ANALYSIS OF LOGISTICS SERVICE EFFICIENCY IN THE SUPPLY CHAIN OF POS INDONESIA IN DIGITAL ERA THROUGH THE IMPLEMENTATION OF ROBOTIC SORTING MACHINES

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Abstract. *Digital transformation is a key factor in improving service quality in the modern era. Agile Leadership and Logistics competency are believed to play a crucial role in supporting the success of digital transformation, which ultimately impacts service quality. This study aims to analyze the influence of Agile Leadership and Logistics competency on Digital Transformation and its impact on service quality. The method used is quantitative with multiple linear regression analysis techniques, where data was collected through a survey of employees in the delivery service sector. The results of the study indicate that Agile Leadership and Logistics competency have a positive and significant effect on Digital Transformation. In addition, Digital Transformation has been shown to contribute significantly to improving service quality. These findings are in line with previous studies that emphasize the importance of adaptive leadership and digital skills in accelerating innovation and operational efficiency. The conclusion of this study emphasizes the need for companies to improve agile leadership, strengthen employee logistics competencies, and optimize digital transformation strategies to improve competitiveness and business performance.*

Keywords: *Agile Leadership, Digital Transformation, Logistic Competency, Service Quality*

1. INTRODUCTION

PosInd has been implementing a digital transformation in recent years to improve operational efficiency and competitiveness in the postal and logistics services industry. This initiative has resulted in increased company profits, reaching more than 500 billion rupiah in 2022 and 2023. PosInd offers various services, including Domestic Mail, International Mail, Domestic Parcels, International Parcels, Financial Services, and Logistics. However, several services experienced a decline in performance from January to October 2023 compared to the same period the previous year. This indicates challenges in maintaining performance amidst the ongoing digital transformation process.

Digital transformation has become a crucial aspect of modern business strategy. Digital transformation is the shift from manual systems to digital technology-based systems that enable faster data access and analysis. (1). Effective implementation of digital transformation has the potential to improve efficiency and quality of services. (2) However, challenges that arise in this process can hinder the achievement of company targets.

Besides digital transformation, adaptive leadership is also a contributing factor to a company's success. (3) Agile leadership, which emphasizes flexibility and the ability to respond quickly to change, has been shown to increase the competitiveness of companies in various sectors. (4) Research shows that agile leadership has a positive correlation with improved performance in the manufacturing industry. (5), while other studies show similar impacts in the telecommunications industry in Indonesia(6).

Logistics competency is also a key factor in digital transformation. (7) The study found that logistics competency supports the successful implementation of digitalization in the MSME sector in Sukabumi. (8) Meanwhile, other studies show that improving logistics

competency increases work efficiency in the government sector. (9). However, other studies (10,11) show varying results depending on industry sector and organizational context.

Several studies have been conducted on the impact of digital transformation on service quality. Previous research (12) found that digital transformation has an impact on the financial performance of savings and loan cooperatives in Thailand. Other research (13) This study demonstrates the positive impact of digitalization on technology companies in Humber. Previous studies also highlighted that digitalization increases the competitiveness of MSMEs in Cikarang.(14)Other research also found that digital transformation has a significant impact on the performance of Regional Development Banks in Indonesia.(15)However, there are also studies that have found that companies in western China are less receptive to digital transformation than those in eastern and central China, so the impact on service quality is not significant.(16).

Furthermore, research related to agile leadership and logistics competencies has also shown mixed results. (17) also found that agile leadership influenced digital transformation in universities in Poland but had no impact on performance. The study also found that agile leadership had an impact on digital transformation in a chemical company in Istanbul (18).

Based on this background, this study aims to examine the influence of digital transformation, agile leadership, and logistics competency on PosInd's performance. By understanding the interrelationship between these three factors, it is hoped that this research will provide insights for the company in developing performance improvement strategies in the digital era.

2. LITERATURE REVIEW

Research on the role of logistics capabilities in driving digital transformation was conducted by Mulyati, Amin, and Saputra (2025) in a case study at PT Pos Indonesia Persero. The results showed that logistics capabilities such as core capability, customer satisfaction, logistics operations, supply chain visibility, and technology and innovation significantly influenced the success of digital transformation. Meanwhile, infrastructure capability showed no significant impact. This study provides the foundation that improving logistics competencies can be a key driver of digitalization in the logistics sector. (30).

Rihawi (2025) in his research investigated the impact of digital transformation on quality management in logistics companies. This study showed that digital transformation has a positive impact on operational efficiency and improved service quality, although it still faces challenges such as resistance from human resources. This strengthens the relevance of digital transformation variables in influencing logistics service quality (LSQ), especially in the context of large organizations such as PT Pos Indonesia, which is currently modernizing its system. (31).

A study by Koh & Yuen (2022) examined the competencies required by logistics professionals in the digital era. This study identified three main competencies: technical, digital, and personal. These findings are relevant in broadening the understanding of logistics competency, which extends beyond operational capabilities to encompass adaptive skills to technology and interpersonal skills to manage rapid change in the digital environment. (32).

From a leadership perspective, a bibliometric analysis by Putra (2022) emphasized the importance of agile leadership in accelerating digital transformation. A review of hundreds of publications showed that agile leaders tend to be able to create a responsive, innovative, and open work environment to technology-based change. This strengthens agile leadership's position as a key variable in shaping organizations capable of sustainably adapting to digital challenges. (33).

Another study conducted by Porkodi (2024) through a meta-analysis also showed that agile leadership has a positive relationship with organizational effectiveness. The most significant effects were seen in the dimensions of internal productivity and data-driven

decision-making. However, the study noted a lack of exploration in directly linking agile leadership to customer satisfaction or service quality. This represents a research gap that can be addressed in this study by examining the indirect relationship between agile leadership and logistics service quality through digital transformation as an intervening variable. (34).

Based on the literature reviewed, this research offers significant scientific contributions. Most previous studies have addressed the relationships between variables partially, without integrating all four variables into a comprehensive model. Therefore, this study aims to examine the simultaneous influence of agile leadership and logistics competency on digital transformation, as well as how this digital transformation impacts the quality of logistics services at PosInd. Therefore, this research is expected to enrich the literature and provide strategic input for the transformation of national logistics services.

3. RESEARCH METHODS

3.1 Types of research

This research uses quantitative methods with descriptive and verification approaches. The descriptive approach is used to provide an objective overview of the phenomenon being studied, while the verification approach aims to test hypotheses and ensure the validity of existing theories in a specific context. This method allows the research to produce in-depth and accurate data-driven analysis.

3.2 Population and sample

The population in this study was 198 Senior Vice Presidents, Executive Vice Presidents, Vice Presidents, and Managers at PosInd Head Office. The sample was determined using the Slovin formula with a 5% margin of error, resulting in a sample size of 132 respondents. Sampling was conducted proportionally to ensure balanced representation of the entire population studied.

3.3 Data collection techniques

Data collection was conducted using a questionnaire that had been tested for validity and reliability. This questionnaire was designed to measure respondents' perceptions of the research variables and ensure the data obtained had a high level of reliability. Furthermore, a literature review was conducted as a secondary data source to enrich the analysis and support the findings from the primary data.

3.4 Data analysis techniques

Data analysis was conducted using descriptive and verification approaches. Descriptive analysis was used to calculate the average and distribution of respondents' responses to obtain a general overview of the variables studied. Meanwhile, verification analysis was conducted using regression tests to examine the relationships between variables and test previously formulated hypotheses. Data processing was performed using statistical software to ensure the accuracy of the research results.

3.5 Research model and hypothesis

The research model in this study is presented in Figure 1, which illustrates the relationship between Agile Leadership, Logistics Competency, Digital Transformation, and Service Quality. This model demonstrates how Agile Leadership and Logistics Competency play a role in driving Digital Transformation, which ultimately impacts overall service quality.

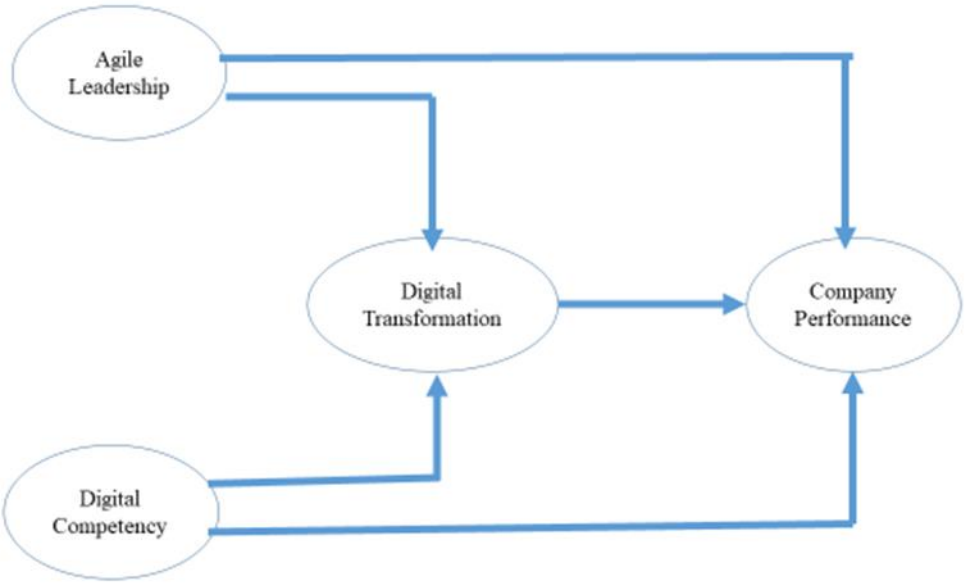

Figure 1. Research model

This study proposes several hypotheses based on the developed model. The hypotheses are as follows:
H1: There is a positive and significant influence of Agile Leadership on Digital Transformation.
H2: There is a positive and significant influence of Logistic competency on Digital Transformation. H3: There is a positive and significant influence of Digital transformation on Service Quality. H4: There is a positive and significant influence of Agile Leadership and Logistic competency on Digital Transformation simultaneously.
H5: There is a positive and significant influence of Agile Leadership and Logistic competency on service quality simultaneously.
H6: There is a positive and significant influence of Agile Leadership and Logistic competency on the quality of Threw Digital Transformation services.

4. RESULTS AND DISCUSSION

4.1 Results

Table 1. Respondents

Job title	Man	Woman	Amount
Senior Vice President	6	3	9
Executive Vice President	5	1	6
Vice President	30	5	35
Manager	62	20	82
Amount	103	29	132

Table 1 shows the distribution of respondents by position and gender at PosInd Head Office. Of the total 132 respondents, the majority came from Manager positions with a total of 82 people, consisting of 62 men and 20 women. The Vice President position had 35 respondents, with 30 men and 5 women. Meanwhile, the Senior Vice President position was filled by 9 respondents, consisting of 6 men and 3 women, while the Executive Vice President position had the fewest number, namely 6 respondents, with 5 men and 1 woman. Overall, the number of male respondents was more dominant with 103 people compared to women who numbered 29 people, indicating that the majority of leadership positions at PosInd Head Office are still dominated by men.

Table 2. Validity test results

Variables	Signification	Standard	Decision
Agile Leadership (X1)	0.000-0.001	< 0.05	Valid
Logistics competency (X2)	0.000-0.001		Valid
Digital Transformational (Y)	0.000-0.001		Valid
Service quality (Z)	0.000-0.001		Valid

Based on the validity test results presented in Table 2, all research variables—Agile Leadership, Logistics Competency, Digital Transformation, and Service Quality—had significance values below 0.05, indicating they met validity standards. Therefore, all indicators used in this study are valid and can be used to accurately measure the established variables.

Table 3. Reliability test results

Variables	Cronbach's Alpha	Decision
Agile Leadership	0.931	Reliable
Logistics competency	0.974	
Digital Transformational	0.930	
Quality of service	0.945	

Table 3 shows that all research variables—Agile Leadership, Logistic Competency, Digital Transformation, and Service Quality—have Cronbach's Alpha values above 0.600. This indicates that all variables meet reliability standards. Therefore, this research instrument is considered reliable, meaning the questionnaire used has good internal consistency in measuring the research variables. Therefore, the data obtained are worthy of further analysis.

Table 4. Descriptive test results

Variables	Average
Agile Leadership	3.01-3.57
Logistics competency	3.01-3.11
Digital Transformation	2.98-4.02
Quality of service	3.23-3.99

Based on the information in Table 4, it is known that the average value of each variable is in the range of 2.98 to 4.02. Variables with an average value below 3.400 are categorized as quite good, while values in the range of 3.400 to 3.99 are included in the good category. (19) These results indicate that the indicators in this study are at a fairly good to good level, indicating that there is still room for improvement. Therefore, this study provides scope to explore factors that can enhance Agile Leadership, Logistics Competency, Digital Transformation, and Service Quality to further optimize them.

Table 5. Regression test results

Hypothesis Testing	Sig	Decision
X1 against Y	0.000 < 0.050	significant
X2 against Y	0.000 < 0.050	significant
Y against Z	0.000 < 0.050	significant
X1 against Z	0.000 < 0.050	significant
X2 against Z	0.000 < 0.050	significant
X1 against Z through Y	0.000 < 0.050	significant
X2 against Z through Y	0.000 < 0.050	significant

Based on the results of the hypothesis test presented in Table 5, all exogenous variables showed a positive and significant influence on the endogenous variables, as indicated by a sig value below 0.050. This indicates that Agile Leadership and Logistics Competency have a significant relationship with Digital Transformation and Service Quality, both directly and through Digital Transformation as a mediating variable. The test results also show that Digital Transformation has a significant influence on improving Service Quality. Thus, the results of this study support the proposed hypothesis and confirm that agile leadership factors and logistics competencies play an important role in digital transformation and service quality.

Table 6. R Square test value

Determination Test	R Square Test Value
Agile Leadership and Logistic competency towards Digital Transformation	0.563
Digital Transformation on Service Quality	0.841

Based on Table 6, the R Square value for the influence of Agile Leadership and Logistic competency on Digital Transformation is 0.563, which means that the two variables simultaneously explain 56.3% of the variation in Digital Transformation, while the remaining 43.7% is influenced by other factors outside this study. Meanwhile, the R Square value of 0.841 indicates that Digital Transformation contributes 84.1% to Service Quality, with the remainder influenced by other external factors. These results indicate that agile leadership and logistics competency factors have a significant role in driving digital transformation, which ultimately has strong implications for improving service quality. The visual form for the results of the research model can be seen in Figure 2 below:

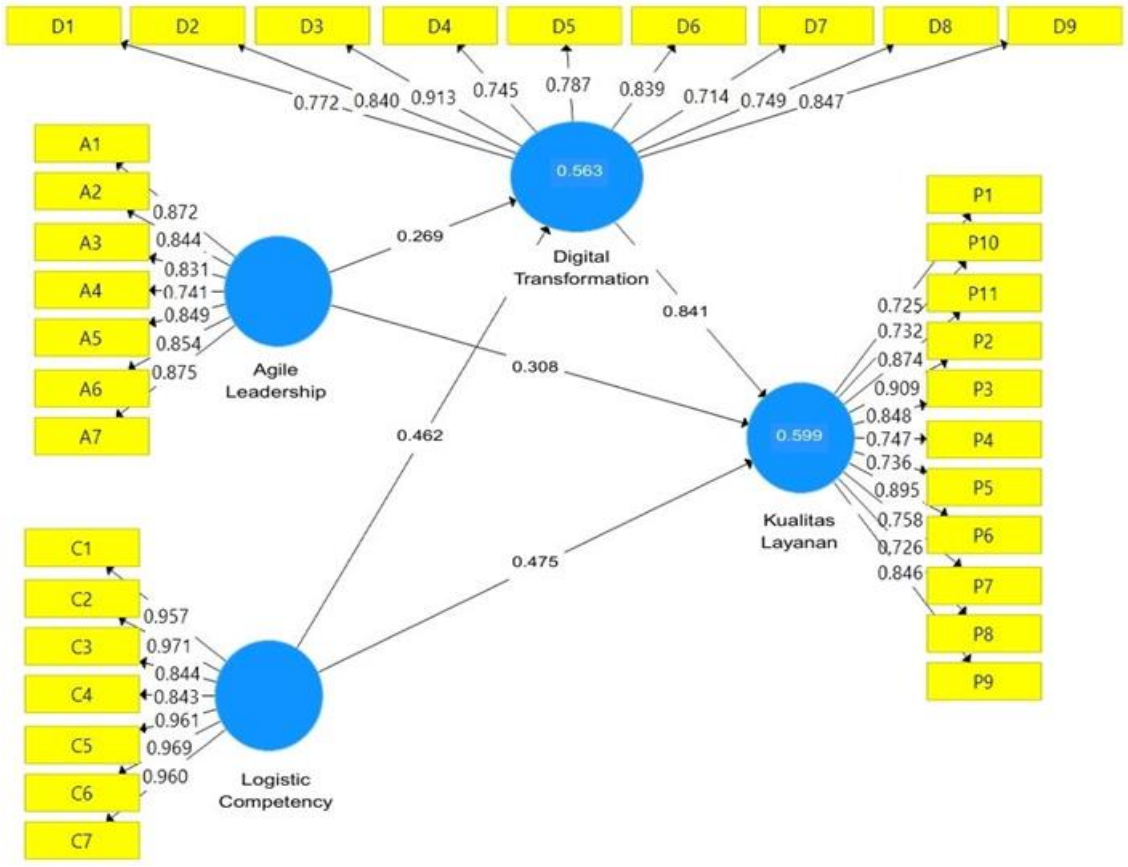

Figure 2. Research result model

4.2 Discussion

The results of this study clearly demonstrate that Agile Leadership has a positive and significant impact on Digital Transformation. These findings indicate that leadership that is adaptive, flexible, and responsive to change can accelerate the implementation of digital transformation within an organization. In a rapidly evolving business world, organizations led by agile leaders have a competitive advantage in responding to the challenges and opportunities that arise from technological change. This research also strengthens the findings of previous studies. (5) which found that agile leadership played a significant role in improving the readiness of London-based manufacturing companies to face rapid digital change. Furthermore, previous research (13) also confirmed that companies operating in the information technology sector in the Humber region were able to accelerate their digital transformation more quickly by implementing agile leadership. Therefore, for organizations seeking to ensure the effectiveness of their digital transformation processes, improving agile leadership within the company is crucial. This improvement can be achieved by encouraging faster decision-making, being responsive to technological changes, and strengthening an organizational culture open to innovation and experimentation to achieve optimal digital transformation.

In addition to agile leadership, this study also proves that logistics competency has a positive and significant impact on digital transformation. Strong logistics competency within an organization enables companies to adopt technology more effectively, improve operational efficiency, and optimize the digital services they offer to customers. (20) With an efficient and competent logistics system, companies can maximize technology to support a faster, more transparent, and more flexible supply chain. The results of this study align with previously presented findings. (8) which found that logistics competency has a significant impact on the successful implementation of digital transformation in the Micro, Small, and Medium Enterprises (MSMEs) sector in Sukabumi Regency. This finding is further reinforced by other research showing that the higher an institution's logistics competency, the faster the adoption of technology applicable to academic environments. (21) Therefore, for companies seeking to optimize their digital transformation process, it is crucial to continuously improve the logistics competency of their employees. This can be achieved through ongoing training, the implementation of more user-friendly technology, and the creation of a work culture that is more adaptive to technological developments, ensuring smooth and effective digitalization implementation.

In addition to influencing digital transformation, this study also shows that Agile Leadership plays a crucial role in improving the quality of service provided by an organization. Agile and adaptive leadership enables companies to be more responsive to various challenges emerging in the business and technology world, thereby improving overall organizational performance. Leaders who apply agile leadership principles can create a more dynamic, collaborative, and innovative work environment, which ultimately has a positive impact on improving the quality of service for customers. These findings align with previous research. (6) which found that the implementation of agile leadership significantly contributed to improving service quality in the telecommunications sector in Bogor. In the study, telecommunications companies that implemented more flexible and innovative leadership strategies were able to increase customer satisfaction and their competitiveness in the industry. Furthermore, previous research (22) also showed that agile leadership had a significant impact on the performance of the Institute of Psychology at the University of Graz, Austria, where agile leadership was proven to improve the effectiveness of organizational management as a whole. Therefore, for organizations seeking to improve the quality of their services, it is important to strengthen agile leadership within the workplace. This can be done by developing more adaptive leadership skills, improving collaboration between teams, and encouraging a more open culture of innovation, so that the organization can continue to grow and provide superior service to customers.

Furthermore, this study also proves that logistics competency has a positive and

significant impact on service quality. Strong logistics competency enables companies to optimize their operations, increase work efficiency, and offer more innovative services to customers. With a reliable and integrated logistics system, companies can ensure that their products and services are delivered more quickly, accurately, and meet higher quality standards. These findings align with previous studies. (23) which shows that logistics competency plays a significant role in improving the performance of government offices in North Sumatra. By implementing a more efficient logistics system, government offices in the region are able to provide better public services to the community. Furthermore, other research (24) found that companies with higher levels of logistics competency significantly increased their productivity and strengthened their competitiveness in the market. Based on these research findings, it can be concluded that organizations seeking to improve the quality of their services should invest in developing their employees' logistics competencies. This can be achieved through ongoing training, implementing more advanced technology, and building an organizational culture that encourages digital innovation to optimize the quality of service provided. (25).

Furthermore, the results of this study also show that digital transformation has a positive and significant impact on service quality. Successful digital transformation enables companies to improve operational efficiency, accelerate data-driven decision-making, and strengthen their competitiveness in the market. In today's digital era, companies that successfully adopt technology will excel in providing faster, more accurate, and more tailored services to customer needs. These findings support previous research. (26) which shows that organizations that successfully implement digital transformation experience significant increases in productivity and profitability. Furthermore, a recent study in the context of the manufacturing industry in Indonesia (27) Research also demonstrates that digitalizing business processes can improve service quality by reducing operational costs and increasing customer satisfaction. Therefore, for companies seeking to improve their performance, prioritizing digital transformation is crucial. This can be achieved by improving technology infrastructure, strengthening employee digital literacy, and integrating more effective technology systems to ensure that digital transformation truly improves the quality of service provided to customers.

Finally, this study also proves that Agile Leadership and Logistics Competency simultaneously have a positive and significant influence on Digital Transformation. The combination of agile leadership and strong logistics competency enables companies to be more flexible in the face of change and adopt new technologies more quickly and effectively. These findings are supported by other studies. (28) This shows that companies with agile leaders and a workforce with strong logistics competencies have a higher success rate in digital transformation than other companies. Other research in the financial services industry also found that agile leaders are able to create a more innovative work environment, while strong logistics competencies ensure optimal technology adoption. (29) Therefore, organizations looking to accelerate their digital transformation process need to focus on developing agile leadership and enhancing logistics competencies. This can be achieved through ongoing training programs, mentoring for organizational leaders, and implementing more intuitive technology into company operations.

Based on various previous research findings, this study offers a novel contribution by combining two variables, Agile Leadership and Logistics Competency, and simultaneously uncovering their impact on Digital Transformation and Service Quality. These results emphasize the importance of an adaptive leadership approach and enhanced logistics competency in supporting more effective digital transformation and enhancing company competitiveness in the digital era.

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