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The Dynamics of Logistics Industry Involvement in Malaysia's E-Commerce

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Abstract: E-commerce in Malaysia has experienced remarkable growth, particularly following the COVID-19 pandemic, as more businesses increasingly adopt digital platforms in their operations. This study aims to examine the contribution of logistics service providers (LSPs) to e-commerce businesses, with particular focus on cost, delivery service, and location as critical factors influencing the selection of logistics operators. The Theory of Reasoned Action (TRA) is employed to explain the decision-making behavior of e-commerce operators.

The Malaysian e-commerce sector was chosen as the research context due to its status as one of the most dynamically developing in Southeast Asia, yet facing significant logistical challenges that directly impact customer satisfaction and sustainability. Using cluster random sampling, 270 e-commerce operators were surveyed, and the data were analyzed through factor analysis, reliability testing, regression, and ANOVA. The findings indicate that location is the strongest predictor of engagement with LSPs, whereas cost and delivery service exhibit relatively weaker effects.

The study contributes to the literature by applying TRA to the logistics-e-commerce interface in a developing market, providing new empirical evidence from Malaysia. Its novelty lies in highlighting the critical role of location - a factor previously underemphasized in global studies - in shaping logistics engagement. The results offer both



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theoretical insights and practical implications, guiding LSPs and policymakers in enhancing coverage, accessibility, and sustainable development within the Malaysian e-commerce ecosystem.

Keywords: Logistics Service Providers (LSPs); E-commerce; Theory of Reasoned Action (TRA); Sustainable Infrastructure; Industrial Growth.

马来西亚电子商务中物流产业参与的动态

摘要：马来西亚的电子商务经历了显著增长，尤其是在 COVID-19 大流行之后，越来越多的企业开始在其运营中采用数字化平台。本研究旨在探讨物流服务提供商（LSPs）对电子商务企业的贡献，重点关注成本、配送服务和地理位置，这些因素是影响物流运营商选择的关键。研究采用理性行为理论（Theory of Reasoned Action, TRA）来解释电子商务运营商的决策行为。

选择马来西亚电子商务行业作为研究对象，是因为该行业是东南亚发展最为迅速的市场之一，但同时面临重大物流挑战，这些挑战直接影响客户满意度和可持续发展。研究通过聚类随机抽样对 270 家电子商务企业进行了调查，并使用因子分析、信度检验、回归分析和方差分析（ANOVA）对数据进行了分析。研究结果表明，地理位置是与 LSPs 合作的最强预测因素，而成本和配送服务的影响相对较弱。

本研究的学术贡献在于将 TRA 应用于发展中市场的物流-电子商务领域，并提供了来自马来西亚的新实证数据。其创新之处在于强调地理位置的重要作用——这一因素在全球研究中此前未被充分关注——在物流合作中发挥了关键作用。研究结果不仅提供了理论洞见，还具有实践意义，可为 LSPs 和政策制定者在提升覆盖范围、可达性以及马来西亚电子商务生态系统的可持续发展方面提供指导。

关键词：物流服务提供商（LSPs）；电子商务；理性行为理论（TRA）；可持续基础设施；产业增长

1. Introduction

Malaysia, one of the most diversified economies in the world, owes its economic growth to sectors like manufacturing, services, agriculture, and mining, which help balance the economy. Among these sectors, the logistics industry plays a critical role in supporting and facilitating Malaysia's supply chain, which is essential for economic development. The rapid advancement of technologies has led to a modernization of the supply chain, fueling the significant growth of E-Commerce in the country [1][2].

The transformation of traditional business models by E-Commerce is undeniable. E-Commerce has not only changed the way businesses purchase, sell, and interact with suppliers and customers, but it has also shifted the business model focus from “production excellence” to “customer intimacy” [3]. This change

highlights the importance of the logistics industry's involvement in E-Commerce, which is key to sustaining and enhancing businesses in a highly competitive market. E-Commerce companies make decisions regarding their engagement with logistics providers based on factors such as delivery service, location, and cost [4][5].

Delivery service plays a significant role in how E-Commerce companies engage with logistics providers in Malaysia. Logistics companies generally offer better delivery options compared to consumer-supplied deliveries, especially when consumer trips are tied to other activities. Modern delivery processes increasingly rely on just-in-time systems, requiring minimal response times to satisfy demand-driven supply chain models [6][7][8][9]. A large proportion of customers now demand express delivery services or require deliveries within narrow time windows [10].

which further intensifies the need for efficient logistics operations.

The geographical coverage and location of logistics services are another critical factor influencing E-Commerce's engagement with logistics in Malaysia. The extensive network of logistics providers ensures that goods are delivered to urban areas and high-demand regions across the country. This broad coverage mitigates geographical barriers, allowing products to reach customers promptly and efficiently, which is crucial for maintaining high customer satisfaction [11].

Transportation costs are a major economic consideration for businesses in the logistics sector. It is estimated that E-Commerce businesses spend about one-third to two-thirds of their logistics budgets on transportation [12]. According to Chan [5], transportation costs account for approximately 44% of logistics costs, a significant figure considering that E-Commerce companies typically operate on narrow profit margins. Therefore, E-Commerce companies tend to seek logistics providers that offer cost-effective transportation solutions, which helps them to reduce operational costs and increase profitability [13].

Customer satisfaction remains a paramount objective for E-Commerce businesses, and logistics service providers are instrumental in ensuring that this goal is met. As the E-Commerce industry in Malaysia continues to expand, logistics providers must adopt higher standards of service delivery to keep up with evolving customer expectations. This requires innovation and continual improvement on the logistics side, in areas such as delivery speed and cost reduction, to match the increasing demand from E-Commerce businesses [14]. Achieving a balanced and well-coordinated relationship between E-Commerce and the logistics industry is essential for fostering sustainable growth and meeting the ever-changing demands of the market [59].

The objective of this research is to analyze the relationship between the various factors influencing the engagement of the logistics industry in Malaysia's E-Commerce sector. The study will examine the impact of delivery service, location, and transportation cost on the logistics industry's role in E-Commerce. As Malaysia sees an influx of E-Commerce start-ups, including prominent platforms like Lazada, Shopee, and Qoo10, these businesses heavily depend on logistics providers to handle their operations effectively [1].

The primary challenges faced by E-Commerce businesses include high transportation costs, the ability to provide reliable delivery services, and ensuring that logistics providers can deliver across all regions of Malaysia. Therefore, logistics companies must offer competitive pricing, timely deliveries, and extensive geographical coverage to support the growth of E-Commerce and meet customer demands effectively.

This study focuses on e-commerce operators and LSPs in Malaysia because the country's rapid digital adoption has created a critical reliance on logistics networks for last-mile delivery and customer satisfaction. Unlike more mature e-commerce markets, Malaysia presents a mixed environment of urban density and rural access challenges, making it an ideal setting to study how cost, delivery service, and location drive operator decisions.

1.1 Research Objectives

- H1: To determine whether cost has a significant influence on the engagement of the logistics industry in Malaysia's E-Commerce sector.
- H2: To determine whether delivery service has a significant influence on the engagement of the logistics industry in Malaysia's E-Commerce sector.
- H3: To determine whether location has a significant influence on the engagement of the logistics industry in Malaysia's E-Commerce sector.

2. Literature Review

2.1 Logistics and E-Commerce: A Global Perspective

The logistics industry plays a pivotal role in the growth and success of the E-Commerce sector globally. In the context of E-Commerce, logistics involves the transportation, storage, and delivery of products from suppliers to consumers. The rapid growth of E-Commerce has reshaped global supply chains, leading to an increasing demand for efficient and cost-effective logistics solutions [15]. The need for prompt and reliable delivery systems has made logistics a key differentiator for E-Commerce businesses, directly influencing customer satisfaction and brand loyalty [16]. This global trend is particularly relevant in Southeast Asia, where E-Commerce has experienced explosive growth in recent years.

2.2 The E-Commerce Growth in Malaysia

Malaysia has become a significant player in the Southeast Asian E-Commerce market, with its logistics industry being integral to its rapid development [2]. The Malaysian government's investment in digital infrastructure, alongside an increase in internet penetration, has facilitated the growth of E-Commerce platforms like Lazada, Shopee, and Qoo10, all of which rely heavily on efficient logistics systems [1]. According to the Malaysian Digital Economy Corporation (MDEC) [17], the value of Malaysia's E-Commerce market is expected to surpass USD 4 billion in the coming years, reflecting the growing demand for logistics solutions in the country.

A report by Fong and Tan [18] identifies several

factors contributing to the growth of E-Commerce in Malaysia, including the increasing adoption of online shopping by Malaysian consumers and the heightened focus on digital payment systems. These factors have driven the demand for efficient, cost-effective, and scalable logistics services to meet customer expectations for timely and affordable deliveries. The logistics industry in Malaysia has been adapting to these demands by leveraging technology to improve operational efficiency and optimize delivery times [19].

2.3 Factors Influencing Logistics Industry Engagement in E-Commerce

2.3.1 Cost Factors

The cost of transportation is one of the most critical factors influencing the engagement between the logistics industry and E-Commerce in Malaysia. As observed by Chang [12], transportation accounts for a significant portion of logistics costs, with estimates indicating it could range from 44% to 60% of overall logistics expenditure. For E-Commerce businesses, managing transportation costs is vital for maintaining profitability, especially when they offer services like free delivery or low-cost shipping [5]. As a result, E-Commerce platforms seek logistics providers that can offer cost-effective transportation solutions without compromising service quality.

A study by Koo [2] shows that logistics companies in Malaysia are increasingly adopting technology such as route optimization tools and predictive analytics to reduce transportation costs and improve delivery efficiency. Moreover, partnerships with third-party logistics (3PL) providers and last-mile delivery services have allowed E-Commerce platforms to outsource logistics functions and focus on their core competencies, such as marketing and customer engagement [4].

2.3.2 Delivery Service

Delivery service is another key factor influencing the engagement of logistics companies in Malaysia's E-Commerce industry. With rising consumer expectations for faster deliveries, E-Commerce companies must ensure that their logistics partners can provide reliable, on-time delivery services. The growth of services like same-day and next-day delivery in Malaysia has become a significant competitive advantage for logistics providers working with E-Commerce platforms [29]. According to Niles [21], customers increasingly demand express delivery services, making it essential for logistics providers to streamline their operations and offer faster, more efficient delivery options.

The use of just-in-time (JIT) delivery models has become commonplace in Malaysia, enabling logistics companies to minimize stock holding and deliver products more efficiently [6]. However, this model

places pressure on logistics providers to maintain real-time inventory tracking, timely deliveries, and flexibility in their services to accommodate peak demand periods, such as sales events or holidays [11].

A recent study by Zainal et al. [22] highlights the importance of last-mile delivery in Malaysia's logistics network, with a focus on ensuring timely delivery despite geographical constraints. As urban areas become more densely populated, last-mile delivery innovations such as drone deliveries and autonomous vehicles have the potential to address some of these challenges [23].

2.3.3 Geographical Location

Geographical location plays an important role in the efficiency of the logistics industry's engagement in Malaysia's E-Commerce sector. Malaysia's diverse topography, with its urban centers, rural areas, and mountainous regions, presents unique challenges for logistics providers. The ability of logistics companies to deliver goods across a wide geographical area is crucial for E-Commerce businesses that aim to serve a large customer base [11].

As E-Commerce companies in Malaysia expand, logistics providers with an extensive network of distribution centers across the country are better positioned to meet the delivery demands of customers in both urban and remote areas. This coverage ensures that goods can be delivered within short timeframes, contributing to higher customer satisfaction and loyalty [22]. The integration of technology in logistics, such as the use of geographic information systems (GIS) for route planning, has allowed logistics providers to better navigate the challenges posed by Malaysia's varied geography [13].

2.3.4 Challenges in Logistics and E-Commerce Collaboration

Despite the significant growth of E-Commerce in Malaysia, the collaboration between logistics providers and E-Commerce companies faces several challenges. One of the primary concerns is the high cost of transportation, particularly in rural and remote areas, where delivery volumes are lower. The logistics industry must find ways to balance the cost of delivery with customer expectations for fast and affordable shipping [13].

Another challenge is the demand for improved service quality, especially in terms of timely and accurate deliveries. Logistics companies must constantly innovate and improve their delivery infrastructure to keep up with the growing expectations of E-Commerce customers. This may involve adopting advanced technologies such as warehouse automation, autonomous delivery vehicles, and artificial intelligence to optimize delivery routes and improve operational efficiency [23].

2.4 Theoretical justification

The **Theory of Reasoned Action (TRA)** is a model explaining on the process of how human behavior is performed or developed. It assumes that the attitudes, intentions and beliefs are related to one person's behavioral. In the recent research in the field of emotions has demonstrate there are existence of different intensity and forms and the emotions could be quantitatively discriminate. Based on Ekman and Davidson [24] argument, moods, emotions, and affect are the distinct categories and require treatment on the individual while the human behaviours' prediction take places. Secondly, there are four distinct dimensions of emotions such as possibility versus probability, conceptual breadth, temporal focus, and lastly, appraisal versus static that able to assist researchers to predict the behaviour [25]. Thirdly, there are significant role that emotion play part in affecting the decision-making process of consumer that make it imperative for researchers of the market to use considered emotions set while implementing and designing the studies [26]. Overall, this is said that affect has different characteristic, it could appear in different kind of forms such as the excitement of performing a behaviour, association with referents, attachment with a product, guilt, anger, and lastly, the effort of gathering information. Hence, the interplay of affect dimension can capture various points on human behaviour within the TRA model.

2.5 Engagement of Logistic Industry

When the E-Commerce in Malaysia grows, the demand for logistics would grow too. Turnout, logistics industry business has been expanding in recent years. Logistics has become one of the key players in improving the economy of a country where boosting most of the organizations became competitive and successful in business [27]. The capability of logistics is relatively related to the performance [28]. To add on, every firms in different sector might react differently depending on their environmental concerns [29] [30], and same goes to logistics industry might react to environmental concerns differently from the firms [31].

Based on Juga et al. [32] findings, the relationships of satisfaction and loyalty of customers are correlated to the service quality by utilizing the empirical structured equation which used to identify critical service dimensions and measurement of the impacts of satisfaction and loyalty level from 235 industrial companies surveyed output. Throughout the research conducted in logistics outsourcing context using satisfaction-loyalty model, it is proven that service perceptions would influence the loyalty depending on the experience of the shipper's overall satisfaction.

2.6 Cost

With such a dynamic business market, the

importance of cost control has become the main priority of every business due to unpredictable market place. Small and medium scale enterprises (SMEs) has been starving for the needs of financial, poor monitoring and implementation of projects, cost and time overrun, tough economy conditions and lastly, non-payment of loans [33].

Due to globalization and deregulation of the business world, existence of strong companies and increase of demand for customer service, it has become more competitive than before. As to counter this, many companies putting an effort to respond to these changes by improving the processes effectiveness by reducing unnecessary cost [34][35]. Based on Koch (2003), consumer often perceive the delivery costs is the main reason of the price increase, thus it is considered one of the aspect that impact on the behaviour.

Based on Forster et. al. [36], cost control is widely utilized today and there is no existence of uniform definition. Cost control is known to describe the activities of manager in short and long run management and planning of costs. The revenue and profit planning are relatively related linked to the cost control and planning. Moreover, the cost control is known as a process whereby objectives are set against which the daily incident cost is used to compare to make sure cost targets is not exceeded.

H1: Cost has a significant influence on the engagement of logistics industry of Malaysia in E-Commerce.

2.7 Delivery service

In the current competitive environment, it is crucial that logistics industry provide an outstanding delivery service. Based on Huang et al. [37], the quality service of logistics performance is an important aspect of key component that able to influence customer satisfaction. As consequences, the increasing number of figures on those small-sized shipment and increase number of variance frequency has impose a great challenge to delivery a good service. To create value and provide high level quality service, the logistics industry should roll out a delivery plan of their services and execute according to the plan to ensure successful implementation [38][39]. Most of the time, it is argued that that the main aim of service delivery is to close the bridge gap in between of customer experience and customer expectation [40].

For example, it is a challenge for most of the industries to deliver the product to customers at the shortest period as possible. Based on hler Gudum [41], the time interval between the decision to place order and stock availability from the order are the main reason that cause inventory problem in order to meet the demand of the customers. Time interval is known as the lead time. Delivery delay occur when there is any delay in the process of ordering till the refilling of

the stock. It is a detrimental result for a company if there is any delivery delay. Inefficiencies, ineffectiveness, poor performance of the processes and products are caused by the delays that happen on daily basis [42].

Based on Dolgui et al. [43], tools performance and the hike of production costs were strongly influence by the lead time. Moreover, through the research conducted by Ali Arkan and Seved Reza Hejazi [44], with an additional cost, the lead time are able be to be controlled. Lead time is considered the most important variable in order to play part of improving the supply chain performance and control the lead time which is possible to achieve when the various factors that have influence on it been identified. Hence, when the factors are identified, strategies could be developed to play the role in the process and product development. Overall, it is crucial that the supply chain strategy of a firm engage the assistance from logistics in order to deliver the products on time in order to prevent any delay.

H2: Delivery service has a significant influence on the engagement of logistics industry of Malaysia in E-Commerce.

2.8 Location

The desire of supply chain is to decide on which location is the most appropriate to install logistics platform. With such as a centralize location would be able to generate a greater scale of economy whereas decentralized location is be much more responsive as it reduces the delivery distance between supply and consumption points [45][46].

Most of the companies would search for a location that able to generate revenues and reduce unnecessary costs as this would help to achieve a higher profit. In order to pick a business location, there are some pre-requisition that must go through such as planning and research, demographic survey, availability of material supplies, appraise competitors, and understanding the states laws and taxes. Hence, business's location is the main key to the success of operation and growth [47].

It is very important for a business to understand the environment which the business is operating at as this would determine the success of a business. Every aspect of business such as its nature, location, prices of products, and distribution policies. According to Eppli and Shilling [48], stores which has an accessible location is much more favourable to consumers. There is some argument stated that the success or failure of the business is determine by the location [49].

H3: Location has a significant influence on the engagement of logistics industry of Malaysia in E-Commerce.

3. Methods

The unit of analysis of study are the organizations that related to the E-Commerce, thus, the business owner, or representative such as employees would be

the one responding to the survey on behalf of the organization, which mainly aim to gather information on the factors that influence the engagement of logistics industry of E-Commerce in Malaysia. The sampling plan for this research project is to explore on the engagement behavior of E-Commerce towards logistic industry in Malaysia. This survey would be using cluster random sampling to conduct the surveys from different states of Malaysia. Sekaran et al. [50] stated that cluster sampling is known as a population which is divided into clusters and it will certain clusters would be randomly drawn from the group. The method of data collection for research would be using quantitative method (questionnaire). The most convenient, easy-to-approach, environmentally friendly and better response rate would be using Google form as the questionnaire to gather data. According to Carr [51], quantitative findings generalised whole or sub populations as it involves a large sample which randomly selected. Beside sampling, it takes less time as it uses statistical software such as SPSS for data analysis [52]. There are three sections would be conducted in the questionnaire. Five items' questions for dependent variable (engagement in industry) adopted from the following authors [53], [54] and [55]. Lastly, three independent variables would be placed on section C. Every respective independent variable would consist of four items question. In this study, factor analysis is performed in the early stages of developing a new or revised instrument [56].

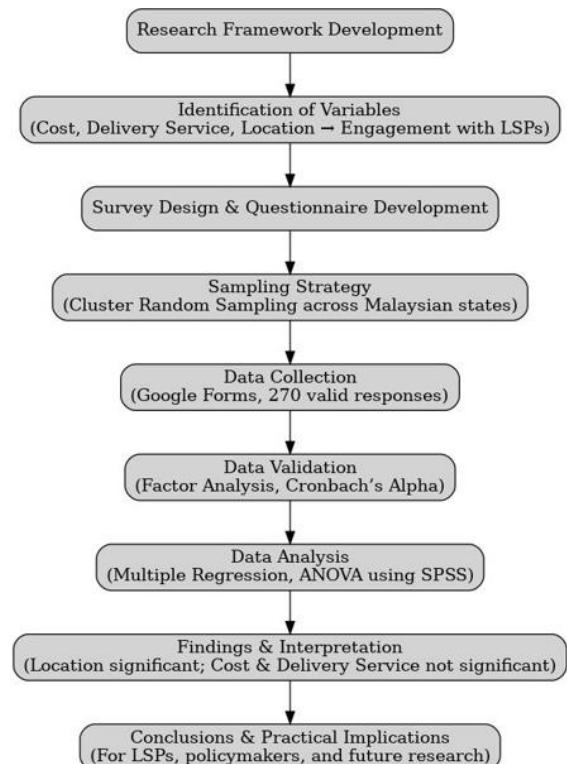


Figure 1. Schematic Research methodology process

The factor analysis process began with an initial analysis run to obtain eigenvalues for each factor in the

data. The reliability of a questionnaire is more concerned with stability, dependability and consistency of scores. Cronbach's alpha for each competency would be used in SPSS to test the internal consistency. Based on Schindler & Cooper (2008) [57], multiple regression analysis was utilized, and correlated matrix were used to conclude for possible predictor variables and dependent variables. The regression model would be able to determine the most changes in the reliable variable whether it is close to 1. If it is close to 0, it represents that the regression model is not able to prove any most changes [58]. ANOVA test was carried out to test the significant differences between class means and could be achieved by analysing the variance.

This schematic illustrates the methodological process of the study, beginning with research framework development and identification of key variables (cost, delivery service, and location) influencing logistics service provider (LSP) engagement. The process includes survey design, cluster random sampling across Malaysian states, data collection (270 valid responses via Google Forms), validation through factor analysis and reliability testing, statistical analysis using multiple regression and ANOVA, and concludes with interpretation of findings and their practical implications for LSPs, policymakers, and future research.

4. Findings

4.1 Descriptive Statistics

Characteristics of total 270 respondents whom completed the survey are tabulated in Figure 6 with respect to gender, race, marital status, age, educational level, and number of years in company. In terms of gender throughout the survey collected, it shows 63.3 percent were male and 36.7 percent were female. 63.3 percent of the survey collected were Chinese race, 20.4 percent were Malay, 14.4 percent were Indian and 1.9 percent were other races. Meanwhile 47.8 percent were married, while 47.4 percent were single and 4.8 percent were divorced. In terms of age of the respondents, 41.9 percent were between 26-35 years old, 38.5 percent were between 36-45 years old, 11.1 percent were between 46-55 years old, 6.7 percent were between 18-25 years old and lastly, only 1.9 percent were between 56-65 years old. Looking at the educational level, there are 51.5 percent of respondents were bachelor's degree holder, 27.4 percent were diploma holder, 10.4 percent were secondary educational level, 8.1 percent were master holder, 1.5 percent were PHD holder and lastly, 1.1 percent were primary educational level. Looking at the number of years in company that the respondent serving, 34.4 percent of respondents been working for the company for 6-8 years, 20 percent were serving for 9-11 years, 19.6 percent serving for 3-5 years, 9.6 percent serving for 12-14 years, 8.1 percent serving for 0-2 years, 4.8

percent serving for 15-17 years and lastly, only 3.3 percent of respondents been serving for their corporate for 18-20 years.

Table 1. Demographic profile

| Profile Characteristics | Description | Frequency (270) | Percentage |
|------------------------------|---------------------|-----------------|------------|
| Gender | Male | 171 | 63.3 |
| | Female | 99 | 36.7 |
| Race | Malay | 55 | 20.4 |
| | Chinese | 170 | 63 |
| | Indian | 40 | 14.8 |
| | Others | 5 | 1.9 |
| Marital Status | Single | 128 | 47.4 |
| | Married | 129 | 47.8 |
| | Divorced | 13 | 4.8 |
| Age | 18-25 | 18 | 6.7 |
| | 26-35 | 114 | 42.2 |
| | 36-45 | 103 | 38.1 |
| | 46-55 | 30 | 11.1 |
| | 56-65 | 5 | 1.9 |
| Educational Level | Primary Education | 3 | 1.1 |
| | Secondary Education | 28 | 10.4 |
| | Diploma | 74 | 27.4 |
| | Bachelor Degree | 139 | 51.5 |
| | Master | 22 | 8.1 |
| | PHD | 4 | 1.5 |
| Number of Year(s) in Company | 0-2 | 22 | 8.1 |
| | 3-5 | 53 | 19.6 |
| | 6-8 | 93 | 34.4 |
| | 9-11 | 54 | 20 |
| | 12-14 | 26 | 9.6 |
| | 15-17 | 13 | 4.8 |
| | 18-20 | 9 | 3.3 |

4.2 Regression Analysis

4.2.1 ANOVA

Table 2 presents the model summary of a multiple regression analysis examining the impact of three independent variables—Cost, Delivery Service, and Location—on the dependent variable, Engagement of the Logistic Industry. The *R* value of 0.884 indicates a strong positive correlation between the predictors and the dependent variable. The *R* Square value of 0.782 suggests that approximately 78.2% of the variance in engagement within the logistics industry is explained by the model, demonstrating a substantial explanatory power. The Adjusted *R* Square, slightly lower at 0.779, accounts for the number of predictors in the model and confirms the robustness of the model's fit. The standard error of the estimate is 0.433, indicating the average distance that the observed values fall from the

regression line. The change statistics reveal a significant *F* Change value of 317.444 (with *df*₁ = 3 and *df*₂ = 266), and a significance level (Sig. *F* Change) of 0.000, which confirms that the overall model is statistically significant. The Durbin-Watson

value of 2.681 indicates a low likelihood of autocorrelation among the residuals, further validating the reliability of the regression analysis. Overall, Table 2 highlights a strong and statistically significant relationship between the predictors and the engagement in the logistics industry.

Table 2. Model Summary

| Model | <i>R</i> | <i>R</i> Square | Adjusted <i>R</i> Square | Std. Error of the Estimate | Change Statistics | | | | Durbin-Watson | |
|-------|-------------------|-----------------|--------------------------|----------------------------|------------------------|-----------------|------------------------|------------------------|---------------|-------------|
| | | | | | <i>R</i> Square Change | <i>F</i> Change | <i>df</i> ₁ | <i>df</i> ₂ | | Sig. Change |
| 1 | .884 ^a | .782 | .779 | .433 | .782 | 317.444 | 3 | 266 | .000 | 2.681 |

a. Predictors: (Constant), Cost, Delivery Service, Location

b. Dependent Variable: Engagement of Logistic Industry

Table 3 presents the results of the ANOVA (Analysis of Variance) test, which assesses the overall significance of the regression model used to predict engagement in the logistics industry based on the independent variables: Cost, Delivery Service, and Location. The table shows that the Regression Sum of Squares is 178.455 with 3 degrees of freedom (*df*), and the Residual Sum of Squares is 49.845 with 266 degrees of freedom. This results in a Total Sum of Squares of 228.300 for 269 observations. The Mean Square for the regression is calculated as 59.485, and for the residual, it is 0.187. The *F*-statistics are 317.444, which is very high and indicates that the model explains a significant amount of variance in the dependent variable. The significance value (Sig.) is .000, which is well below the conventional threshold of 0.05, confirming that the model is statistically significant. In summary, Table 3 demonstrates that the regression model significantly improves the prediction of engagement in the logistics industry, validating the combined effect of the predictors as meaningful and impactful.

Table 3. ANOVA

| ANOVA ^a | | | | | |
|--------------------|----------------|-----------|-------------|----------|-------------------|
| Model | Sum of Squares | <i>df</i> | Mean Square | <i>F</i> | Sig. |
| Regression | 178.455 | 3 | 59.485 | 317.444 | .000 ^b |
| Residual | 49.845 | 266 | .187 | | |
| Total | 228.300 | 269 | | | |

a. Dependent Variable: Engagement of Logistic Industry

b. Predictors: (Constant), Cost, Delivery Service, Location

Table 4 presents the coefficients from the multiple regression analysis, which evaluates the influence of

Cost, Delivery Service, and Location on the Engagement of the Logistic Industry. The **unstandardized coefficients (B)** indicate the actual impact of each independent variable on the dependent variable. Among the predictors, **Location** has the highest unstandardized coefficient (*B* = 0.927), showing that a one-unit increase in the quality or suitability of location leads to a 0.927 unit increase in engagement, assuming other variables are constant. This effect is statistically significant, as reflected by its ***t*-value of 30.822** and a ***p*-value (Sig.) of .000**, which is well below the 0.05 threshold. In contrast, **Cost** (*B* = 0.003, *p* = .916) and **Delivery Service** (*B* = 0.016, *p* = .599) have very low coefficients and high *p*-values, indicating that their contributions to engagement are not statistically significant in this model. The **standardized coefficient (Beta)** for Location is also very high (0.884), confirming its strong relative impact compared to the other variables. The constant term (intercept) of 0.251 is not statistically significant (*p* = .226), suggesting that the baseline level of engagement, when all predictors are zero, does not differ meaningfully from zero. Overall, Table 4 highlights that **Location is the primary and significant driver** of engagement in the logistics industry, while Cost and Delivery Service do not show a statistically significant effect.

Table 4. Coefficients

| Model | Unstandardized Coefficients ^a | | Standardized Coefficients <i>t</i> | Sig. |
|------------------|--|------------|------------------------------------|------|
| | <i>B</i> | Std. Error | | |
| (Constant) | .251 | .007 | 1.213 | .226 |
| 1 Cost | .003 | .030 | .003 | .916 |
| Delivery Service | .016 | .030 | .015 | .599 |

| | | | | | |
|----------|------|------|------|-------|-----|
| Location | .927 | .030 | .884 | 30.82 | .00 |
| | | | | 2 | 0 |

a. Dependent Variable: Engagement of Logistic Industry

H1. Cost has significantly influence engagement of logistics industry of Malaysia in E-commerce. $F = .000b$, calculated $p > 0.05$, Accept H0, (Cost does not have relationship with engagement of logistic industry) and Reject H1 (Cost do have relationship with engagement of logistic industry).

H2. Delivery service has significantly influence engagement of logistics industry of Malaysia in E-commerce. $F = .000b$, calculated $p > 0.05$, Accept H0 (Delivery service does not have relationship with engagement of logistic industry) and Reject H2 (Delivery service do have relationship with engagement of logistic industry).

H3. Location has significantly influence engagement of logistics industry of Malaysia in E-commerce. $F = .000b$, calculated $p < 0.05$, Reject H0 (Location does not have relationship with engagement of logistic industry) and Accept H3 (Location do have relationship with engagement of logistic industry).

5. Discussions

Based on the findings, cost, location, and delivery service would affect the engagement of logistics industry in Malaysia of E-Commerce by 80.4% and only 19.6% other factors that would influence the engagement. Hence, this research study shows there is a positive relationship between cost, location and delivery service towards the engagement of logistic industry in Malaysia of E-Commerce. In chapter two, an extensive literature review that was performed is related to the development of research framework to find out the factors that influence the engagement. Three hypotheses were developed to meet the research objectives and to find out the effects of the factors towards engagement of logistics industry in Malaysia of E-Commerce. In chapter four, there were several analyses performed which show the hypotheses testing results.

5.1 Recommendations

5.1.1 Focus on Location as a Critical Factor

From the analysis, the variable Location has shown a significant influence on the engagement of the logistics industry in Malaysia's E-Commerce sector (p -value = 0.000). This indicates that logistics companies in Malaysia should prioritize expanding their geographical coverage to meet the growing demand from E-Commerce businesses. Logistics providers should focus on enhancing their networks in underserved and rural areas, where demand is increasing but infrastructure might still be lacking. Additionally, offering flexible and localized delivery options can help E-Commerce businesses optimize

their service offerings and better meet consumer expectations.

5.1.2 Reevaluate the Role of Cost in Logistics Engagement

The Cost factor has shown an insignificant impact on the engagement of logistics companies with E-Commerce (p -value = 0.916). While cost efficiency remains important, this finding suggests that E-Commerce companies in Malaysia may place more emphasis on service quality and delivery speed rather than just cost reductions. Logistics providers should continue focusing on offering competitive pricing but should not compromise on service levels. A potential strategy could be exploring partnerships with third-party logistics providers (3PL) or adopting advanced technologies such as route optimization and automation to manage costs more effectively without affecting service quality.

5.1.3 Enhance Delivery Service Capabilities

Similarly, the Delivery Service factor has not demonstrated a significant impact on logistics engagement (p -value = 0.599). Although this may seem counterintuitive, it highlights that delivery service alone may not be enough to drive engagement. Logistics providers should invest in improving their technological infrastructure to enhance speed and reliability of deliveries, particularly through innovations in last-mile delivery solutions. However, it is important to remember that this variable should not be ignored but rather integrated with other aspects such as location and cost to provide a more holistic approach to logistics services.

5.2 Limitation of Research Study

The three factors which are cost, location and delivery service in this research do not represent all the influence factors. Cross-sectional convenient sampling approach were used in this research to collect data instead of random sampling with longitudinal studies. Hence, this does not represent every different representative. All the relationships were examined in this research using statistical tools through correlation-based approaches such as multiple regression analysis. Therefore, instead of proven causality, it would be only inferred.

5.3 Implication on Future research

In every research, there is a room of improvement for future research to further explore other factors that might influence the engagement of logistics industry. The future research should use longitudinal random sampling method which involves quantitative and qualitatively to figure out any changes on the engagement of logistics industry in Malaysia of E-

Commerce. Using qualitative research methodology approaches such as grounded theory could help to explore other factors that influence the engagement of logistics industry that may not be presented in past literature. Future studies may consider the other factors that have significant influence the engagement of logistics industry. In this research there are only three independent variables that is insufficient enough and should add more independent variables for further research.

6. Conclusion

This paper has analyzed the role played by the logistics service providers (LSPs) in the e-commerce industry in Malaysia based on cost, delivery service and location. According to the findings of the survey, 270 e-commerce operators responded in relation to the factors of location, cost, and delivery service; the findings showed that location was statistically significant in relation to engaging with LSPs, whereas cost and delivery service showed no significant effects. Based on these results, it is implied that the most important determinants among the e-commerce operators in Malaysia are geographical accessibility and coverage of the distribution networks.

6.1 Academic Contribution

The scholarly value of the study is the extension of the use of the Theory of Reasoned Action (TRA) to the context of the logistics-e-commerce nexus in the environment of an emerging marketplace. This way, the study can expand the theoretical knowledge on decision-making processes that e-commerce operators use in choosing LSPs. It provides novel Malaysian empirical data, thus adding to the literature about regional logistics, which has been underserved relative to more developed economies.

6.2 Practical Implications

The results can be useful to the services providers in logistics to enhance their competitiveness. In particular, LSPs are advised to focus on geographical network expansion and the increase in the availability of services in underserved areas. Although cost and speed of delivery are crucial tools of operations, the data points to the aspect of location coverage as the critical determinant that forms the long-term alliances with e-commerce companies. These insights can also be useful to the policymakers to develop infrastructure and regulatory frameworks that will support inclusive and sustainable e-commerce development in Malaysia.

6.3 Originality and Innovation

The novelty of the current paper is its focus on location as the most powerful factor- unlike much of the world literature, which tends to focus on cost and service efficiency. In this study, it is established that in the Malaysian context where urban-rural differences are still pronounced, logistical coverage and accessibility are more important than conventional

efficiency indicators. The novelty of the work is the combination of TRA and logistics decision-making offering a behavioral orientation expanding the focus area of e-commerce and supply chain studies.

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