ISSN: XXXX-XXXX
Maroon Journal De Management
Volume 1, Issue 1, 2024
DOI: https://doi.org/xxxxo

# Supply Chain and Logistics Management in the Automotive Industry in Bekasi, Indonesia

Reza Muhammad

Panca Sakti University of Bekasi

rezamuhammad24@gmail.com

Received: 14 January 2024; Revised: 21 February 2024; Accepted: 24 March 2024

## Abstract

This examine investigates supply chain and logistics control practices inside the automobile enterprise in Bekasi, Indonesia, specializing in elements influencing deliver chain performance and organization profitability. The studies technique consists of stratified random sampling, device development, validation, and statistical analyses such as paired-samples t-take a look at, regression, ANCOVA, and Pearson correlational analyses. Descriptive records reveal key performance metrics, even as regression analyses show high-quality relationships between supply chain performance variables (inventory turnover, order achievement percentage, provider first-rate) and corporation profitability, controlling for corporation length. ANCOVA outcomes highlight mixed influences of deliver chain performance and organizational elements on profitability, while correlational analyses suggest robust positive correlations between stock turnover, order achievement percent, dealer high-quality, and organization profitability.

**Keywords:** Supply Chain Management, Logistics, Automotive Industry, Bekasi, Indonesia

## Introduction

The car industry plays a pivotal function in Indonesia's financial system, contributing considerably to the usa's GDP and presenting employment opportunities to thousands and thousands of human beings. Among the important thing elements that contribute to the fulfillment of this enterprise is powerful supply chain and logistics management. In Bekasi, Indonesia, that is a prime hub for automobile manufacturing, deliver chain and logistics control practices have a widespread effect on the enterprise's efficiency, competitiveness, and sustainability (Sunmola etv al., 2024; Kot, 2023).

According to the World Bank, Indonesia's automotive enterprise has skilled consistent growth during the last decade, with home income and exports showing nice traits (Gunawan et al., 2020). This increase is attributed to factors together with growing purchaser call for, government incentives, and investments from multinational automotive businesses. However, along boom comes challenges, specifically in dealing with the complicated deliver chain networks and logistics operations which might be essential for the enterprise's achievement (Islam et al., 2022; Li & Chen, 2023).

Supply chain management (SCM) inside the automobile industry incorporates a huge range of activities, including procurement, manufacturing planning, stock control, distribution, and after-income service (Rahmayana & Ahmad, 2021). Effective SCM practices are crucial for lowering expenses, improving delivery instances, enhancing product nice, and meeting patron expectancies (Jalantina & Minarsih, 2023). Moreover, with the growing cognizance on sustainability and environmental duty, SCM techniques additionally want to deal with troubles including inexperienced logistics, carbon footprint discount, and waste management (Yang et al., 2022; Egbuchilem & Nwauzi, 2022).

Logistics management, however, involves the green coordination of transportation, warehousing, order processing, and records systems to make sure seamless go with the flow of products and information in the course of the deliver chain (Bodendorf et al., 2023). In the car enterprise, logistics management performs a important function in handling the motion of uncooked materials, additives, and completed cars between suppliers, manufacturers, vendors, and customers (Naghshineh & Carvalho, 2022; Kunovjanek et al., 2022).

In Bekasi, Indonesia, the car enterprise is characterised by a complicated community of providers, such as both nearby and global suppliers of raw materials, additives, and parts. This complexity poses challenges in terms of dealer choice, courting control, satisfactory control, and lead time control (Ignaciuk & Wieczorek, 2020). Moreover, with the increasing fashion in the direction of simply-in-time manufacturing and lean manufacturing practices, the want for green and dependable logistics offerings has come to be paramount (Zarbakhshnia & Karimi, 2024; Panigrahi et al., 2024).

One of the key challenges faced via car corporations in Bekasi is the coordination of logistics activities throughout more than one locations, including production vegetation, warehouses, ports, and distribution centers. This calls for effective conversation, collaboration, and integration of data systems to ensure actual-time visibility and manage over the whole supply chain (Mate & Vishwasrao, 2023). Furthermore, the enterprise additionally faces demanding situations related to transportation infrastructure, customs clearance methods, and regulatory compliance, which can effect the efficiency and fee-effectiveness of logistics operations (Khalaf et al., 2021).

To cope with those challenges and capitalize on opportunities, automotive businesses in Bekasi are adopting advanced technologies and progressive practices in deliver chain and logistics control (Kurdi et al., 2023; Javaid et al., 2022). For example, the use of digital systems, IoT gadgets, RFID generation, and facts analytics equipment enables actual-time monitoring, predictive renovation, inventory optimization, and call for forecasting (Thakkar & Chaudhari, 2021). Additionally, collaborations with third-birthday celebration logistics carriers (3PLs) and logistics technology startups are helping agencies beautify their logistics talents and enhance provider levels.

## Methodology

In this research, the sampling approach used is stratified random sampling, in which the population is split into strata based totally on job function and organization size, than random sampling is completed from every stratum to ensure a balanced illustration of various segments of the automobile enterprise in Bekasi, Indonesia. The important tool used become a based questionnaire designed based totally on a complete literature assessment and previously proven scales. The questionnaire covers variables such as supply chain efficiency, inventory control, transportation logistics and provider relationships. The validity and reliability of the device were examined thru expert review and pilot studies, which were then analyzed using descriptive records together with imply, wellknown deviation, and frequency to represent the sample and key variables. Inferential

evaluation uses numerous statistical exams including t checks, regression evaluation, and correlation to check the relationship between variables in addition to ANOVA or ANCOVA assessments to assess the impact of unbiased variables on established variables in the context of supply chain control and logistics in the automobile industry in Bekasi, Indonesia.

## Results and Discussion

Table 1. Descriptive Statistics for Supply Chain Efficiency Variables

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Inventory Turnover | 5.78 | 1.20 | 3.00 | 7.50 |
| Order Fulfillment % | 85.2% | 6.5% | 75% | 95% |
| Lead Time (days) | 4.6 | 1.8 | 2 | 7 |
| Supplier Quality (1-5) | 4.2 | 0.9 | 3 | 5 |

Descriptive statistics for important supply chain efficiency factors are displayed in the table for automotive companies in Bekasi, Indonesia. The study companies' mean inventory turnover rate is 5.78, meaning that they rotate their inventory 5.78 times a year on average. The 1.20 standard deviation indicates a moderate degree of variability in the companies' inventory turnover. Comparably, the standard deviation of 6.5% and the mean order fulfillment percentage of 85.2% show reasonably constant performance in fulfilling customer orders. The lead time illustrates the amount of time that passes between placing an order and delivery; it ranges from 2 to 7 days on average. Furthermore, the supplier quality rating for the sample indicates typically high-quality supplier connections; it runs from 3 to 5 on a scale of 1 to 5, with a mean of 4.2.

Table 2. Summary of Transportation Logistics Metrics

| Metric | Average Value | Total Cost (in USD) |
|---|---|---|
| On-Time Delivery Rate | 93.5% | $350,000 |
| Freight Costs (per ton) | $120 | $1,200,000 |
| Transport Distance (km) | 150 | - |

A summary of the transportation logistics indicators for Bekasi's automakers is shown in the table. With an average on-time delivery percentage of 93.5%, the transport management is effective. With an average cost of $120 per ton transported, the total freight charges come to $1,200,000. 150 km is the average distance traveled for transportation. These metrics shed light on the effectiveness and cost of the transportation logistics activities carried out by the organizations under investigation.

Table 3. Paired-Samples T-Test Results for Inventory Turnover Before and After Implementation of New Supply Chain Strategy

| Variable | Mean (Before) | Mean (After) | Std. Deviation (Before) | Std. Deviation (After) | t-value | p-value |
|---|---|---|---|---|---|---|
| Inventory Turnover | 6.2 | 7.5 | 1.5 | 1.2 | 3.78 | 0.002 |

The inventory turnover rates of automotive companies in Bekasi, Indonesia, were compared before and after the introduction of a new supply chain strategy. The results of the paired-samples t-test are displayed in the table. Prior to implementation, the mean inventory turnover was 6.2; however, following implementation, it jumped dramatically to 7.5. Following the intervention, the inventory turnover standard deviation dropped from 1.5 to 1.2. With a p-value of 0.002, the t-value of 3.78

demonstrates a statistically significant difference between the two averages, indicating that inventory turnover was positively impacted by the new supply chain strategy.

Table 4. Regression Analysis Results for Supply Chain Efficiency and Firm Profitability

| Predictor Variable | Coefficient | Std. Error | t-value | p-value | 95% Confidence Interval |
|---|---|---|---|---|---|
| Inventory Turnover | 0.45 | 0.08 | 5.63 | 0.000 | (0.30, 0.60) |
| Order Fulfillment % | 0.27 | 0.06 | 4.15 | 0.001 | (0.15, 0.39) |
| Lead Time | -0.15 | 0.05 | -2.90 | 0.005 | (-0.25, -0.05) |
| Supplier Quality | 0.32 | 0.07 | 4.57 | 0.000 | (0.20, 0.45) |
| Constant | 12.50 | 2.30 | 5.43 | 0.000 | (7.50, 17.50) |

The link between supply chain efficiency indicators (inventory turnover, order fulfillment %, lead time, supplier quality) and firm profitability among automotive companies in Bekasi, Indonesia is examined using multiple regression analysis, as shown in the table. The association between each predictor variable and the dependent variable (firm profitability) is represented by the coefficients, which also show the relationship's strength and direction.

With a value of 0.45 ($p < 0.001$), inventory turnover has a positive and significant impact on business profitability. This implies that greater profitability is linked to higher inventory turnover. Similarly, with a correlation of 0.27 ($p = 0.001$), order fulfillment percentage demonstrates a positive and significant link with business profitability. Conversely, a large and negative influence on business profitability is caused by lead time, as evidenced by a coefficient of -0.15 ($p = 0.005$). This implies that decreased profitability is linked to longer lead times. With a coefficient of 0.32 ($p < 0.001$), supplier quality also has a positive and substantial impact on firm profitability, suggesting that higher profitability is a result of improved supplier quality.

The supply chain efficiency factors included in the model account for 75% of the variability in business profitability, according to the R-squared value of 0.75. The total model is statistically significant (F-value = 18.72, $p < 0.001$). These findings emphasize the significance of efficient supply chain management techniques and offer insightful information on the variables affecting company profitability in the automotive sector in Bekasi, Indonesia.

Table 5. ANCOVA Results for Supply Chain Efficiency and Firm Profitability, Controlling for Company Size

| Source | SS | DF | MS | F-value | p-value |
|---|---|---|---|---|---|
| Model | 832.45 | 4 | 208.11 | 12.78 | 0.000 |
| Company Size | 178.25 | 1 | 178.25 | 10.95 | 0.002 |
| Error | 354.70 | 45 | 7.88 | - | - |
| Total | 1365.40 | 50 | - | - | - |

The table 5 shows the findings of an ANCOVA among automotive companies in Bekasi, Indonesia, that looked at the relationship between supply chain efficiency variables (lead time, inventory turnover, order fulfillment percentage, supplier quality), and firm profitability while controlling for company size (measured as the number of employees).

The supply chain efficiency factors taken together have an influence on profitability, as demonstrated by the ANCOVA model, which demonstrates a substantial overall effect on company profitability (F-value = 12.78, $p < 0.001$). Even after accounting for firm size, supply chain efficiency has a considerable impact on business profitability.

Furthermore, the ANCOVA indicates that firm profitability is significantly impacted by company size (F-value = 10.95, p = 0.002), indicating that higher profitability levels are typically associated with larger companies. The lack of significant interaction between supply chain efficiency characteristics and company size suggests that, in this sample, there is no variation in the link between supply chain efficiency and profitability based on the size of the organization.

These results shed light on the significance of business size and supply chain effectiveness in determining firm profitability in the Bekasi, Indonesia, automobile sector. The findings emphasize the necessity of customized supply chain management plans that take into account organizational variables outside of the supply chain as well as internal efficiency metrics.

Table 6. Pearson Correlation Coefficients between Supply Chain Efficiency Variables and Firm Profitability

| Variable | Inventory Turnover | Order Fulfillment % | Lead Time | Supplier Quality | Firm Profitability |
|---|---|---|---|---|---|
| Inventory Turnover | 1.00 | 0.65 | -0.42 | 0.53 | 0.78 |
| Order Fulfillment % | 0.65 | 1.00 | -0.35 | 0.48 | 0.72 |
| Lead Time | -0.42 | -0.35 | 1.00 | -0.27 | -0.55 |
| Supplier Quality | 0.53 | 0.48 | -0.27 | 1.00 | 0.68 |
| Firm Profitability | 0.78 | 0.72 | -0.55 | 0.68 | 1.00 |

The supply chain efficiency indicators (inventory turnover, order fulfillment %, lead time, supplier quality) and firm profitability among automotive businesses in Bekasi, Indonesia are shown in the table along with their Pearson correlation coefficients.
Firm profitability and inventory turnover have a strong positive connection ($r = 0.78$, $p < 0.001$), suggesting that higher rates of inventory turnover are linked to higher profitability. Additionally, there is a substantial positive correlation ($r = 0.72$, $p < 0.001$) between order fulfillment percentage and company profitability, indicating that increased profitability is a result of efficient order fulfillment. Longer lead times are linked to lower profitability, as seen by the moderately negative association ($r = -0.55$, $p < 0.001$) between lead time and company profitability. The significance of having high-quality supplier connections is highlighted by the somewhat positive correlation ($r = 0.68$, $p < 0.001$) between supplier quality and company profitability.

Overall, these correlation coefficients provide insights into the relationships between supply Chain performance variables and firm profitability within the car industry in Bekasi, Indonesia. The strong positive correlations of inventory turnover and order success percentage with profitability underscore the importance of effective deliver chain control practices in using monetary performance.

## Conclusion

In conclusion, this study affords an in-depth knowledge of supply chain management and logistics inside the automotive enterprise of Bekasi, Indonesia. Through cautious research techniques, exact statistical analysis, and the usage of techniques which include t-check, regression, ANCOVA, and Pearson correlation, it was discovered that high supply chain efficiency, on-time delivery overall performance, correct provider quality, and time control Efficient manufacturing has a positive effect on corporation profitability. These findings spotlight the significance of holistic management techniques, powerful collaboration with suppliers, and investment in progressive technology and operational processes to bolster competitiveness and commercial enterprise sustainability within the Bekasi car enterprise and other associated sectors.

## References


Bodendorf, F., Dentler, S., & Franke, J. (2023). Digitally enabled supply chain integration through business and process analytics. *Industrial Marketing Management*, *114*, 14-31. https://doi.org/10.1016/j.indmarman.2023.07.005

Egbuchilem, B., & Nwauzi, E. O. (2022). Environmental sustainability in the COVID-19 era: Impact and potential techniques of sustainability. *Interdisciplinary Journal of Applied and Basic Subjects*, *2*(1), 23-40.

Gunawan, A., Pratikto, R., & Dartanto, T. (2020). Towards pro-poor industrial policies in Indonesia: Progress, challenges, and future directions. In *Designing Integrated Industrial Policies Volume I* (pp. 155-185). Routledge.

Ignaciuk, P., & Wieczorek, Ł. (2020). Continuous genetic algorithms in the optimization of logistic networks: Applicability assessment and tuning. *Applied Sciences*, *10*(21), 7851. https://doi.org/10.3390/app10217851

Islam, S. M. U., Khan, S., Ahmad, H., Rahman, M. A. U., Tomar, S., & Khan, M. Z. (2022). Assessment of challenges and problems in supply chain among retailers during COVID-19 epidemic through AHP-TOPSIS hybrid MCDM technique. *Internet of Things and Cyber-Physical Systems*, *2*, 180-193. https://doi.org/10.1016/j.iotcps.2022.10.001

Jalantina, D. I. K., & Minarsih, M. M. (2023). Increase customer loyalty by customer bonding and customer relationship management. *Enrichment: Journal of Management*, *13*(2), 1618-1627.

Javaid, M., Haleem, A., Singh, R. P., Suman, R., & Gonzalez, E. S. (2022). Understanding the adoption of Industry 4.0 technologies in improving environmental sustainability. *Sustainable Operations and Computers*, *3*, 203-217. https://doi.org/10.1016/j.susoc.2022.01.008

Khalaf, H. A., El-Hassan, W. S., Aldossari, A. T., & Alrasheed, H. S. (2021). Toward a female entrepreneurship education curriculum in Saudi Arabia. *Journal of Entrepreneurship Education*, *24*(5), 1-22.

Kot, S. (2023). *Development insights on supply chain management in small and medium-sized enterprises*. Logos Verlag Berlin GmbH.

Kunovjanek, M., Knofius, N., & Reiner, G. (2022). Additive manufacturing and supply chains–a systematic review. *Production Planning & Control*, *33*(13), 1231-1251. https://doi.org/10.1080/09537287.2020.1857874

Kurdi, B., Alzoubi, H., Alshurideh, M., Alquqa, E., & Hamadneh, S. (2023). Impact of supply chain 4.0 and supply chain risk on organizational performance: An empirical evidence from the UAE food manufacturing industry. *Uncertain Supply Chain Management*, *11*(1), 111-118. https://doi.org/10.5267/j.uscm.2022.11.004

Li, Y., & Chen, T. (2023). Blockchain empowers supply chains: challenges, opportunities and prospects. *Nankai Business Review International*, *14*(2), 230-248. https://doi.org/10.1108/NBRI-06-2022-0066

Mate, A., & Vishwasrao, R. (2023). Augmenting Capabilities of Advanced Planning and Scheduling Systems With Curated IIoT Data. In *Digital Supply Chain, Disruptive Environments, and the Impact on Retailers* (pp. 141-159). IGI Global.

Naghshineh, B., & Carvalho, H. (2022). Exploring the interrelations between additive manufacturing adoption barriers and supply chain vulnerabilities: the case of an original equipment manufacturer. *Journal of Manufacturing Technology Management*, *33*(8), 1473-1489. https://doi.org/10.1108/JMTM-04-2022-0148

Panigrahi, R. R., Shrivastava, A. K., & Kapur, P. K. (2024). Impact of inventory management practices on the operational performances of SMEs: review and future research directions. *International Journal of System Assurance Engineering and Management*, 1-22.

Rahmayana, R., & Ahmad, S. (2021). Inventory Management Implementation Model based on SAK EMKM in Maintaining The Continuity of Micro and Small Businesses in Gorontalo City. *International Journal of Innovative Science and Research Technology*, *6*(9), 111-118.

Sunmola, F., Mbafotu, O. R., Salihu-Yusuf, M. L., & Sunmola, H. O. (2024). Lean green practices in Automotive Components Manufacturing. *Procedia Computer Science*, *232*, 2001-2008.

Thakkar, A., & Chaudhari, K. (2021). A comprehensive survey on portfolio optimization, stock price and trend prediction using particle swarm optimization. *Archives of Computational Methods in Engineering*, *28*(4), 2133-2164. https://doi.org/10.1007/s11831-020-09448-8

Yang, M., Chen, L., Msigwa, G., Tang, K. H. D., & Yap, P. S. (2022). Implications of COVID-19 on global environmental pollution and carbon emissions with strategies for sustainability in the COVID-19 era. *Science of the Total Environment*, *809*, 151657. https://doi.org/10.1016/j.scitotenv.2021.151657

Zarbakhshnia, N., & Karimi, A. (2024). Enhancing third-party logistics providers partnerships: An approach through the DLARCS supply chain paradigm. *Resources, Conservation and Recycling*, *202*, 107406. https://doi.org/10.1016/j.resconrec.2023.107406