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An effect of dynamic logistics capabilities on courier's business performance

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ABSTRACT

Courier companies face environmental challenges influenced by the development of e-commerce businesses, demanding high service quality and reliability in meeting consumer demand. Courier companies demand to immediately adjust company strategies to be able to survive in competitive market conditions, the only way is to continue to keep dynamic on internal capability. This study develops and tests a model of the relationship between dynamic logistic capabilities, environmental turbulence, and business performance. As quantitative research, a survey was used to collect data. A sample of 70 valid answers from courier company members of the Association of Indonesian Express Delivery, Postal, and Logistics Services Companies (ASPERINDO) was treated through the Partial Least Square (PLS) method. The research results show a full mediation relationship between dynamic logistics capability and business performance, given the proportion of the impact of dynamic logistics capabilities on business performance (72.7%) identified in this study. As a result, the main result points out that the positive correlation between dynamic logistics capabilities and business performance strengthens the relationship evidence in the literature that dynamic logistics capabilities contribute to business performance, that is, sales growth, delivery reliability and security.

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Introduction

The increase in e-commerce has caused the flow of goods and document deliveries within the country. The e-commerce development requires courier service providers to innovate in response to changes, namely the highly customized nature of services, which is influenced by desires and impulses, price and convenience, thereby contributing to the fragmentation of courier services consumers desire. The ability to consistently deliver requested products within the delivery time frame is one of the performance measures in logistics companies, in this case, courier service providers (Hua et al., 2020; Ismail & Kusumawardhani, 2017; Kucukaltan et al., 2016; Wang, 2020). Empirical data based on reports published by the Indonesian Consumers Foundation (YLKI) in 2021 recorded complaints about the operational performance of courier operating companies at 3.2% of the total 535 complaints related to delivery accuracy, inappropriate delivery time estimates, and damaged goods. It did not arrive, and the item was lost.

Logistics capability is important for business logistics, especially courier companies, to create customer satisfaction by responding quickly to surges in demand in the market. Previous research emphasizes logistics as

a potential source of advantage through logistics services, giving rise to the belief that if this logistics capability is created, it will become a strong driving force for business performance (Bowersox et al., 2002; Calantone et al., 2003; Hendra Fachrudin et al., 2021). Based on resource-based theory (RBT) (Barney & Hesterly, 2015), logistics capabilities possessed by companies providing courier services are unique capabilities that have the characteristics: valuable, rare, provide added value, and difficult to imitate, which can increase business performance that effect competitive advantages for the company. Literatur finds that internal resources and capabilities that are "inimitable" are not enough to maintain a competitive advantage in a turbulent environment it has to be dynamic, which emphasizes an organization's ability to manage, develop and adapt to changes in the external environment, including the organization's ability to respond to changes in markets, technology and external conditions effectively. Flexible and innovative, reflecting "inimitability." So, the logistics capabilities possessed by companies providing courier services are dynamic logistics capabilities that can respond to environmental changes and positively influence performance.

The environment is considered a significant external factor in the study of strategic management. External factors provide threats and are also a source of opportunities for the company. Threats and opportunities in the external environment manifest in the form of various risks and threats facing the company. Risks are exacerbated by the environment's complexity and dynamics, which can significantly hinder a company's success. Companies must build their dynamic capabilities when facing such a turbulent environment. The framework of thought developed in this research refers to the strategic management framework in Wheelen and Hunger (2018). This framework states that every company can carry out management strategies influenced by internal and external factors aimed at formulating actions to be taken to improve company business performance. In the context of courier companies, this thinking framework still has much room to be developed to look for variables that influence the company's business performance. So, this research aims to see the influence of internal capability factors (dynamic logistic capability) and external factors (environmental turbulence) on business performance.so, the proposing the suppositions as follows: 1) H1. Environmental turbulence has a positive impact on dynamic logistics capabilities; 2) H2. Environmental turbulence has a positive impact on business performance; 3) H3. Logistics service innovation has a positive impact on business performance.

Method

The research used in this study is characterized as explanatory, seeking to explain business performance in courier companies through dynamic logistics capabilities, logistics service innovation, and environmental turbulence. A survey research model for collecting quantitative data was designed in 4 phases. In the first phase, a literature review was developed, followed by the research model, and finally, the research instrument for collecting data was performed. This research measures the dynamic logistics capabilities of courier companies and tests the relationship between environmental turbulence, dynamic capabilities, and business performance. The research instrument developed was a questionnaire based on studies presenting indicators for constructing dynamic logistics capabilities, logistics service innovation, and environmental turbulence. Mostly closed questions use 7-point Likert scales, where 1 was related to "I disagree" and 7 "I agree."

Environmental Turbulence is the level and frequency of environmental change, which is characterized by changes in customer preferences and the uncertainty of technological change in the business environment(Heirati et al., 2016; Hina et al., 2021; Sakchutchawan et al., 2011; Wong, 2014) which consists of 8 indicators. For the DLC construction, we adopted and synthesized dynamic capability adopted the model (Liu et al., 2016; Wang, 2020) with 18 indicators to measure DLC through three dimensions (dynamic capability, flexible operation capability, and customer response capability). Business Performance is the level of achievement of business activity goals that contribute to achieving strategic goals in courier companies (Ismail & Kusumawardhani, 2017; Kucukaltan et al., 2016; Liu et al., 2016; Matwiejczuk, 2019; Wang, 2016) namely sales growth, delivery accuracy level, information accuracy level (Table 1).

The second research phase comprised the data collection. An initial study was implemented on several courier companies to ensure the validity and reliability of the instrument. Our research respondents were from the association of Indonesian express delivery, postal and logistics service companies members. Regarding a modeling plan using partial least squares (PLS-SEM), the sample requirements do not require the basic assumption of meeting the minimum sample because it has been proven that no problems have been identified with a small sample size. The opinion known as the 10 (ten) Times Rule is currently widely referred to as a guideline in determining research sample sizes; the 10 (ten) Times Rule in determining the PLS-SEM sample size means that the research sample size can be based on (1) 10 times the largest number of formative indicators used to measure one construct or (2) 10 times the largest number of structural pathways directed on certain constructs in the structural model(Hair et al., 2013), in other words this rule says that the minimum sample size is 10 times the maximum number of arrows pointing to the latent variable in anywhere in the PLS path model.

Tabel 1. Conceptual Framework of The Study: Construct, Dimension, and Indicators

Construct	Dimension	indicator
Environmental Turbulence,		The level of change in customer preferences for courier services
		Level of demand for courier services from new customers
		The degree of variation in customer behavior
		The level of technological change in the courier services industry
		Level of technology development (R&D) in the courier services industry
		The level of opportunity resulting from technological change
		Competitor promotion war
		Competitor aggressive selling
Dynamic Logistics Capabilities	Dynamic Capability (DC)	The ability to anticipate and prepare oneself for various things as a result of environmental changes
		Ability to meet current and future customer needs
		Ability to combine and adjust resources within and outside the company effectively
		Ability to use resources efficiently
		Ability to develop and expand necessary resources
		Ability to implement strategic transformation to keep up with environmental changes
		Ability to relate well with partners, customers and other stakeholders
	Flexible Operational Capability (OC)	On-time delivery capability
		Ability to speed delivery
		Ability to provide customized logistics services
		Ability to provide delivery services throughout Indonesia
		Ability to provide information systems for tracking tracing
		Ability to maintain security from damage and loss
		Ability to provide capable and skilled personnel
	Customer Response Capability (CR)	Ability to provide a customer service management system
		Ability to respond to consumer requests (customer requests)
		Ability to provide service flexibility according to consumer needs
		Ability to solve problems and complaints.
Business performance		Sales Growth
		Delivery
		Security

Based on these considerations related to the structural path in the research model, it was found that the minimum sample in this dissertation research was 10 times the maximum number of arrows pointing to the performance latent variable in this research model (10 x 5) so that the number of samples could be determined in this study there were a minimum of 50 samples. The survey link was sent to potential respondents. We chose to rely on single key informants in our data collection to maximize the data accuracy and reliability; the owner or CEO was asked to complete the survey themselves or to delegate it to the most appropriate senior person in the company (e.g., chief technology officer, general manager, business development manager). A pre-test was developed to evaluate the questionnaire developed. We received questionnaires electronically, and after excluding all missing values, the sample of this study consisted of 70 reliable and valid questionnaires, indicating a reliability sample power of 98.7%.

The third research phase led the way to treat the data collected preciously. Partial least square (PLS) was adopted for data analysis. We utilized covariance-based methods to explore the effect of environmental turbulence, dynamic logistics capabilities, and logistics service innovation on business performance. We used the software SmartPLS 3.2.9 to analyze all relationships between latent variables in one analysis. Considering these method parameters, the fourth research phase presents the result and discussion of the data analysis.

Results and Discussions

In General, there are three steps of methodological assessments used in PLS application: a) assessment of the reliability and validity of measures (*outer model assessment*); b) assessment of the structural model (*inner model assessment*); and c) determining model adequacy and choosing the final model. The logistics capabilities proposed

in this paper comprise three related and independent dimensions. The hypothesis will be tested using the hierarchical component models (HOC) method. Structural equation model analysis using Partial Least Square (PLS) in this research uses hierarchical component models (HOC), commonly known as second-order models. Analysis of the measurement model (outer model) is divided into two stages: analysis of the lower order measurement model, namely between indicators and their dimensions, and then analysis of the higher order measurement model, namely between dimensions and variables. The analysis of the lower-order measurement model is as follows:

Tabel 2. Analysis of the Result of Outer Model Assessment for Reflective Construct

Variabel Laten	**Dimensi**	**Indikator**	**Convergent Validity**		**Internal Reliability**	**Consistency**
			Loading (>0.70)	**AVE (>0.50)**	**CR (0.60 – 0.95)**	**Cronbach's Alpha)0.60 – 0.95)**
Environmental Turbulence (ETU)		MT01	0.874	0.751	0.960	0.952
		MT02	0.903			
		MT03	0.905			
		TT01	0.867			
		TT02	0.885			
		TT03	0.778			
		CI01	0.878			
		CI02	0.839			
Dynamic courier capabilities (DLC)	Dynamic Capability (DC)	DC01	0.950	0.885	0.982	0.978
		DC02	0.944			
		DC03	0.956			
		DC04	0.878			
		DC05	0.957			
		DC06	0.957			
		DC07	0.943			
	Flexible Operation Capability (OC)	OC01	0.951	0.823	0.970	0.963
		OC02	0.944			
		OC03	0.958			
		OC04	0.943			
		OC05	0.896			
		OC06	0.828			
		OC07	0.816			
	Customer Response Capability (CRC)	CR01	0.931	0.864	0.962	0.947
		CR02	0.927			
		CR03	0.943			
		CR04	0.916			

ETU, DLC, and LSI were designed reflectively. Reliability and validity were analyzed by the composite reliability indicator and Cronbach's alpha coefficient expecting values >0.7, and all construct was found to be acceptable. The convergent validity (evaluated the degree to which two measurements of the same concept are related) was performed based on the average variance extracted (AVE) analysis that should be at least above the threshold of 0.5; all the constructs show that AVE was met and reached the expected convergent validity as shown in Table 2.

Table 3. Analysis of The Result of Outer Model Assessment for Formative Construct

Variabel Laten	**Indikator**	**Outer Weights**	**Significance of Weight**		**Collinearity**
			t-statistic	**P-Value**	**VIF < 5**
Business Performance (BPU)	FF01	0.536	5.482	0.000	2.149
	OF01	0.407	4.540	0.000	1.857
	OG01	0.208	2.282	0.023	1.549

Business performance (BPU) were designed in a formative way Pada konstruk berbentuk formatif, maka evaluasi model pengukuran dilakukan dengan mengidentifikasi *significance of outer weight* dan uji multikoleniaritas melalui pengukuran nilai *variance inflation factor* (VIF) sehingga validitas dan reliabilitas

konstruk tidak diperlukan Berdasarkan nilai model pengukuran formatif pada Tabel 4.19. *significance of outer weight t-statistic* telah terpenuhi dimana masing-masing indikator >1.96 (untuk *signifinace level = 5%)* serta nilai VIF <5 sehingga dapat disimpulkan bahwa indikator yang digunakan dalam variabel *business performance* sudah valid dan *reliable*.

Tabel 4. Analysis of The Result of Higher Order Construct

Variabel Laten	Dimensi	Convergent Validity		Internal Reliability	Consistency
		Loading (>0.70)	AVE (>0.50)	CR (0.60 – 0.95)	Cronbach's Alpha)0.60 – 0.95)
Dynamic Logistics Capabilities (DLC)	Dynamic Capability (DC)	0.930	0.917	0.956	0.909
	Flexible Operational Capability (OC)	0.941			
	Customer Respons Capability (CRC)	0.946			

The higher-order measurement model is a relationship between dimensions and variables (Hair, Sarstedt, et al., 2012b; Hair Jr. et al., 2016). Below are the research results of the measurement model for the higher-order construct (Table 4). The measurement results show that each DLC dimension has excellent convergent validity where the loading factor and AVE values exceed the rule of thumb values. The CR and CA values of the DLC dimensions are 0.6 – 0.9, which shows satisfactory reliability. After the convergent validity of the model was met, the next step was to confirm the model's discriminant validity, which indicates whether the latent variables are independent. The confirmation could be achieved by comparing the latent variables and their respective square root values of the AVE analysis, also known as the Fornell-Larcker Criterion (Table 5).

Table 5. Discriminant Validity Analysis (Fornell-Larcker Criterion)

BPU	DLC	ETU	
BPU			
DLC	0.850	0.939	
ETU	0.735	0.817	0.867

After performing the necessary calculations, it was found that the AVE square root values of each latent variable were checked as higher than the correlations found for the other dimensions. Once the analysis confirming the model's discriminant and convergent validities was completed, the loading factors of the manifest variables and their respective latent variables were considered definitive and continued to assessment of the structural model (*inner model assessment*). This study used the student t-test through the bootstrapping technique (Figure 1).

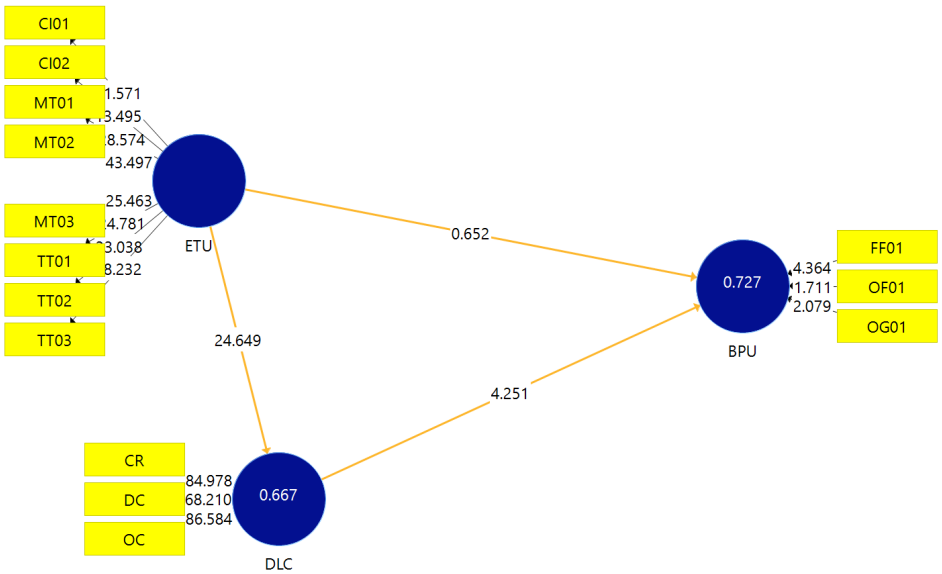

Figure 1. Estimated Standardized Loadings of the Indicators of PLS Measurement Mode

The value that can be considered significant is that of t-statistic > 1.96 and p-value <0.05. Table The values obtained are reported in Table 1. The t-test values can be considered relevant because they are above the given level of relevance, thus indicating the causal relationship between the constructs. This analysis showed that the ETU construct positively affects DLC according to the t-statistic (26.226 > 1.96), thereby explaining 66.7% of the ETU effect on DLC given by variance or coefficients determination (R^2) and conforming to hypothesis H1. The parameter values of R^2 are 0.25, 0.50, and dan 0.75 (Hair Jr. et al., 2016),which are considered weak, moderate, and substantial. Based on this parameter, the R^2 for this latent variable is considered moderate.

Table 6. Structural Model Path Coefficients

Ekso		Endo	Original Sample	T-Statistic	P-Value	f2	R2	Q2
ETU	→	DLC	0.817	26.226	0.000	2.003	0.667	0.486
ETU	→	BPU	0.125	0.689	0.491	0.019	0.727	0.575
DLC	→	BPU	0.747	4.550	0.000	0.681		

The ETU construct does not affect BPU according to the t-statistic (0.689 <1.96) (t-statistic 1.206), rejecting hypothesis H2. The DLC construct positively affects BPU according to the t-statistic (4.550 > 1.96) conforming to hypothesis H3, BPU explained 72.7 % by DLC and ETU. Based on the R2 parameter, this latent variable is considered moderate. The predictive relevance test (Stome-Geisser's Q2 test) given by the blindfolding test indicates whether the model can satisfactorily predict the indicators classified as endogenous. The result suggests that all predictive relevance values have a good explanatory power. Thus, for effect size (f2), the impact of the latent variables on dependent ones to adjust the model is considered low if the values are 0.02, moderate if up to 0.15, and substantial if 0.35 for each latent variable analyzed. As observed in Table, the result is between low and substantial classification.

The result of this study presents empirical evidence of a positive and significant relationship between the construct of environmental turbulence and dynamic logistics capabilities. This relationship was statistically proven and explained by two tests confirming hypothesis H1. The first test showed a highly significant causal relationship between ETU and DLC construct given by t-statistic 27.177 > 1.96 (p-value < 0.050). The second test showed that the ETU construct explained 67.2% of the effects on the DLC construct. This result indicates that it is possible to increase the likelihood of dynamic logistics capabilities in a turbulent environment. This result indicates that the Dynamic logistics Capabilities dimension can build and update resources, assets, and capabilities profitably and reconfigure as needed to innovate and respond to changes in the environment, which affects operational capability, where fragmentation of courier services is very likely to provide variations in consumer demand so companies must be able to identify appropriate operational capabilities.

It is proven that dynamic logistics capabilities mediate the relationship between environmental turbulence and business performance (ETU → DLC → BPU) because statistically, the t-stat > t-table value at the 5% level of significance is 4.290 > 1.96 (p-value 0.000 < 0.05). The type of mediation produced by dynamic logistics capabilities on this relationship is full mediation (Zhao et al., 2010), which shows the insignificant direct influence of environmental turbulence on business performance (0.019 < 1.96), but the direct influence mediated by dynamic logistics capabilities is significant. Dynamic capabilities can positively impact business performance, especially for companies that rely on efficient logistics and timely deliveries as a crucial part of their operation. Dynamic logistics capabilities such as real-time tracking and flexible delivery options improve customer experience, boosting sales and revenue. Dynamic logistics capabilities made businesses adapt their courier services to meet changing customer demand and environmental conditions. By investing in and optimizing these capabilities, companies can positively impact their performance, increase customer satisfaction, and maintain a competitive edge in their respective markets. Finally, the finding suggests the validity of the empirical model based on the measurement and structural model analysis. These positives confirm dynamic logistics capabilities, showing that variable significantly contributes to business performance.

Conclusions

The result of this study points out that dynamic logistics capabilities can explain 72.7% of the effect on business performance. Given that this study has not explained 27.7% of the effect, this finding enables a new approach to the topic of courier business performance that will allow a better understanding of the complexity of this relationship between environmental turbulence, dynamic logistics capabilities, and business performance In the academic context, the validation of the proposed hypothesis sheds light on the contribution of how dynamic capabilities effect on courier business performance. The findings support the dominance of dynamic logistics capabilities directly affecting business performance and mediating performance. Courier companies should have

the dynamic capability, operational capability, and customer service capability to face environmental turbulence for increased sales growth, reliability on delivery and security.

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