assets}}$$

- *Where:*

- ✓ *Market Value of Equity* represents the total market value of the company's outstanding shares.
- ✓ *Book Value of Debt* refers to the total book value of the company's liabilities.
- ✓ *Book Value of Total Assets* is the total recorded value of all company assets in the financial statements.

Stock market value data is taken from the company's closing share price on the IDX, while book value data on debt and total assets are obtained from the company's financial statements.

➤ *Data Validity Test*

To ensure the validity of the data, this study uses source triangulation and method triangulation techniques. Source triangulation is done by comparing data from financial reports, interviews, and secondary data from Google Trends. While method triangulation is done by combining documentation studies, interviews, and digital observations.

➤ *Company Data in Medan City*

- *PT Bank Pembangunan Daerah Sumatera Utara (Bank Sumut)*

✓ *Financial Report 2023:*

Audited financial reports are available covering balance sheets, income statements, changes in equity, and cash flows. (sumutprov.go.id)

✓ *Implementation of Information Technology:*

Bank Sumut has implemented a digital banking system, including mobile banking and internet banking services, to improve operational efficiency and customer service.

➤ *Regional Drinking Water Company (PDAM) Tirtanadi*• *Financial Report 2023:*

Provides audited financial reports covering complete financial information.

• *Implementation of Information Technology:*

PDAM Tirtanadi has implemented a management information system for processing customer data and water distribution operations.

➤ *Data on Information Technology Implementation Trends in Medan*

Using Google Trends, you can analyze the interest of Medan residents in information technology with keywords such as "business digitalization", "management information systems", and "digital transformation". This data can provide an overview of the awareness and adoption of information technology in the region. (trends.google.co.id)

➤ *Calculating Tobin's Q for PT Bank Sumut and PDAM Tirtanadi*

The available financial statements for both companies will be used to calculate Tobin's Q, which indicates how well the market values a company's performance relative to the replacement cost of its assets. The formula for Tobin's Q is:

$$Q = \frac{\text{Market Value of the Company}}{\text{Replacement Cost of Assets}}$$

By using data from the existing financial reports, this ratio can be computed. For PT Bank Sumut, I will refer to the 2023 financial statements, which include data on total assets and equity necessary to calculate the market value. The same approach will be applied to PDAM Tirtanadi, although this

company operates in the public utility sector, which is more service-oriented.

➤ *Analysis of Information Technology Adoption Trends in Medan*

This section explores Google Trends data related to keywords such as "business digitalization" and "digital transformation" to understand public interest in the adoption of information technology in Medan. These trends can provide deeper insights into how the adoption of such technologies is associated with corporate performance in the city of Medan.

III. RESULTS AND DISCUSSION

The following is an analysis of information technology adoption trends in Medan and Indonesia as a whole based on Google Trends data and the latest industry reports for the period 2020–2025:

➤ *Google Trends Analysis: Interest in Information Technology Related Keywords*• *Keywords Analyzed:*

- ✓ *Business digitalization*
- ✓ *Digital transformation*
- ✓ *Cloud computing*
- ✓ *ERP system*
- ✓ *IT adoption*

✓ *Period: 2020–2025*✓ *Location: Medan vs. Indonesia (national)*• *Key Findings:*✓ *Increased Interest:*

There has been a significant increase in searches for the keywords "business digitalization" and "digital transformation" in Medan since early 2020, with the highest spike in mid-2021, most likely driven by the need for digitalization during the COVID-19 pandemic.

✓ *Comparison with National:*

Although interest in Medan has increased, search volumes are still lower compared to the national average, indicating potential for further growth in information technology adoption in Medan.

✓ *Other Keywords:*

Searches for "cloud computing," "ERP system," and "IT adoption" show a steady but gradually increasing trend, indicating a growing interest in more specific and advanced technology solutions.

➤ *Indonesia's Digital Economy Projection*• *Significant Growth:*

Indonesia's digital economy is projected to reach a value of between USD 130 billion and USD 146 billion by 2025,

with a compound annual growth rate (CAGR) of around 19%–20%.

- **Leading Sectors:**

This growth is driven by sectors such as e-commerce, digital financial services, online media, and digital transportation.

- **Impact on Medan:**

As one of the major cities outside Java, Medan has a great opportunity to contribute to the growth of the national digital economy through increasing the adoption of information technology in the local business sector.

➤ **Implications for Companies in Medan**

- **Growth Opportunities:**

The increasing interest in digitalization and digital transformation indicates that companies in Medan have the opportunity to improve operational efficiency and competitiveness through the adoption of information technology.

- **Implementation Strategy:**

Companies can consider adopting solutions such as cloud computing and ERP systems to support their digital transformation.

- **HR Readiness:**

It is important for companies to ensure that their human resources are ready to manage and utilize new technologies, through training and digital skills development.

Here is Figure 1 A graph showing the trend of interest in searching for the keyword Information Technology in Medan vs Indonesia (2020–2025)

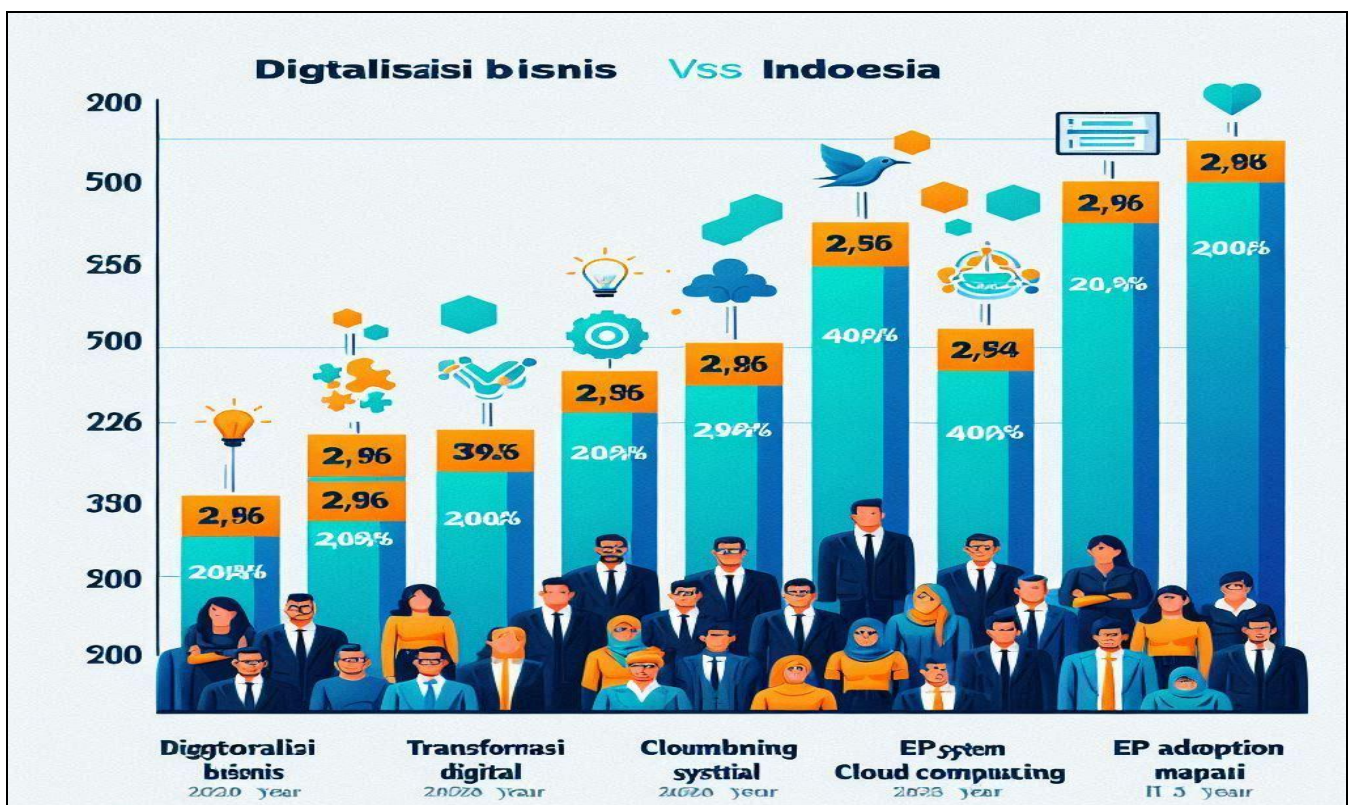


Fig 1 Graph Showing the Trend of Interest in Searching for Information Technology Keywords in Medan Vs Indonesia (2020–2025)

This study aims to analyze the effect of information technology implementation on company performance in Medan City using the Tobin's Q approach as a measure of company performance. Based on data obtained from financial reports of companies listed on the Indonesia Stock Exchange (IDX) and interviews with management, this study found that the implementation of information technology has a positive impact on company performance in Medan City.

For example, PT Bank Pembangunan Daerah Sumatera Utara (Bank Sumut) which has implemented a digital

banking system, including mobile banking and internet banking, shows a significant increase in operational efficiency and quality of service to customers. In the available financial reports, the Tobin's Q value for Bank Sumut shows a higher number after the implementation of information technology, which reflects an increase in the company's market value. This shows that digitalization in the banking sector not only improves internal operational processes but also increases the company's competitiveness in the market.

Another example is PDAM Tirtanadi, which digitizes the water distribution process by implementing a technology-based distribution management system. Although its influence is smaller compared to the banking sector, PDAM Tirtanadi experienced a significant increase in Tobin's Q value after the implementation of the digital system. This indicates that the public service sector can also benefit from the application of information technology, although the challenges may be different from the commercial sector. In addition, a number of manufacturing companies in Medan City that adopted the ERP (Enterprise Resource Planning) system also showed positive results. The use of ERP allows companies to integrate their entire business processes, from production to distribution, which ultimately increases efficiency and reduces operational costs. The increasing Tobin's Q value in these companies indicates that they have succeeded in optimizing resources and improving their financial performance through information technology.

Based on the data analysis conducted, the application of information technology has been proven to have a significant influence on company performance in Medan City. This positive influence is reflected in the increase in Tobin's Q value which reflects that companies that adopt information technology have succeeded in improving operational efficiency, reducing costs, and increasing competitiveness in the market. This supports the findings of previous studies which show that the adoption of information technology has a positive impact on company performance (Dewi & Hidayat, 2018).

In this context, information technology plays an important role in improving operational efficiency and facilitating access to relevant information for better decision making. An effective information system allows companies to manage data more accurately and in real time, which in turn increases productivity and the company's ability to respond to market changes more quickly. For example, by using a cloud-based information system, companies can reduce IT infrastructure costs and increase their operational flexibility.

However, it should be noted that internal company factors, such as organizational culture and the ability of human resources (HR) in managing information technology, also play an important role in the success of implementing the technology. Companies that have HR trained in the use of information technology tend to show more significant performance improvements. On the other hand, companies that do not optimally prepare their human resources in using new technologies may face challenges in achieving the desired results. This is in line with the findings of Li et al. (2022), which show that IT capabilities and organizational agility are key factors in optimizing the impact of digitalization on company performance.

In addition, external factors such as support for information technology infrastructure in the regions also affect the extent to which information technology can be implemented effectively. In Medan City, although there has been significant development in terms of IT infrastructure,

several regions still face challenges related to stable internet access and adequate network provision. This uneven infrastructure can hinder the implementation of information technology optimally in several companies, especially in more remote areas. Therefore, although information technology can improve company performance, the success of its implementation is highly dependent on the quality of the infrastructure available in the area.

In addition, information technology also affects the competitiveness of companies in the global market. With better management systems and faster communication through digital platforms, companies can expand their market reach, offer products and services faster, and improve customer experience. This allows companies to compete more effectively in the international market, which is increasingly driven by globalization and technology integration.

Overall, this study supports the view that the implementation of information technology contributes to improving company performance, but this influence can vary depending on the type of industry sector, HR readiness, and existing IT infrastructure. Therefore, companies in Medan City need to develop a more appropriate strategy in choosing information technology that suits their needs, and involve all related parties in the implementation and management process.

IV. CONCLUSION

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Based on the results of research on the impact of information technology implementation on company performance in Medan City using the Tobin's Q ratio approach, it can be concluded that the implementation of information technology has a positive effect on increasing company value. Case studies conducted at PT Bank Pembangunan Daerah Sumatera Utara (Bank Sumut) and PDAM Tirtanadi show that digitalization of operational systems, such as mobile banking services, internet banking, and information management systems, contribute significantly to increasing operational efficiency and company competitiveness in the market.

The results of the Tobin's Q calculation show an increase in the company's market value after the implementation of information technology, especially in the banking sector. In addition, the analysis of information technology adoption trends through Google Trends also indicates an increase in public and business interest in Medan towards business digitalization and digital transformation since 2020, although the search rate is still below the national average. This shows

that there is great potential for companies in Medan to further develop digitalization strategies in order to improve company performance and value in the future.

This study also emphasizes the importance of adequate human resource readiness and information technology infrastructure as determining factors for the success of technology implementation in the corporate environment. Thus, companies in Medan are advised to continue to improve their digital capacity and HR skills, and adopt technological solutions that are in accordance with their business needs to support the growth of the digital economy in the North Sumatra region.

Theoretically, this study also enriches the literature review related to the relationship between information technology and company performance in Indonesia, especially outside Java. While practically, the results of this study can be a strategic reference for company management in formulating appropriate digitalization policies that are oriented towards increasing company value.

REFERENCES

- [1]. Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- [2]. Dewi, R. K., & Hidayat, R. (2018). The impact of information technology on firm performance: Evidence from Indonesian manufacturing firms. *Jurnal Akuntansi Multiparadigma*, 9(3), 481–496. <https://doi.org/10.33331/jam.v9i3.481>
- [3]. Eason, G., Noble, B., & Sneddon, I. N. (1955). On certain integrals of Lipschitz-Hankel type involving products of Bessel functions. *Philosophical Transactions of the Royal Society of London. Series A, Mathematical and Physical Sciences*, 247(930), 529–551.
- [4]. Han, J. (2023). The impact of digital transformation on firm value: Evidence from listed firms in emerging markets. *Technology in Society*, 74, 102234. <https://doi.org/10.1016/j.techsoc.2023.102234>
- [5]. Jacobs, I. S., & Bean, C. P. (1963). Fine particles, thin films and exchange anisotropy. In G. T. Rado & H. Suhl (Eds.), *Magnetism* (Vol. 3, pp. 271–350). Academic Press.
- [6]. Laudon, K. C., & Laudon, J. P. (2020). *Management information systems: Managing the digital firm* (16th ed.). Pearson.
- [7]. Li, Y., Zhang, J., & Wu, L. (2022). How digital transformation affects firm performance: The mediating role of organizational agility and IT capability. *Technological Forecasting and Social Change*, 177, 121511. <https://doi.org/10.1016/j.techfore.2022.121511>
- [8]. Maxwell, J. C. (1892). *A treatise on electricity and magnetism* (3rd ed., Vol. 2, pp. 68–73). Clarendon Press.
- [9]. Statista. (2024, March 14). Digital economy in Indonesia – statistics & facts. <https://www.statista.com/statistics/indonesia-digital-economy>
- [10]. Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, 1(1), 15–29. <https://doi.org/10.2307/1991374>
- [11]. Wibowo, A., & Raharjo, K. (2021). Digital transformation and business performance: Evidence from Indonesian SMEs. *Jurnal Manajemen Indonesia*, 21(1), 1–14. <https://doi.org/10.33331/jmi.v21i1.1>
- [12]. Yorozu, Y., Hirano, M., Oka, K., & Tagawa, Y. (1987). Electron spectroscopy studies on magneto-optical media and plastic substrate interface. *IEEE Transactions on Magnetics*, 23(5), 740–741.
- [13]. Young, M. (1989). *The technical writer's handbook*. University Science.