How do the Top and the Least Performer Trucking Companies Differ in their Resilience Factors?

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Abstract

Trucking holds most of the Indonesian transportation market share; thus, research in this sector is critical. It is essential to know the differences between the least and the top performance Indonesian trucking companies, yet not many studies brought up a comparative analysis between the least and top performers in trucking industries. This research will search for similarities and differences between the least and top performer trucking companies in terms of resilience factors affecting company resilience and performance, draw a linkage for the impact of COVID-19 on company performance and find the correlation between company resilience and performance. An in-depth literature review was done to define the research gap, the constructs, and the indicator, which was then converted into questionnaires. These questionnaires were distributed to Indonesian trucking companies that consist of trucking carriers, couriers, third-party logistics, factories, and distributors that own trucks. These data are further analyzed through SEM PLS Algorithm. This research found that the impact of COVID-19 affects both groups. The least-performing companies mainly emphasize financial resources management and company relationship management to enhance company resilience, and the effect of innovation in digitalized technology directly correlates to company performance.

Keywords
Adaptability and flexibility, Risk and business continuity management, and Company performance.

1. Introduction
The COVID-19 pandemic caused a significant impact on the global economy, and SMEs are classified as one of the sectors that are highly affected by this disruption (Jedynak and Bak, 2021). Shen et al. (2020) reported that catering, tourism, entertainment, and transportation are sectors that experienced a tremendous hit during the Pandemic of COVID-19. In addition, Sugianto et al. (2023) also stated that the pandemic of COVID-19 hugely impacted transportation sectors, resulting in demand reduction and unused capacity. Furthermore, Gourinchas et al. (2020) also observed that the SME bankruptcy rate is much higher during the COVID-19 pandemic rather than in non-pandemic in 17 primarily European countries. A similar situation also occurred in Indonesia during the early entrance of COVID-19. The Indonesian land transportation and logistics sector reported a significant decline in revenue at 25 to 50 percent and 75 to 100 percent, respectively (Parama, 2020). Unlike the financial crisis in 1998, when SMEs remained strong and supported the Indonesian national economy, SME sectors are the most badly hit by the Pandemic of COVID-19 due to their lack of resources for survival (Fitriasari, 2020). According to (Sasono, 2003), Indonesian cargo and freight predominantly consist of small companies with simple operations. The fact that trucking is a part of the Indonesian supply chain and holds a 90.6 percent market share (Azka, 2020) made this land transportation sector a crucial contributor to the nationwide supply-chain performance. The fall in this sector might contribute to the overall performance of the Indonesian supply chain; thus, more research in this area of study is critical and requires urgent attention.

This study aims to search the differences between the least and the top performer in the trucking industry, which can be the foundation for the supply chain manager to determine the tactical strategy to enhance company performance. The problem is that many companies do not know what factors they are lacking compared to the top performer; thus,

it is crucial to know the differences between these two groups to define which resilience factors are required to emphasize to accelerate their performance.

2. Literature Review

The literature review search began by typing specific keywords related to performance, resilience, business continuity management, and risk mitigation. Much literature discussed performance in the scholar, yet only a few articles did a comparative analysis between the least and top-performing companies, and none of the studies brought up the differences between the least and top performers in the trucking industries. Laugen et al. (2005) talk about best practices, but the scope of their research is not during the disruption of the COVID-19 pandemic and precisely aims at manufacturing industries. Furthermore, Jedynak and Bak (2021) wrote a book regarding risk management and thoroughly discussed the winners and losers of the COVID-19 pandemic. However, this book does not explicitly mention Indonesian trucking industries and spot the differences between the least and top performer trucking companies in terms of the resilience factor they are emphasizing nor draw the connection of those factors to company resilience and performance. In addition, not much research investigates the correlation between resilience and performance. This finding matches Hosseini et al. (2020), who recommend future research examining the relationship between resilience and performance.

Organizational resilience can be described as a company's capability to sustain, continue operations, and adapt to the changing environment (Starr et al., 2003). In addition, well-established business continuity management contributed to company resilience, leading to increased company performance. The impact of COVID-19 disruption differs from country to country (Liu et al., 2020). Shen et al. (2020) observed various industries and regions in listed Chinese firms and then found that the COVID-19 pandemic contributed to the decline of firm total revenue and investment scale, which lowered company performance. This phenomenon of the COVID-19 pandemic has tremendous consequences for the world economy and rapidly changing. Hence, this unpredictable situation is best explained through the black swan theory.

Leadership significantly contributes to the success of the business, and the effect is even more crucial during a disruptive situation. Resilient leadership becomes more critical during the COVID-19 pandemic, where the leader must make fast decisions that have enormous consequences based on limited data only (Deloitte Insight, 2020). Therefore, the presence of resilience leadership is suitable for a disruptive situation like the COVID-19 pandemic, and the theory of resilience leadership was the best to explain this relationship between resilience and company resilience and performance.

Nieman and Nieuwenhuizen (2009) stated that financial management is one of the essential factors contributing to company resilience. Each company is unique regarding its resources and how they can be converted, substituted, imitated, and replaced for their rarity (Helfat and Peteraf, 2003). Therefore, a Resources Based View (RBV) that relies on the perception that each company is different from the other perfectly explains the relationship between financial resources management and company resilience.

Flexibility is positively correlated to company resilience (Liu and Lee, 2018), while adaptability is strongly linked to company resilience (Starr et al., 2003). The level of company adaptation flexibility can be looked at through its effort to tailor its day-to-day operation following the changes in customer behavior or supply and demand. Therefore, the theory of dynamic capability, defined as the company's ability to adapt well to a rapidly changing situation (Eisenhardt and Martin, 2000), is suitable to explain this situation.

Yang and Kankanhali (2014) reveal that company performance is significantly correlated to implementing social media. Aligning with this finding, Agnese (2020) observed that digitalization applications are efficient and effective in logistics and transportation. Again, the theory of dynamic capability can be best applicable as the foundation theory of this innovation and digitalization technology.

Furthermore, Liu and Lee (2020) stated that firm performance could be described through its service performance which directly correlated to company relationship management, such as communication and information sharing. Edeh et al. (2019) also found a significant correlation between customer relationship management with company resilience.

Relationship management theory best describes the connection between relationship management and company resilience and performance.

Ueda (2012) claims that risk management can strengthen corporate immunity, thus becoming one of the critical factors in enhancing company resilience. In addition, implementing standard risk management with a minimum budget positively correlates to company resilience (Bakker et al., 2012). Contingency theory involving internal and external factors leading to some actions and strategies (Grotchsch et al., 2013) is a fundamental theory that best explains the correlation between risk and business continuity management with company resilience.

3. Methods

This research started in early March 2020 with the extensive literature on performance, business continuity management, resilience, and factors affecting resilience. The research gap is then identified, followed by the development of the constructs involving financial resource management (FRM), company adaptability and flexibility (CAF), innovation digitalization technology (IDT), resilient leadership (RLEAD), customer relationship management (CRM), company resilience (RES) and company performance (PER). After that, the indicator of each construct was determined and continued with the establishment of a conceptual model (Figure 1). Then, the creation of the survey questionnaire in the form of a five-point Likert scale was created. A score of one represents strongly disagree, while a score of five illustrates strongly agree.
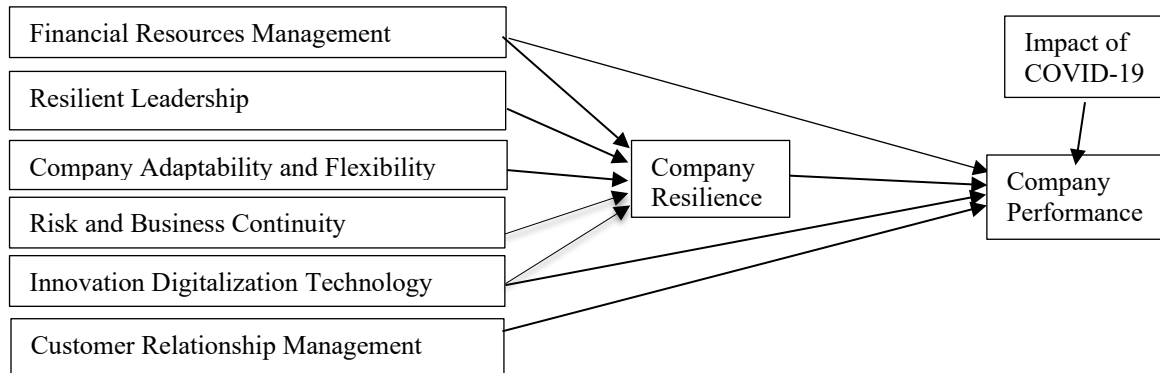

Figure 1. Conceptual Model

A total of 190 respondents were involved, and the total score of resilience and performance were calculated and ranked, leading to the filtration of 63 least perform trucking companies and 63 top perform trucking companies. The data was then further analyzed using Structural Equation Modeling Partial Least Square (SEM PLS) Algorithm. A statistical analysis comparison was then conducted to search for the differences between these two group categories.

4. Data Collection

The questionnaires were distributed online on August 2021 with the help of some Indonesian trucking associations with the target respondent, including trucking carriers, third-party logistics, factories, couriers, and distributors. The participants were requested to fill out questionnaires in the google form as this online method best fitted the pandemic situation in which most people work from home and prefer less physical contact.

5. Results and Discussion

5.1 Hypothesis Analysis

Table 1 shows that financial resources management contributes the highest to company resilience and performance of the least performers trucking companies in Indonesia with T-statistic values of 3.455 and 4.680, respectively. Furthermore, customer relationship management also significantly correlates to the company's resilience and performance. The correlation between customer relationship management and resilience appears significantly

positive. However, the correlation between customer relationship management and performance reveals an adverse effect.

Table 1. The least performer trucking companies

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (|O/STDEV|)	P-Values
CRM -> PER	-0.454	-0.416	0.142	3.186	0.001[a]
CRM -> RES	0.303	0.304	0.136	2.228	0.026[a]
FRM -> PER	0.539	0.512	0.115	4.680	0.000[a]
FRM -> RES	0.428	0.429	0.124	3.455	0.001[a]
IDT -> PER	0.323	0.265	0.166	1.940	0.052[b]
IMP -> PER	-0.305	-0.305	0.116	2.624	0.009[a]

a significant at alpha 0.05
b significant at alpha 0.10

In addition, the COVID-19 pandemic also negatively impacts the performance of trucking industries, yet innovation and digitalization technology connect positively to trucking company performance. One unit increase in the impact of COVID-19 represents a 0.305 decline in the performance of the least performed group, while one unit increase in innovation digitalization technology leads to a 0.323 increase in company performance of the least performed group.

Table 2. The top performer trucking companies

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (|O/STDEV|)	P-Values
CAF -> RES	0.543	0.546	0.173	3.141	0.002[a]
IDT -> RES	-0.408	-0.381	0.132	3.084	0.002[a]
IMP -> PER	-0.452	-0.473	0.090	4.999	0.000[a]
RBCM -> RES	0.297	0.294	0.149	1.992	0.046[a]
RES -> PER	0.241	0.240	0.104	2.317	0.021[a]
RLEAD -> RES	0.316	0.309	0.122	2.588	0.010[a]

a significant at alpha 0.05

Based on Table 2, COVID-19 pandemic also affected the performance of the top-performer trucking companies. In addition, company adaptability and flexibility have appeared to have the highest positive correlation to company resilience. However, innovation in digitalization technology has a negative correlation to company resilience. Furthermore, this research also highlights the contribution of resilient leadership to trucking company resilience. Risk and business continuity management also find positively relate to company resilience of the top-perform trucking company. Next, company resilience also shows a significant positive contribution to company performance, while the impact of COVID-19 shows an adverse effect on the performance of the top-performed groups. One unit increase in the impact of the COVID-19 pandemic resulted in 0.452 declines in the top performer trucking companies.

5.2 Performance Framework of the Least and Top Performer Trucking industries
Figure 2 and Figure 3 illustrate framework differences between the least and top performers. The result shows that the COVID-19 pandemic impacted both the least and top perform trucking companies, yet the effect is higher on top performer trucking companies compared to the least performed group. Consistent with this finding, Shen et al. (2020) also observed that the COVID-19 pandemic has a vastly negative effect on the performance of listed Chinese companies. One of the reasons behind this is probably due to mandatory government regulation involving travel restrictions, lockdowns, and event prohibitions to minimize the outspread of the COVID-19 virus. In terms of enhancing company resilience and performance, the least performing companies are affected by three resilience factors (Figure 2). There are financial resources management, customer relationship management, and innovation digitalization technology.

However, top-performing companies can address a broader range of resilience factors such as resilient leadership, innovation digitalization technology, company adaptability and flexibility, risk, and business continuity management (Figure 3).
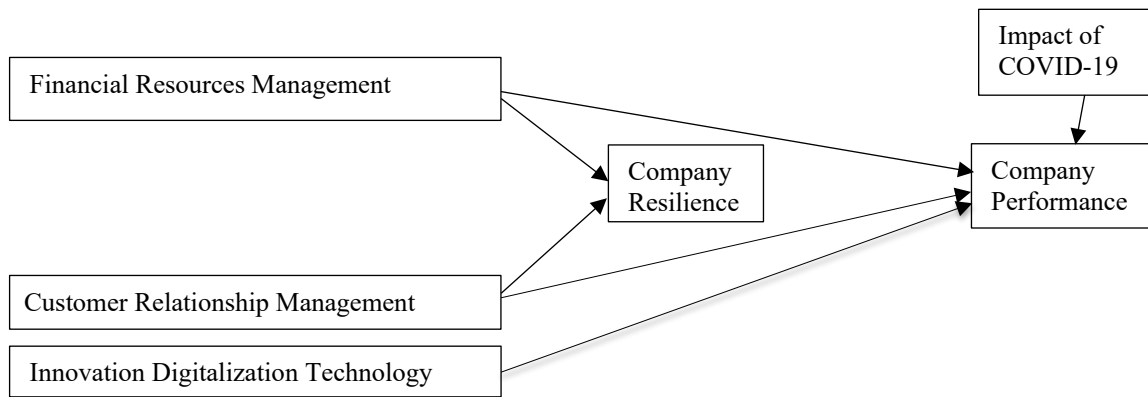

Figure 2. The least performer trucking companies

Those factors directly improve company resilience and indirectly enhance the performance of top trucking companies. This finding is consistent with (Fabeil et al., 2020), which confirms that liquidity is a crucial issue faced by micro and small companies during the disruption of the COVID-19 pandemic. The result also matched Sugianto et al. (2023) observation, which revealed that the least performers group predominantly consists of micro-small trucking companies with limited financial resources, while the top performer group mainly consists of big trucking companies with more access to financial resources.
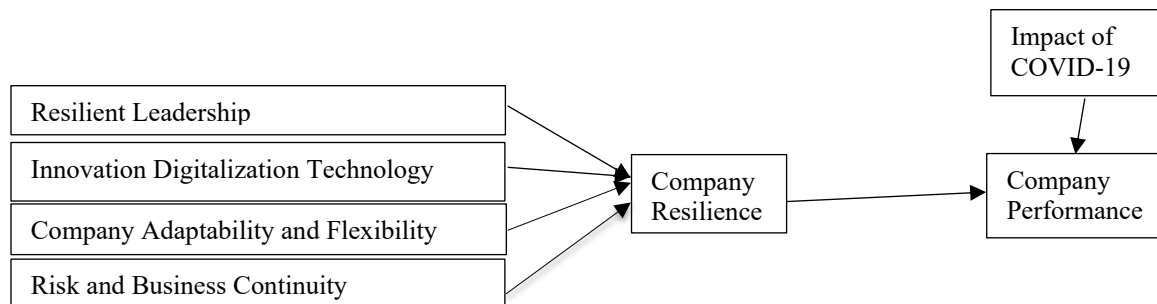

Figure 3. Top performer trucking companies

The fact that top performers have better access financially than the least performed group might be why top perform trucking companies can manage a wide-ranging resilience factor rather than the least perform trucking companies. With limited access to financial resources and the fact that the least perform trucking companies primarily consist of micro-small trucking companies, thus it is certainly challenging to be adaptive and flexible during crises which is probably the reason why company adaptability and flexibility is not significant for the least perform group, yet contributes significantly for the top performer.

6. Conclusion and Future Work Recommendation

This research highlight the similarities and differences between the least and the top-performing trucking companies. The least-performing group mainly emphasizes financial resource management and customer relationship management to enhance company resilience while focusing on innovative digitalization technology to improve their performance. In contrast, the top performers are different from the least performer trucking companies in a way that they can manage a broader range of resilience factors. In addition, they emphasize company adaptability and flexibility, followed by innovative digitalization technology, resilient leadership, risk, and business continuity

management to enhance company resilience, which then contributes to increased company performance. This result matches Pujawan and Bah (2022), who observe flexibility as one of the preferable risk mitigation strategies used to tackle challenges presentable during the COVID-19 pandemic. This research is unique as none of the previous research specifically address comparative analysis between the least and the top performer in the Indonesian trucking business. Knowing the differences between these two groups also helps identify which resilience factors the least-performed companies lack compared to the top-performed trucking companies. Hence, it can provide insight to the supply chain managers on which factors of resilience they need to emphasize, thus tailoring their strategy accordingly and helping the least performer improve their performance. Rebmann (2013) stated that no research compared various business sectors and mainly focused on specific types of business. This research has not covered a comparative analysis of different types of land transportation, which opens up these topics as a possibility for future work research.

References

Agnese, B., *Digitalization and Resilience in Times of Covid-19: An Empirical Research on Freight Forwarding Companies*. Universita 'Degli Studi Di Padova Dipartimento. Italy, 2020.

Azka, R.M., Didominasi Moda Darat, Angkutan Logistik Bakal Diratakan, June 21, 2020, https://ekonomi.bisnis.com/read/20200621/98/1255602/didominasi-moda-darat-angkutan-logistik-bakal-diratakan-. Accessed January 21, 2021.

De Bakker, K., Boonstra, A., and Wortmann, H., Risk Managements' Communicative Effects Influencing IT Project Success*, International Journal of Project Management*, vol. 30, no. 4, pp. 444–457, 2012.

Deloitte Insight, Resilient leadership responding to COVID-19, 2020, Available: https://www2.deloitte.com/global/en/insights/economy/covid-19/heart-of-resilient-leadership-responding-to-covid-19.html, May 19, 2021.

Edeh, F.O., Ugwu, J.N., Ikpor, I.M, Udeza, C.G., and Ogwu, V.O, Workplace Democracy and Employee Resilience in Nigerian Hospitality Industry, *American Journal of Economics and Business Management*, vol. 2, no.4, pp. 147-162, 2019.

Eisenhardt, K. and Martin, J., Dynamic Capabilities: What are They?, *Strategic Management Journal*, vol. 21, no. 10-11, pp. 1105-21, 2000.

Fabeil, N.F., Pazim, K.H., Langgat, J., The Impact of Covid-19 Pandemic Crisis on Micro-Enterprises: Entrepreneurs' Perspective on Business Continuity and Recovery Strategy, *Journal of Economics and Business*, vol. 3, no. 2, pp. 837-844, 2020.

Fitriasari, S., How do Small and Medium Enterprise (SMEs) Survive the COVID-19 outbreak?, *Jurnal Inovasi Ekonomi*, vol. 5, no. 2, pp. 53-62, 2020.

Gourinchas, P., Kalemli-Özcan, S., Penciakova, V., Sander, N., COVID-19 and business failures, 2020, Available: www.oecd.org/global-forum-productivity/webinars/Gourinchas-Kalemli-Ozcan-covid-19-and-business-failures.pdf, November 21, 2022.

Grotchsch, V., Blome, C., and Schleper, M., Antecedents of Proactive Supply Chain Risk Management - A contingency Theory Perspective, *International Journal of Production Research*, vol. 51, no.10, pp. 2842-2867, 2013.

Hair, Jr.J.F., Black, W.C., Babin, B.J., Anderson, R.E, Multivariate Data Analysis, Eight Ed, Cengage Learning, United Kingdom, 2018.

Helfat, C.E. and Peteraf, M.A., The Dynamic Resource-Based View: Capability Life Cycles, *Strategic Management Journal*, vol.24, no.10, pp. 997-1010, 2003

Hosseini, S., Ivanov, D., and Blackhurst, J, Conceptualization and measurement of supply chain resilience in an open-system context, *IEEE Transactions on Engineering Management*, vol 69, no. 6, pp.3111-3126, 2020.

Jedynak, P., & Bąk, S., *Risk Management in Crisis: Winners and Losers during the COVID-19 pandemic.*, Routledge, New York, 2021.

Laugen, B. T., Acur, N., Boer, H., & Frick, J., Best manufacturing practices: what do the best-performing companies do?, *International Journal of Operations & Production Management*, vol. 25, no. 2, pp. 131-150, 2005.

Liu, C.L., and Lee, M.Y., Integration, Supply Chain Resilience, and Service Performance in Third-Party Logistics Providers, *The International Journal of Logistic Management*, vol. 29, no.1, pp. 5–21, 2018.

Liu, Y., Lee, J.M., Lee, C., The Challenges and Opportunities of a Global Health Crisis: the Management and Business Implications of COVID-19 from an Asian Perspective, *Asian Business & Management*, vol.19, pp.277–297, 2020.

Nieman, G.H. and Nieuwenhuizen, C., *Entrepreneurship: A South African Perspective*, Van Schaik Publishers, Pretoria, 2009.

Parama, M., Transportation industry seeks' rescue package' to weather COVID-19 impacts, April 14, 2020,

https://www.thejakartapost.com/news/2020/04/transportation-companies-seek-rescue-package-to-weather-COVID-19-impacts.html. Accessed November 3, 2020.

Pujawan, I.N., and Bah, A.U., Supply Chains under COVID-19 Disruptions: Literature Review and Research Agenda, *Supply Chain Forum: An International Journal*, vol. 23, no. 1, 81-89, 2022.

Rebmann, T., Business continuity and pandemic preparedness: US Health Care versus Non-Health Care Agencies, *American Journal of Infection Control*, vol.41, no.4, p. e27-e33, 2013.

Sasono, D., Multimodal Transport Development in Indonesia Current Situation, United Nations Conference in Trade and Development. UNCTAD Expert Meeting, pp. 1-12, Geneva, Switzerland, 24-26 September 2003.

Shen, H., Fu, M., Pan, H., Yu, Z., and Chen, Y., The Impact of the COVID-19 Pandemic on Firm Performance, *Emerging Markets Finance and Trade*, vol. 56, no. 10, pp. 2213-2230, 2020.

Starr, R., Newfrock, J., and Delurey, M., Enterprise Resilience: Managing Risk in the Networked Economy, *Strategy and Business*, vol. 30, pp.70-79, 2003.

Sugianto, I.M., Pujawan, I.N., and Purnomo, J.D.T., A Study of Indonesian Trucking Business: Survival Framework for Land Transport during the Covid-19 Pandemic, *International Journal of Disaster Risk Reduction*, vol 84, pp.103451, 2023.

Yang, Y., and Kankanhalli, A., The Impact of Social Media Marketing on Online Small Business Performance, *PACIS 2014 Proceeding*, 63, pp.1-11, 2014.

Ueda, K., Risk Management Thinking and Case Studies for Creating Business Resiliency − Possibilities for Soft Control and Social Capital, *The Senshu Social Capital Review*, vol. 3, pp. 91-118, 2012.

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Ira Margaritha Sugianto graduated from the University of New South Wales, Sydney, Australia, with an honors degree in Bachelor of Science in Food Science and Technology in 2004. She then accomplished her master's degree in 2005 with a degree in Master of Technology Management at the same university. She is currently working as the Vice President of PT. Lookman Djaja Logistics since 2005 and currently taking a doctoral program at Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia. Academically, she presented her paper in 2022, The 3rd International Conference on Industrial Engineering and Industrial Management, one conference proceeding publication, and published one article in the International Journal of Disaster Risk Reduction. Her research interest involves survivability, performance, business continuity management, the trucking sector, and land transportation.

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