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The Influence of Digital Capabilities on The Performance of Supply Chain Innovation Through Digital Innovation in Manufacturing Companies in Bogor, Indonesia

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Abstract: In an increasingly digital era, companies must adapt quickly to remain competitive in a competitive global market. Digital capability, which is the organization's ability to utilize digital technology in all aspects of its operations, is the main key in achieving competitive advantage. This study aims to analyze the effect of digital capability on supply chain innovation performance through digital innovation in manufacturing companies in Bogor. The method used is a quantitative approach with a survey using a questionnaire evaluated by a panel of experts. Data were collected from 140 respondents of manufacturing companies in Bogor and analyzed using Structural Equation Modeling (SEM) with AMOS software. The results showed that digital capability has no significant influence on supply chain innovation performance (p-value 0.380 > 0.05). Meanwhile, digital capability has a significant positive influence on digital innovation (p-value 0.033 < 0.05). On the other hand, digital innovation has no significant impact on supply chain innovation performance (p-value 0.484 > 0.05), and digital capability also has no significant effect on supply chain innovation performance through digital innovation based on the mediation flow of direct and indirect (p-value 0.421 > 0.05). The conclusion of this study is that although digital capability can drive digital innovation, it does not necessarily improve supply chain innovation performance directly. Suggestions for future research are to involve more companies from various locations and use mixed quantitative-qualitative research methods to increase validity and in-depth understanding. In addition, there is a need to explore other factors that may affect supply chain innovation performance to strengthen digital capability and digital innovation strategies in manufacturing companies.

Keywords: Digital Capability, Supply Chain Innovation Performance, Digital Innovation.

1. INTRODUCTION

In an increasingly digital era, companies must adapt quickly to remain competitive in a competitive global market. Digital capability, which refers to an organization's ability to leverage digital technology in all aspects of its operations, including in the supply chain, is key to achieving competitive advantage. As stated by Vice President Director of PT Danamon Indonesia Tbk, Hafid Hadeli, improving digital capabilities is essential to serve customers better. The business paradigm shift towards digitalization has encouraged companies in various sectors to adopt digital technology as an integral part of their operations. Digital transformation in the supply chain is necessary to improve efficiency and customer satisfaction. Developing strong digital capabilities in organizations can support innovation in the supply chain and provide a competitive advantage (Dubey et al., 2023). Technological developments such as e-commerce platforms, Internet of Things (IoT), big data analytics, and blockchain have changed the way companies operate in the supply chain. Organizations need to adopt and integrate these technologies as part of their supply chain innovation and performance improvement strategies.

On the other hand, increased reliance on digital technology also increases cybersecurity risks in the supply chain. Vulnerability to cyberattacks and data theft are serious challenges that companies



must face. Therefore, strong digital capabilities in managing cybersecurity risks and protecting critical data are indispensable. Research shows that organizations with strong digital capabilities tend to have higher innovation performance and greater competitive advantage (Wono et al., 2023). The widespread use of digital technologies has changed the way consumers interact and shop, requiring companies to provide a more personalized and integrated experience. Therefore, digital capabilities have become crucial to meet consumers' increasingly high expectations.

Supply chain innovation performance is the ability of an organization to create and implement innovations in its supply chain. Digital innovation refers to digitally-enabled innovation that enables companies to meet the challenges of supply chain innovation performance by leveraging their digital capabilities. In other words, digital innovation mediates between existing digital capabilities and how well companies are able to innovate in their supply chains. Organizations with strong digital capabilities high tend to have higher levels of innovation (Richey et al., 2022). The use of digital technology can accelerate the innovation process and improve supply chain performance (Yang et al., 2023). Digital innovation can help companies overcome challenges in the supply chain, such as complexity and uncertainty (Bharti et al., 2019). Strong digital capabilities enable companies to increase efficiency and flexibility in their supply chains (Khin & Ho, 2018). Dubey et al. (2023) define digital capability as an organization's ability to leverage digital technology to improve supply chain innovation performance. In this study, manufacturing companies in Bogor have great potential to grow through increasing digital capabilities. The large number of suppliers and increased digitalization are the first steps for the growth of manufacturing companies in Bogor. This study aims to analyze the effect of digital capabilities on supply chain innovation performance through digital innovation in manufacturing companies in Bogor. Based on this background, the study aims to determine "The Effect of Digital Capability on Supply Chain Innovation Performance through Digital Innovation in Manufacturing Companies in Bogor" with the conceptual framework in Figure 1.

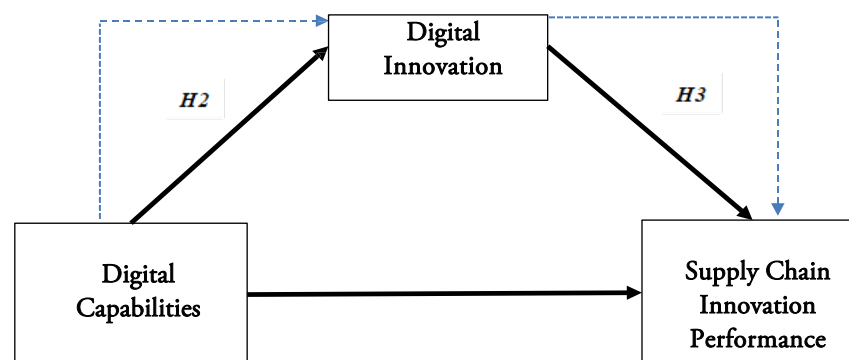


Figure 1. Conceptual Framework

H1. Digital Capability has a positive influence on Supply Chain Innovation Performance

Digital capability is the ability of companies to utilize digital technology to develop new products, business processes or business models. Hypothesis H1 states that digital capabilities have a positive influence on supply chain innovation performance. Companies with good digital capabilities can recognize and absorb new information related to digital technology, thus increasing innovation in the supply chain. By configuring digital resources, companies can take advantage of opportunities and respond quickly to market demand, improving supply chain innovation performance (Abourokbah et al., 2023). Abourokbah et al.'s research (2023) shows that good digital capabilities improve supply chain innovation performance. Companies that are able to manage digital transformation well tend to improve performance compared to competitors and provide a better value for money. High-quality

products or services. Digital capabilities help companies manage relationships with stakeholders, such as suppliers and employees, create digital innovations, and improve competitiveness and business performance in the supply chain.

H2. Digital Capability has a positive influence on Digital Innovation

Some companies are investing in new digital platforms to enhance their innovation capabilities and digitize their services and processes (Vigren et al., 2022). Regarding digitization expertise and innovation facilitation, (Vigren et al., 2022) suggest that companies can improve their absorption capabilities and routines in identifying new opportunities, adapting new ideas, and implementing them for improved business performance. Digital innovation differs on each platform depending on how practices are stimulated, streamlined, and managed (Yang et al., 2023). Over the past few years, researchers have shown that digital capabilities indirectly impact performance (Amelda et al., 2021). Companies with strong digital capabilities can create new offerings to delight consumers, thereby increasing sales and financial returns when mediating between digital innovation and competitiveness and performance. Digital capabilities have a positive influence on digital innovation. In a study conducted by Berawi et al. (2020), they defined digital innovation as the process of developing new products, business processes, or business models using digital technology. In this context, digital capabilities are needed to create digital innovation. Research also shows that companies with strong digital capabilities tend to have better business performance (Sousa-Zomer et al., 2020). Digital competencies play a vital role in achieving success in the creation of digital products because success in producing digital products depends heavily on the organization's ability to manage digital technology (Vigren et al., 2022). Each stage of digital innovation requires an optimal level of skills possessed by intelligent people to acquire digital technologies and create new digital solutions.

H3. Digital Innovation has a positive influence on Supply Chain Innovation Performance

Digital innovation has a positive influence on supply chain innovation performance. Hund et al. (2021) define digital innovation as value-added innovations such as products, services, processes, or business models based on digital technology. Technological capabilities are critical to the success of innovation, helping organizations develop new products and adapt business models in the digital age. The development of digital technology accelerates the storage distribution of information communication, and reduces search costs, and changes the focus of innovation to various dispersed entities (Plekhanov et al., 2023). Data analysis from multiple sources Research by Emrouznejad et al. (2023) provides a deep understanding of customers, reduces operational expenses, and manages supply chain risks more effectively. The use of big data technology allows companies to remain competitive, improve customer service, optimize operations, drive strategic change, and develop innovative products and services. Studies show that digital innovation significantly impacts companies' financial and non-financial performance (Shahadat et al., 2023). Therefore, digital innovation is important for developing new solutions and expanding digital capabilities.

H4. Digital Capability has an influence on Supply Chain Innovation Performance through Digital Innovation.

Digital capability is the company's ability to manage technology and digital resources to create innovation. Digital innovation includes developing new products, business processes, or business models with digital technology (Muttaqin, 2023). Strong digital capabilities enable companies to respond more to market changes, develop innovative products or services, and provide a competitive advantage (Abourobkbah et al., 2023). In the supply chain, digital capabilities help companies optimize resources, identify opportunities, and respond quickly to market demands, improving overall business performance. Open innovation can help firms access external resources and expertise to improve

innovation performance (Strazzullo et al., 2023). Digital collaboration with business partners, such as customers and suppliers, provides access to market information (Karhade & Dong, 2021). By integrating technologies such as big data and artificial intelligence, companies can understand customer needs and develop new products according to market demand. Strong digital capabilities enable companies to respond to market changes faster, increase productivity and create significant added value for customers (Syamil et al., 2023).

2. RESEARCH METHOD

This study used a quantitative approach. Data was collected through a survey using a questionnaire evaluated by a panel of experts to ensure relevance and clear understanding. Using a sample of manufacturing companies in Bogor, variables were measured using a 5-point Likert scale. The method used is multi-step hypothesis testing which involves determining variables, hypotheses, variable distribution, sample size, and sampling procedures. The variables studied include digital capabilities (independent), supply chain innovation performance (dependent), and digital innovation (mediation). Data collection was conducted cross-sectionally using purposive sampling with respondents from various management levels. Data collection methods included surveys distributed through online platforms such as Google Forms, and communication via email and social media. The research population consisted of business employees of manufacturing companies in Bogor. Determination of the sample number of respondents in this study which refers to Hair et al., (2019) with a total of all indicators in the questionnaire and a minimum of five to a maximum of ten. In this study, there are 20 indicators and will be multiplied by 7 so that the minimum number of research samples is 140 respondents. Data were analyzed using Structural Equation Modeling (SEM) with AMOS software to test the relationship between latent variables and observational variables. In addition, the validity and reliability of the instrument were tested using confirmatory factor analysis (CFA) and Cronbach alpha. The validity test results are determined based on the loading factor value, and the reference value ≥ 0.50 is considered valid. Data analysis methods include testing model fit (Goodness of Fit) using various metrics such as chi-square, RMSEA, and CFI. SEM techniques allow researchers to assess the complex relationships between variables in an analytical model, thus providing a comprehensive understanding of the model as a whole.

3. RESULT AND DISCUSSION

3.1. Respondent Profile

This study uses primary data in the form of questionnaires submitted to employees. Manufacturing Company in Bogor. This questionnaire does not collect information related to the research variables but also collects information about the gender, age, length of service, education, and position of the respondents. Based on gender characteristics, most respondents were male (58.6%) compared to female (41.4%). In terms of age, most respondents were in the range of 20-30 years (36.4%) and 31-40 years (38.6%), while respondents aged less than 20 years and more than 50 years were only 1.4% and 10.7% respectively. Characteristics based on length of service show that most employees have worked for 1-5 years (35.7%) and 6-10 years (32.1%). Only a few respondents have worked for less than 1 year (2.1%) or more than 15 years (11.4%). In terms of education, most respondents had a Bachelor's degree (S1) at 50.7% and a Postgraduate degree (S2) at 17.1%. High school and diploma education amounted to 20.7% and 9.3%, respectively, with few respondents having other education (2.1%). In terms of position, the majority of respondents are Employees/Staff (39.3%), followed by Supervisors (33.6%) and Managers (20%). Only a few are in the Executive position (7.1%). Overall, based on the data processing results, respondents in this study are dominated by employees with higher education and significant work experience, most of whom are in operational and managerial positions.

3.2. Descriptive Statistics

The mean value of the digital capability variable is 4.4157, which means that the average respondent agrees with the existence of digital capabilities in a company. The resulting standard deviation value on the digital capability variable is 0.66530, which means that the respondents' responses are quite diverse. While the mean value of the supply chain innovation performance variable is 4.4032, which means that the average respondent in the company performs maximum supply chain innovation. The standard deviation value generated on the supply chain innovation performance variable is 0.67558, which means that the respondents' responses are quite diverse. It can be explained that the mean value of the supply chain innovation performance variable is 4.2333, which means that the average respondent agrees with the existence of digital innovation in a company. The resulting standard deviation value on the digital capability variable is 0.77604, which means that the respondents' responses are quite diverse.

3.3. Instrument Test and Goodness of Fit

The method used in this research is the Structural Equation Model (SEM), which is a multivariate statistical method that combines factor analysis and is used to examine structural correlations between constructs and variables involved in research (Hair et al., 2019). SEM has two main steps, namely checking the validity and reliability of the instrument (confirmatory factor analysis) and testing the relationship model between variables (path analysis). Data collected through surveys using questionnaires based on validity testing shows that each variable has a high factor loading value which indicates strong validity. The loading factor or loading factor in the validity test is a value that shows the relationship between latent variables, namely variables that cannot be measured directly with indicators that can be measured (Sugiyono., 2020). This loading factor is used to evaluate the validity of the construct measured through measuring the level of correlation between the latent variable and the indicators that measure it. The factor loading value in Exploratory Factor Analysis (EFA) which determines the validity of the construct. Based on the number of samples used in the study. In this study, the sample size was 140 respondents, so the minimum factor loading value required for an item to be valid was 0.5.

The variable "Digital Capability" shows factor loading values above 0.8 for all items, indicating that these items consistently measure the company's ability to utilize digital technology to support its business processes. Similarly, the variables "Supply Chain Innovation Performance" and "Digital Innovation" also show high factor loading values, indicating that the items in these variables accurately measure a company's ability to innovate in the supply chain and generate and implement innovative digital solutions. To ensure that the research instruments used are reliable and produce consistent results, a reliability test is conducted. Reliability refers to the belief that the instruments used in research to collect information are reliable and able to reveal real information from the field (Sanaky, 2021). The value used in the reliability test is Cronbach's Coefficient Alpha. If the value is above or equal to 0.60 (Hair et al., 2019). The results showed that all variables have a Cronbach Alpha value above 0.60, which means that each is considered good. The "Digital Capability" variable has a Cronbach Alpha value of 0.946, "Supply Chain Innovation Performance" has a value of 0.900, and "Digital Innovation" has a value of 0.911. Before testing the research hypothesis, it is necessary to test the model fit (Goodness of Fit) first. The model fit test aims to determine whether the proposed model is suitable or not (Hair et al., 2019). According to Hair et al., (2019) states that if there is only one measurement that states Goodness of Fit, then the model used is acceptable and hypothesis testing can be carried out.

Table 1. Goodness of Fit Test Results

| Type Measurement | Measurement | Value | Acceptance limit that suggested | Conclusion |
|---------------------------|-------------|---------|---|--------------|
| Absolute fit measures | P-value | 0.000 | ≥ 0.05 | Poor fit |
| | ECVI | 3,334 | Approaching Saturated value compared to independent | Goodness Fit |
| | RMSEA | 0.095 | ≤ 0.1 | Goodness Fit |
| Incremental fit Measures | IFI | 0.900 | ≥ 0.90 | Goodness Fit |
| | NFI | 0.834 | ≥ 0.90 | Poor fit |
| | TLI | 0.885 | ≥ 0.90 | Poor fit |
| | CFI | 0.899 | ≥ 0.90 | Poor fit |
| | RFI | 0.812 | ≥ 0.90 | Poor fit |
| Parsimonious fit measures | CMIN/DF | 2,260 | Lower limit 1, upper limit 5 | Goodness Fit |
| | AIC | 463.491 | Approaching Saturate value compared to independent | Goodness Fit |

Based on the test results as listed in Table 1, it can be seen that the Goodness of Fit test results show variations in the suitability of the research model. Based on the absolute measurement, the P-value of 0.000 indicates a poor fit because the value is below the recommended acceptance limit, which is ≥ 0.05 . However, the ECVI value of 3.334 and RMSEA of 0.095 indicate Goodness Fit, in accordance with the criteria that the ECVI value is close to the saturated value and $RMSEA \leq 0.1$. In the incremental fit measures, the IFI value of 0.900 meets the Goodness Fit criteria because its value is equal to the recommended acceptance limit, which is ≥ 0.90 . In contrast, the NFI, TLI, CFI, and RFI values of 0.834, 0.885, 0.899, and 0.812, respectively, indicate a poor fit because they are below the recommended acceptance limit of ≥ 0.90 . The parsimonious fit measures showed good results, with a CMIN/DF value of 2.260 which is within the acceptance limit of 1 to 5, indicating Goodness Fit. The AIC value of 463.491 also indicates Goodness of Fit as it is closer to the saturated value than the independent value. Overall, although there are some measures that show poor fit, most indicators show that the research model has an adequate fit. This indicates that the model used in this study is valid and reliable enough to describe the relationship between the variables studied. Hypothesis testing is carried out directly and indirectly with the path analysis diagram as follows.

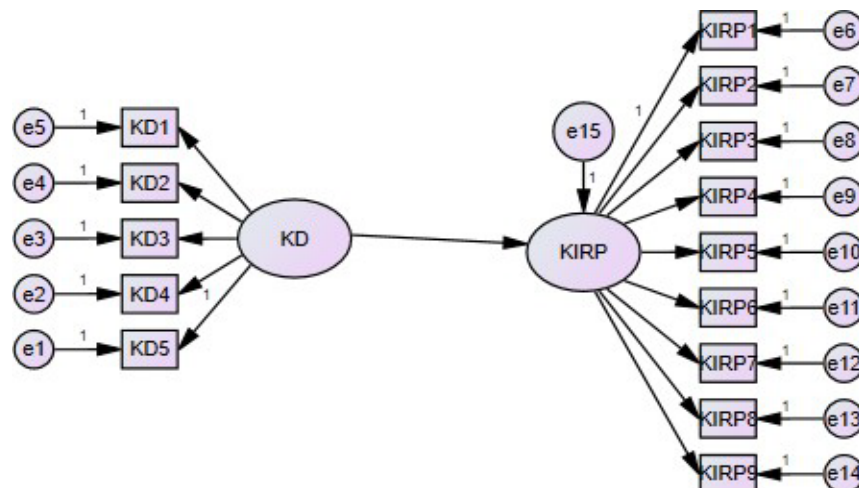


Figure 2. Path Diagram of Hypothesis Test by (Direct)

Source: AMOS output, 2024

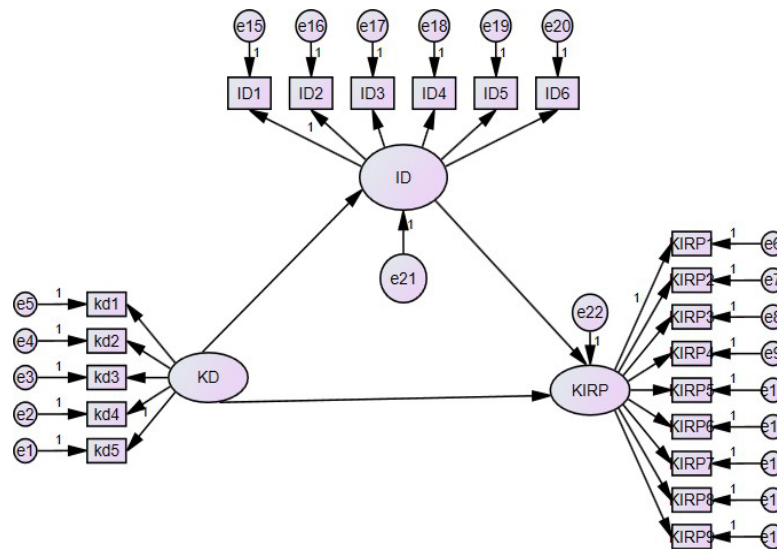


Figure 3. Indirect Hypothesis Test Path Diagram

(Source: AMOS output, 2024)

3.4. Discussion

Table 2. Hypothesis Test Analysis

| | Hypothesis | Estimate | P-value | Decision |
|-----|---|----------|---------|---------------------|
| H-1 | Digital Capability has a positive influence on Supply Chain Innovation Performance. | -0.024 | 0.380 | H1 is not supported |
| H-2 | Digital Capability has a positive influence on Digital Innovation. | 0.188 | 0.033 | H2 supported |
| H-3 | Digital Innovation has a positive influence on Performance Supply Chain Innovation. | 0.003 | 0.484 | H3 no supported |

Source: Data processed with AMOS (2024)

Based on the results of hypothesis testing presented in Table 2, the first hypothesis in this study examines the effect of Digital Capability on Supply Chain Innovation Performance. The test results show that the P-value of 0.380 is greater than 0.05, so digital capabilities do not have a significant effect on supply chain innovation performance. Thus, it can be concluded that the presence of digital capabilities in a company does not directly improve innovation performance in the supply chain. This result may be influenced by several factors that have been identified in previous studies. For example, research by Ismawati et al. (2021) found that digital capabilities often have no significant effect on supply chain innovation due to the lack of effective technology integration in daily operational processes. Without proper integration, digital technology cannot provide the full benefits expected in improving supply chain efficiency and innovation. In addition, a study by Kirana et al. (2023) showed that digital capabilities require strong management support and an organizational culture that supports change. If the company does not have a strong management commitment to implement digital technologies thoroughly, the existing digital capabilities may not deliver the expected benefits. significant impact on supply chain innovation performance. Research by Rizal et al. (2023) also highlights that companies often face challenges in terms of digital technology adoption, including a lack of digital skills among employees and resistance to change. This can limit the effectiveness of digital capabilities in driving innovation in the supply chain.

Furthermore, the second hypothesis tests whether Digital Capability has a positive effect on Digital Innovation. The test results show a P-value of 0.033 which is smaller than 0.05, as well as a positive estimate value of 0.188, so the alternative hypothesis (Ha) is accepted. This indicates that Digital Capability has a positive influence on Digital Innovation. With optimal digital capabilities, companies can develop digital solutions that are superior to competitors. This research supports the view of Vigren et al. (2022) that digital capabilities help companies identify and adapt new opportunities to improve business performance. Previous research also supports these findings.

Research by Alfiana et al. (2024) shows that digital capabilities enable firms to be more responsive to market and technological changes, which in turn drive digital innovation. Digital capabilities provide companies with the necessary tools and resources to explore and implement new technologies, which is critical in a changing business environment. In addition, research by Erliyana & Pambudi (2024) revealed that strong digital capabilities enable companies to integrate advanced technologies such as big data analytics, artificial intelligence, and IoT into their operations. The integration of these technologies not only improves operational efficiency but also opens up new opportunities for product and service innovation, allowing companies to compete more effectively in the global market.

The third hypothesis in this study examines the effect of Digital Innovation on Supply Chain Innovation Performance. The test results show a P-value of 0.484, which is greater than 0.05 so this indicates that digital innovation has no significant effect on supply chain innovation performance. This is in line with the results of research by Erinaldi (2024) which shows that the adoption of digital innovations often faces internal barriers such as resistance to change and lack of digital skills among employees. These barriers can reduce the effectiveness of digital innovation in improving supply chain performance. In addition, research by Febrianto & Soediantono (2022) revealed that the success of digital innovation is highly dependent on good integration and synchronization between various parts of the supply chain. If digital technology is not well integrated or there is no effective coordination between departments, the benefits of digital innovation may not be fully realized, resulting in no significant impact on supply chain performance. Research by Tan et al. (2024) also highlights that digital innovation requires significant investment in technological infrastructure and employee training. Without adequate financial support and commitment to build the necessary infrastructure, digital innovation may not deliver the expected results in terms of improved supply chain performance.

Table 3. Hypothesis Test Analysis (Mediation)

| Hypothesis 4 | Estimate | p-value | Decision |
|---|----------|---------|--------------------------------|
| Model 1 (Direct Frame) | | | |
| Available at influence Capability Digital on Supply Chain Innovation Performance | -0,024 | 0.380 | (taken from model direct) |
| Model 2 Full Frame | | | |
| There is an Influence between Digital Capability to Digital Innovation | 0,188 | 0,003 | Terms (a) not fulfilled (>sig) |
| There is an influence between Digital Innovation on Supply Chain Innovation Performance | 0,003 | 0,484 | Terms (b) No fulfilled (>sig) |
| Available at influence Capability Digital on Supply Chain Innovation Performance | -0,063 | 0,421 | Terms (c) not fulfilled (>sig) |

Hypothesis 4 tested whether Digital Capability affects Supply Chain innovation performance through Digital Innovation. The results shown in Table 2. indicate that the first model shows a negative influence on Supply Chain Innovation Performance (p-value 0.380), but the second model does not fulfill the condition a. In addition, there is no influence of Supply Chain Innovation (p-value 0.033). Thus, the hypothesis that Digital Capability on Supply Chain Innovation Performance is mediated by Digital Innovation in this study is not supported.

4. CONCLUSION

Based on the results of the analysis, the main findings of this study are as follows. First, digital capability has no positive effect on supply chain innovation performance in manufacturing companies

in Bogor. The P-value of 0.380 indicates that there is no significant influence between digital capabilities and supply chain innovation performance, so the first hypothesis is not proven. Second, digital capability has a significant positive effect on digital innovation, with a P-value of 0.033 and a positive estimated value of 0.188, supporting the second hypothesis. This shows that the company's ability in digital technology can encourage more competitive digital innovation. Third, digital innovation does not have a significant positive impact on supply chain innovation performance (P-value = 0.484), so the third hypothesis is not proven. Finally, digital capability also has no effect on supply chain innovation performance through digital innovation, as indicated by the insignificance of the P-value in the tested mediation path. These findings suggest the need for further research to explore additional factors that may influence supply chain innovation performance, as well as to strengthen digital capability and digital innovation strategies in manufacturing companies in Bogor more effectively. To get a broader and more relevant picture, it is recommended to involve more manufacturing companies from various locations so that the results are more representative. The use of quantitative-qualitative mixed research methods, can increase validity and provide an in-depth understanding of the relationship between digital capabilities, digital innovation, and supply chain innovation performance. Future research can focus more on exploring the factors that drive the influence of digital capabilities on supply chain innovation performance, which in turn can improve supply chain innovation performance. In addition, to maintain the relevance of future research, it is important to continuously monitor industry and market developments. Efficient allocation of resources such as time, manpower, and funds can also help overcome these limitations and expand the scope of the research.

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