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Investigation and Analysis of Omnichannel Logistics Models: A Study in The Electronic Retail Industry in Indonesia

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ABSTRACT

The retail industry has undergone several transformations over the years. There are three types of retail channel from a logistical perspective. The first type is single-channel logistics, where retail traders operate one sales channel, and the logistic system is dedicated for one channel. The second type is multi-channel logistics, where retail traders use several channels, such as store and direct sales. The third type is omni-channel logistics, where retail buyers and traders do not differentiate channels. Shared logistics management is usually available through e-commerce and online sales. The objectives of this research are to investigate the retail transformation trend from offline retail traders to multi/omni-channel logistics and identification of suitable business strategy. Empirical quantitative approach is conducted in the form of a survey, which collected 114 data from electronic retailers. The data consists of 70 retail stores with offline and online stores and the other 44 respondents are retail stores with only offline stores. The result of the analysis shows that most retail transactions are offline transactions where buyers have to go to the retail stores to claim their products. However, there is sufficient empirical evidence that, in terms of financial performance, retailers that use multi-channel logistics have the best financial performance, followed by omni-channel and offline stores only. Three critical factors have been identified to contribute to the total retail sales increase. Firstly, price discrimination in product delivery, secondly, the existence of dedicated resources (space and staff) that are optimally used in terms of work time efficiency and buyer service, and thirdly, the ability for consumers to see every goods or stocks in all retail shops/warehouses.

Keywords: e-*commerce, B2C, multi-channel, omni-channel, logistics.*

1. INTRODUCTION

Retail has undergone several transformations over the years and encountered many shifts. The leading cause is as a result of the digitalization that is happening in business, transforming all processes and, as an effect, consumer behavior (Ohmori *et al.,* 2019; Waker *et al.*, 2018). The internet has proliferated as a commercial tool for retail owners in conducting business. The advancement in technology and internet connection infrastructure that is easily accessible by smartphones has made Indonesian consumers increasingly confident in doing online transactions. Consumers are increasingly shifting from offline purchases to online transactions. The size of the online shopping market in Indonesia continues to increase, estimated at 8.59 billion US dollars in 2018, up from 5.78 billion US dollars in 2016 (Statista, 2018). The trend of e-commerce has given rise to many new express shipping services. However, shipping services still have problems including imperfect shipping systems, reduced service levels, inadequate customer databases, unimproved mode of operation, lack of scientific practice and efficiency in choosing patterns, shipping modes and packaging services.

Online retailing, also known as e-commerce, has dramatically increased the number of sales for the past two decades, both nationally and globally. These trends have prompted the immense development of Internet-based retail just as the difficulties and opportunities for the retail business. Amazon drove the way, setting up an incredible upper hand over generally retailers. In June 2017, Amazon reported it had procured Whole Foods, across the nation market chain in the United States, with almost 500 stores, for $ 13.7 billion in real money (Cusumano, 2017). It is found that omni-channel shoppers' spending is 15-30 percent bigger than traditional shoppers' (Murfield *et al.*, 2017). In addition, Zhang *et al.* (2019) indicated that consumer electronics is the most frequently ordered online item in Amazon.

There is a trend where buyers are increasingly engaging across multiple channels during their shopping process for the same product offered by retailers (Kokho Sit *et al.*, 2018). This development has made traditional stores also move to sell online to compete with online retailers that do not have physical stores. Increasing online retail slices compared to conventional retail happened mainly because traditional retailers slowly shifted their activity to e-commerce, thereby increasing turnover from their online sales. Despite

traditional retailers' adoption to online sales, physical stores continue to act as primary shopping venues. Recent research by IBM (2015) has shown that the combination of offline and online retail enables traditional stores to provide resistance to genuine online retail traders. The study found that physical stores, used the right omni-channel model that has digital integration throughout the organization, achieve service level that cannot be matched by pure online retail traders. A recent study by Uvet (2020) identified that enabling integration in logistics operations, coupled with information sharing has also been found to increase customer satisfaction.

A retail channel determines the way a retailer sells and delivers goods and merit to its customers (Levy *et al.*, 2019). Hübner *et al.* (2016) defines three types of retail channel from a logistical perspective. The first type is single-channel logistics, where retail traders operate one sales channel, and the logistic system is dedicated for one channel. The second type is multi-channel logistics, where retail traders use several channels, such as store and immediate sales. Generally, multi-channel logistics have separated systems for operation and logistics. Buyers get products either in the store or through direct delivery. Operational and logistical processes are not integrated. An example is retail traders who have offline stores and online stores that serve buyers without operational coordination or exchange of goods between channels. The third type is omni-channel logistics, where retail buyers and traders do not differentiate channels (Bell *et al.*, 2014; Brynjolfsson *et al.*, 2013; Verhoef *et al.*, 2015). Simultant logistics management is available; for example, orders via e-commerce can be processed through an offline store or items in the store are used for shipping online sales. The integration of all channels (physical, online and mobile) allows customers to shop seamlessly across channels (Jocevski, 2019). **Figure 1** provides an illustration and the difference between the three types of logistics channels.
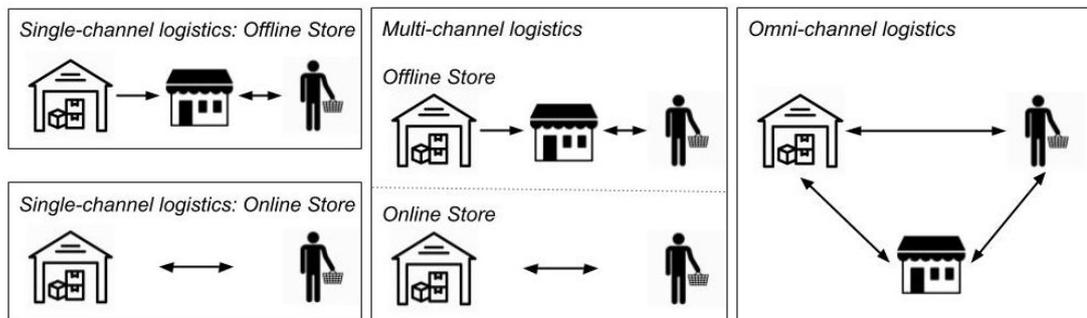
Figure 1 Types of Logistic Channels

According to Zhang *et al.* (2018), the need to understand the multi-channel and omni-channel strategies is not new. Companies should be mindful that besides managing their channels, they need to be aware of other policies that will affect their performance. Regardless of the channels used, technology is crucial for retailers, play its role in how they sell their goods and deliver them. Technology enables a customer to connect with the business on websites, smartphones, PC or laptop, on TV and in-store (Saghiri *et al.*, 2017). Here, customers can submit their requests in a single channel, e.g., on a smartphone, then pick up the purchased product through another channel, e.g., home delivery, and return items in a third channel, e.g., physical store (Brynjolfsson *et al.*, 2013; Saghiri *et al.*, 2017). The challenge is to build a business that utilizes these multi channels including inside logistics coordination of retailers and in the structure and procedures of the store network/supply chain. It is also important to investigate why and how retailers use a single-channel logistics model to multi-channel and omni-channel logistics. There is an urgency to examine the logistics model (as a combination of logistical variables) that is optimally used by retail companies in implementing omni-channel logistics strategies. The study by PWC (2015) shows that omni-channel logistics strategies are essential for the success and prosperity of the future of the retail industry.

The purpose of this study is to determine the application of single-channel, multi-channel, and omni-channel logistics models in the electronic retail industry in Indonesia and by using logistics variables, analyze logistics strategies for these various types of electronic retail stores. Thus, three research questions are developed to address the issues, i.e., how these different types of logistics model have been implemented in the electronic retail, which type of retailers have better business performance, and what business logistics models are suitable to be applied in electronic retail in Indonesia.

The change in the business paradigm from brick-and-mortar business to online / internet business has caused problems in managing the logistics system and distribution of goods delivery. The omni-channel logistics concept is a new reference for winning the competition. Therefore, a comprehensive scientific study is required to understand the ideal omni-channel logistics model in the Indonesian perspective and is highly competitive. Existing logistical models must be tested or validated for both endogenous and exogenous variables that influence the optimization of logistics management.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The use of the internet as a commercial media has developed rapidly, especially for retail traders, in conducting business activities. These business activities, known as e-commerce, have managed to increase sales significantly over the past two decades in all major markets, both national and global. Zwass (1996) defines e-commerce as "business information disclosure, maintaining business relationships, and conducting business transactions through telecommunications networks." E-commerce uses an

electronic transaction payment system, generally through the internet or cellular media, where consumers use computers and smartphones to get information and shop online. E-commerce processes and activities are a union of business processes, information processes, payment processes, and logistics (Xianglian & Hua, 2013).

Logistics is essential in e-commerce business because it affects various performance measures such as product and service availability, communication speed between buyers and sellers, lead time, scope of activities, flexibility and reliability of supply (Kadlubek, 2015). The study by PWC (2015) mentions that there are three crucial conditions to be considered for the success of the omni-channel logistics strategy. First is the readiness of technological infrastructure. This readiness is assessed from the sophistication of network and communication technologies such as the use of mobile Internet broadband and smartphone penetration; services that offer products and product promotions to buyers according to where they are; sophisticated application that can provide depth of product information, buyer reviews, and price comparisons. Second is the ability to meet high buyer expectations. Buyers may demand the same online shopping experience as shopping offline. Third is the readiness of retailers themselves. To run the omni-channel model, retail traders need to transform their thinking, including renewing organizational culture. They must be able to strategize and treat online and offline businesses as a whole system integration, application development, and innovation to attract buyers into the company's ecosystem.

According to Euromonitor International (2020), the e-commerce in Indonesia has shown significant growth in the last 5 years, which can be seen in **Table 1**. The main reason for this growth is the fact that Indonesia's population is increasingly connected to the internet. This is due to the massive construction of telecommunications infrastructure and the reduced cost of subscribing to internet connections, whether using a mobile phone or at home.

Table 1 Sales in the e-commerce market in Indonesia

Unit	2014	2015	2016	2017	2018	2019
USD million	2.065,5	2.817,5	4.003,6	8.241,2	12.669,5	19.725,1

Euromonitor International (2020) also reported that retail was the most important industry for digital commerce in Indonesia, with estimated sales of IDR 19 billion in 2019. Revenue in the e-commerce market is projected to reach US$30 billion in 2020 (Statista, 2020). The prices of mobile devices such as smartphones have become increasingly affordable these days, and explains why sales at electronics retail are high. On the other hand, the increase in smartphone users has also led to the growing number of Indonesians connected to the Internet, and this has increased the opportunity to conduct e-commerce transactions.

The electronic retail industry, which is the focus of this research, is consistently the second largest digital commerce market segment in Indonesia after fashion (see **Table 2**). This data shows the important role of the electronic retail industry in Indonesia. It also inherently explains the potential opportunities of using omni-channel logistics strategy to

improve the performance of traditional electronics retailers, both in terms of single stores and in supply chain networks.

Table 2 The five largest digital commerce market segments in Indonesia (adapted from (Statista, 2020))

Rank	2017	2018	2019	2020
1	Fashion	Fashion	Fashion	Fashion
2	Electronics & Media	Electronics & Media	Electronics & Media	Electronics & Media
3	Toys, Hobby & DIY	Furniture & Appliances	Furniture & Appliances	Food & Personal Care
4	Food & Personal Care	Toys, Hobby & DIY	Toys, Hobby & DIY	Furniture & Appliances
5	Furniture & Appliances	Food & Personal Care	Food & Personal Care	Toys, Hobby & DIY

The main activities in electronic commerce generally consist of payment and logistics information platforms (Hua & Jing, 2015). The logistics part in e-commerce is not only to support the platform or to engage the last link of e-commerce; it is also happened to be the most crucial factor in the success of e-commerce. However, once the necessary infrastructure is available, the biggest obstacle lies in the readiness of retail traders to invest in a specific technology that helps the adoption of omni-channel logistics strategies and make customer experience it (PWC, 2015). One of the most significant drivers for selling goods online is the best logistical strategy choice (Ghezzi et al., 2012).

It is a general idea that logistics involves transferring physical goods from one location to another (Lummus et al., 2005). Logistics is the process of planning, implementing, and controlling the flow of goods or services and related information from the origin to consumption point according to the buyer's request. Joong-Kun Cho et al. (2008) stated that there is a positive relationship between logistics performance and company performance in the e-commerce market. Logistics performance is a critical requirement to produce superior company performance in the world of e-commerce.

Previous studies suggest three logistics models: the Classical Logistics Model, the Logistics Model with the Integration of Functions and Processes, and the Omni-channel Logistics Model. The Classical or Traditional Logistics Model starts from the order transaction by the customer, continues with a trip to the store, picking up the goods which are continued from the distribution center to a smaller distribution place, then directly to the destination (customer). The second logistics models have function & process integration (Saghiri et al., 2017). In the model, there are four main processes for logistics, namely Pre-Purchase (relating to integrated promotion), Payment (relating to transactions and built-in pricing), Delivery (relating to integrated order fulfillment), and Return (relating to reverse logistics).

The third is the omni-channel logistics model suggested in the study of Marchet *et al.* (2018). The omni-channel logistics model shows four sets of processes, namely delivery services, distribution setting, fulfilment strategies, and return management (see **Table 3**). In the delivery service process, there are four logistical variables, namely delivery mode, speed, time slot, and slot price differentiation. Furthermore, in the distribution arrangement process, there are three variables, namely choosing locations, shipping areas, and transportation services. In the third process, namely the fulfilment strategy, there are three variables consisting of automation, integration, and order allocation. Whereas for return management, there is the only logistics variable, namely the return mode.

Table 3 Omni-channel Logistics Model

Strategic Area	Description	Logistics Variable
Delivery Service	Refers to how retailers deliver products to customers and how customers receive products	Delivery Mode
		Velocity
		Time Slot
		Slot Price Differentiation
Distribution Setting	Refers to where customer orders are taken, the order delivery area for each logistics facility, and how transportation services are selected	Picking Location
		Delivery Area
		Transport Service
Fulfilment Strategy	Refers to how pickers prepare customer orders and how resources (space and staff) are used to fulfill orders	Automation
		Integration
		Order Allocation
Returns Management	Refers to how the retailer manages the return of goods or implements a return policy	Returns Mode

Based on these three logistic models, we find that the omni-channel logistics model (Marchet *et al.*, 2018) offers a more comprehensive logistic model for managing logistics management. This model has also been adapted in various retail industries, including electronic products (Buldeo Rai *et al.*, 2019); this means each variable is suitable for a study in the electronic retail industry. Besides, because this model has just been published, this model is considered more suitable for the current situation and set as the focus of this research.

From the results of the literature review above, a research framework was developed to examine the relationship between the logistics variables identified in the literature review and their effects on the performance of the electronic retail business. The relationship between logistics variables and business performance is shown in **Figure 2**. According to the study from Hübner *et al.* (2016), there are 3 types of logistics channels, namely single, multi, and omni

channels. Based on this understanding, we divide electronic retail stores in Indonesia into 4 types, namely:
1. Offline only, no branches (single channel)
2. Offline only, with branches or warehouse (multi-channel)
3. Offline and online, no integration in meeting buyer orders (multi-channel)
4. Offline and online, with integration in meeting buyer orders (omni-channel)

It is important to investigate how the performance of retailers using single-channel logistics models for logistics versus those using multi-channel or omni-channel. As described by Zhang *et al.* (2019), there is a tendency for customers, especially buyers of electronic goods, to buy products online on e-commerce sites. Ghezzi *et al.* (2012) argue that selling goods online is one of the best logistics strategy choices. This opinion is also supported by a study by Marchet *et al.* (2018), which suggests that retailers switching from a single channel (offline or traditional) to multiple or omni-channel logistics model will offer more comprehensive logistics capabilities. Therefore, we want to test the hypothesis:

H₁: *Electronic retail sales performance is associated with the type of retailers*

Then we want to test how the differences in the implementation of the logistics strategy implemented by the 4 types of retailers are in accordance with the logistics variables proposed by Marchet (2018). Here we will discuss how delivery service, distribution settings, fulfilment strategy, and returns management are implemented by these electronic retailers. Previous research by Marchet (2018) is still in the form of qualitative tests, so by applying hypothesis testing using quantitative data, this research contributes to enriching and verifying the results of previous studies. Therefore we developed the following hypothesis tests:

H₂: *The implementation of delivery services differs from the type of retailer*
H₃: *The implementation of distribution setting differs from the type of retailer*
H₄: *The implementation of fulfilment strategy differs from the type of retailer*
H₅: *The implementation of returns management differs from the type of retailer*

The results of these five hypotheses will allow the analysis to find answers to the research question of how retailers have evolved and what logistics strategies are used to get the best performance.

3. METHOD

This study consists of four stages: first, the definition of the scope of the relevant research from the perspective of omni-channel logistics. Second, literature studies to understand the development of the latest research for the range of research. Third, identification of gaps in existing studies to create survey research designs. The fourth and final stage is to carry out the survey research.
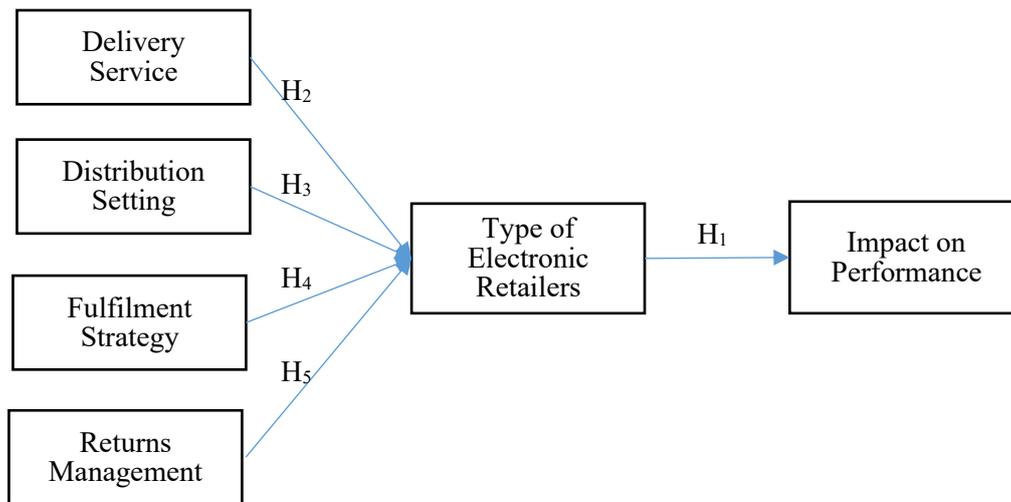
Figure 2. Research framework

This study uses an empirical quantitative approach in the form of a survey. Surveys are quantitative research methods that use a standard format, e.g., questionnaires, which are used to define or explain variables, and to analyze relationships between variables (Malhotra & Grover, 1998). The research framework was adapted from the study by Marchet *et al.* (2018), consisting of four areas of the company's logistical decisions, namely: delivery services, distribution setting, fulfillment strategy, and returns management. Each logistics decision field (also called endogenous variable) consists of different logistical variables (also called exogenous variables) that represent the design parameters to be applied, with several options available for each variable. The first factor has four items that refer to delivery services. The second factor has three items that relate to distribution setting. The third factor has three items that apply to the fulfillment strategy, and the last is the fourth factor with 1 item that refers to the returns management.

The survey questionnaire prepared in this study will be distributed to the respondents, i.e., companies engaged in the retail industry. The use of companies as respondents in logistics research was common in past studies, i.e., study by Joong-Kun Cho *et al.* (2008), Ghezzi *et al.* (2012), and Marchet *et al.* (2018). The survey data obtained will then be analyzed using descriptive statistical analysis and parametric statistics to identify dominant factors and see the relationships between variables to get answers to the research questions set for the purpose of this study.

4. RESULTS AND DISCUSSION

This study, based on the results of a survey of traditional retailers, describes the stage and operational nature of their logistics operations and check the statistical profile of traditional retailers. Differential demographic, behavioral, and attitudinal characteristics of respondents are provided. From 114 respondents, 70 respondents (or 61.4% of total respondents) are retail stores that have both offline and online stores. This finding is relevant with a study by Statista that shows an increasing trend of online sellers or

marketplace. There are 42 respondents, whose store profiles are offline and online, have integration in fulfilling buyer orders. This profile has the highest number of respondents compared to the other patterns, and it represents 36.8% of total respondents. The other 28 respondents are stores that do not have integration between their offline and online-based operations. Then, there are 44 respondents who only have an offline store, either with no branches or with branches/warehouse. The distribution of respondents suits the objective of this research in the context of omni-channel logistics. **Table 4** presents the respondents' profile.

Table 4 Frequency distribution of respondents

	Frequency	Percentage
Offline only, no branches	23	20.2
Offline only, with branches or warehouse	21	18.4
Offline and online, with integration in fulfilling buyer orders	42	36.8
Offline and online, no integration in fulfilling buyer orders	28	24.6
Total	114	100.0

All respondents were retailers located in the Great Jakarta area, and focusing their business on electronic devices. Most are doing business in big shopping malls in central Jakarta and the rest are small street stores. From the total of 114 respondents, there were more male respondents than female respondents. There were 63 male respondents (55.3% of total respondents), while the remaining 51 people were female respondents (44.7% of total respondents). **Table 5** presents the frequency of respondents' job status. 71.9% of respondents were permanent workers (82 people). This is the highest number compared to other employment statuses. Then 13.2% of respondents are part-time workers. There were also respondents who owned the retail shop. These

respondents were divided into 2, which were owners who worked full time (10.5%), and owners who worked part-time (2.6%). Two respondents (1.8%) were relatives to the store owner. Therefore, 97 respondents (85.1%) whose status were workers and 15 respondents (13.1%) whose status were shop owners.

Table 5 Type of respondent's job status

Respondents job status	Frequency	Percentage
Store owner (work full time)	12	10.5
Store owner (work part-time)	3	2.6
Family (Child, Wife, Close relative)	2	1.8
Permanent worker (Staff)	82	71.9
Part-time worker	15	13.2
Total	114	100.0

Customers of the respondents are end customers, resellers, or both of them. Most respondents (69.3%) are retail stores that have both end customers as well as resellers. Some stores that only serve end customers (28.9%), while only two stores serve only resellers (1.8%). **Table 6** presents the type of product sold by respondents. From 114 respondents, there were 107 respondents expressed their primary products and 98 respondents who also expressed their secondary products. Handphone has the highest number as primary product, followed by laptop, handphone accessories, computer accessories, PCs, and laptop accessories. No respondents mention tablets for primary products. For secondary products, handphone accessories are the highest, followed by laptop accessories, computer accessories, laptops, PCs, mobile phones, and tablets. Therefore, it is reasonable to assume that the items that most often sold by our respondents from the survey results are handphone and handphone accessories.

Table 6 Type of product sold by respondents

Type of product	Primary	Secondary	Total
Handphone	40	9	49
Laptop	33	10	43
PC	9	10	19
Tablet	0	1	1
Handphone Accessories	11	34	45
Laptop Accessories	4	22	26
Computer Accessories	10	12	22
Total	107	98	

Handphones and Laptop are the two most popular products for electronic retailers. As can be seen from **Table 7**, offline and online stores without integration in fulfilling buyer's orders has the highest range of average revenue for both products. The second rank is offline only stores with branches/warehouses for handphones and Offline and online stores with integration for laptops. Stores with the lowest average revenue are offline only stores without branches for both products. Thus, it is reasonable to assume that handphones and laptops are best sold in offline and online stores without integration in fulfilling buyer's orders.

The result of the analysis also shows that most transactions (80%) are offline, which means that buyers have to go to the retail stores to claim their products. This finding is different from other studies by Murfield *et al.* (2017) who say that online spending is 'greater than traditional spending'. This is possible because their study was conducted in the United States which has a better e-commerce implementation compared to Indonesia. Although offline and online stores without integration in fulfilling buyer's orders have the highest sales among other types of stores, only about 10% of the transaction is an online transaction. Multi-channel retailers tend to have more significant revenues than omni-channel retailers. The main reason for this phenomenon is probably the multi-channel retailers are most likely big stores, while omni-channel retailer is a new thing in Indonesia; these stores tend to be in the development stage. This finding supports previous study by IBM (2015) where a combination of offline and online retail enables traditional stores to provide resistance to genuine online retail traders. However, this finding is different from the PWC study (2015) which shows the omni-channel logistics strategy is already important for the retail industry.

Table 7 Handphone and Laptop Sales per-Retailer

Type of Retailer	Average Monthly Sales (in hundred million Rupiah)	
	Handphone	Laptop
Offline only, no branches	2.80	2.25
Offline only, with branches or warehouse	5.18	3.00
Offline and online, with integration in meeting buyer orders	3.57	4.25
Offline and online, no integration in meeting buyer orders	5.90	4.82
Average	4.50	4.00

The subsequent analysis is inferential statistics using SPSS. The first analysis is to test whether different types of store's profile have any differences in sales (see H_1 in the research framework). Using ANOVA test, we find F-value = 3.967 and a small p-value = 0.01. It means at alpha 5%, reject the null hypothesis. There is at least one store's profile that has a different amount of sales. Based on the descriptive statistics, offline and online stores without integration has the highest monthly revenue, which is Rp. 200-250 million and

the lowest is offline only retailers without branches with a range of monthly revenue Rp. 50-100 million. These suggest that retail stores in Indonesia may not need omni-channel logistics system. The logistics performance of a company can be improved by entering the e-commerce market or online, without the need to integrate with existing operations.

Table 8 presents further ANOVA tests (Post Hoc Tests) using Tukey's HSD. Post Hoc Tests using Tukey's HSD which compare offline only retailers (no branch) with offline-online retailers (no integration) shows small p-value (0.007). This also confirms that retailers with offline only operations (single channel) have different sales performance compared to retailers that combine offline and online operations (multi-channel).

Table 8 Post Hoc Tests using Tukey's HSD

(I) Profile	(J) Profile	Mean Diff (I-J)	Std. Error	Sig.
Offline only, no branches	Offline only, with branches or warehouse	-1.827	0.786	0.1
	Offline and online, with integration in fulfilling buyer orders	-1.149	0.687	0.344
	Offline and online, no integration in fulfilling buyer orders	-2.451*	0.740	0.007

Dependent Variable: Monthly sales revenue
* The mean difference is significant at the .05 level.

The second hypothesis test is to understand delivery service where different types of retailers may have any differences. The objective is to how retailers deliver products to customers and how customers receive products. Here, four logistics variables (see **Table 3**) are considered, i.e., delivery mode, velocity, time slot and slot price differentiation. After conducting an ANOVA test, the summary of result is presented in **Table 9**. The result shows that there is a significant p-value for delivery mode variable (at $\alpha=0.05$) and time slot (at $\alpha=0.10$). Subsequent analysis using post-hoc Tukey's HSD test showed that offline-online retailers (no integration) shows significant differences compared to other type of retailers in terms of how the goods are picked up by the consumer at the seller's retail store (delivery mode variable) and whether there is time slot for delivery of ordered products (time slot variable). Thus, it can be concluded that Offline and online, no integration in meeting buyer orders retailer offering a more diverse range of delivery services, be it in the form of the buyer picking up the goods in the store or the goods will be delivered to the buyer's location, but the buyer does not have to specify the hour / time the purchased item is received.

The third hypothesis test (H_3) is to understand distribution setting where different types of retailers may have any differences. Here three logistics variables are considered, i.e., picking location, delivery area, and transport service. The objective is to understand where customer orders are taken, the order delivery area for each logistics

facility, and how transportation services are selected. An analysis of variance (ANOVA) on these scores again yielded significant p-value (at $\alpha=0.10$) for picking location and delivery area variables. The summary of result is presented in **Table 10**. Post-Hoc Tukey's HSD analysis shows that offline-online retailers (no integration) presents significant differences compared to other type of retailers in terms of usage of warehouse in branches so that goods can be scattered and not piled up (picking location variable) and whether the retail market cover national area or not (delivery area variable). Thus, it can be concluded that Offline and online, no integration in meeting buyer orders retailer does have differences in terms of warehouse usage and distribution coverage (locally or nationally).

Table 9 ANOVA Results for Delivery Service

Type of Retailer	ANOVA with Post-Hoc tests			
	Delivery Mode	Velocity	Time Slot	Slot Price Differentiation
Offline only, no branches (*)	Non-Significant	Non-Significant	Non-Significant	Non-Significant
Offline only, with branches or warehouse (**)	Non-Significant	Non-Significant	Non-Significant	Non-Significant
Offline and online, with integration in meeting buyer orders (***)	Non-Significant	Non-Significant	Non-Significant	Non-Significant
Offline and online, no integration in meeting buyer orders (****)	Significant (*) 0.002 (**) 0.006 (***) 0.020	Non-Significant	Significant ($\alpha=10\%$) (*) 0.002 (**) 0.001 (***) 0.081	Non-Significant

The fourth hypothesis test (H_4) is to understand Fulfilment Strategy where different types of retailers may have any differences. The objective is to understand how retailers processed customer orders are and how resources (space and staff) are used to fulfill orders. Three logistics variables are used, i.e., automation, integration, and order allocation. The summary of ANOVA test result is presented in **Table 11**. The result shows that there is a significant p-value for integration (at $\alpha=0.05$) and order allocation (at $\alpha=0.10$) variables.

Since the all p-values is less than alpha (0.05) for integration variable, it can be implied that researcher rejects H_4 or there is at least one store type that has differences in the existence of dedicated resources (space and staff) that are optimally used in terms of working time efficiency and buyer services. As can be seen from **Table 11**, the intended retailers

is Offline and online, with integration in fulfilling buyer orders. Descriptive statistics show that 50% of this type of retailer has optimally used dedicated resources to fulfill buyer orders, a higher percentage figure than other types of retailers. Researcher presumes that for these stores it is necessary to have dedicated resources (space and staff) in order to stabilize their sales with their stocks and their lead times. Customers may use offline / online channels dynamically to order products, and because the stock and systems between each channel are already integrated, it is important for retailers to control stock availability and lead times. **Table 11** also shows that Offline stores only, no branches retailer have significant differences compared to other types of retailers, for order allocation variable. It is acceptable if there is a difference here because descriptive statistics show that this type of retailer is the only retailer without a separate store branch or warehouse to store products.

The fifth and last hypothesis test (H_5) is to understand Returns Management where different types of retailers may have any differences. Here a logistics variables are considered, i.e., returns mode and after conducting an ANOVA test, the researcher gets a big p-value or non-significant, we fail to reject H_0. Thus, it can be concluded that every retailer does not have any differences in terms of how the retailer manages the return of goods or implements a return policy (see **Table 12**). The data shows that most retailers use a policy where the buyer comes to return goods to the retail store where the buyer makes a purchase. Based on the descriptive statistics, this policy is applied in 64.8% of cases in offline only, no branches retailers, 66,2% of cases in offline only, with branches or warehouse retailers, 85.5% of cases in offline and online, with integration in meeting buyer orders retailer and 67.6% of cases in offline and online, no integration in meeting buyer orders retailer. In other less popular cases, retailers may be able to use a return mode such as a no return policy or buyers return items using a third party shipping service.

Table 10 ANOVA Results for Distribution Setting

Type of Retailer	ANOVA with Post-Hoc tests		
	Picking Location	Delivery Area	Transport Service
Offline only, no branches (*)	Non-Significant	Non-Significant	Non-Significant
Offline only, with branches or warehouse (**)	Non-Significant	Non-Significant	Non-Significant
Offline and online, with integration in meeting buyer orders (***)	Non-Significant	Non-Significant	Non-Significant
Offline and online, no integration in meeting buyer orders (****)	Significant (α=10%) (*) 0.052 (**) 0.062 (***) 0.034	Significant (α=10%) (*) 0.022 (**) 0.000 (***) 0.100	Non-Significant

Table 11 ANOVA Results for Fulfilment Strategy

Type of Retailer	ANOVA with Post-Hoc tests		
	Automation	Integration	Order Allocation
Offline only, no branches (*)	Non-Significant	Non-Significant	Significant (**) 0.000 (***) 0.000 (****) 0.000
Offline only, with branches or warehouse (**)	Non-Significant	Non-Significant	Non-Significant
Offline and online, with integration in meeting buyer orders (***)	Non-Significant	Significant (*) 0.018 (**) 0.010 (****) 0.000	Non-Significant
Offline and online, no integration in meeting buyer orders (****)	Non-Significant	Non-Significant	Non-Significant

This paper aims to identify the application of the omni-channel logistics model in the electronic retail industry in Indonesia and analyse various logistics strategies for single-channel, multi-channel, and omni-channel electronic retail stores. Several managerial implications can be identified from this study.

Table 12 ANOVA Results for Returns Management

Type of Retailer	ANOVA with Post-Hoc tests
	Returns Mode
Offline only, no branches (*)	Non-Significant
Offline only, with branches or warehouse (**)	Non-Significant
Offline and online, with integration in meeting buyer orders (***)	Non-Significant
Offline and online, no integration in meeting buyer orders (****)	Non-Significant

First, the findings from this study can be used in the electronics retail industry and academia by providing guidance on how to select the optimal logistics strategy among the choice of single, multi, and omni-channel logistics models. The results of the analysis show that cell phones and laptops are the two most popular products for electronic retailers. In terms of sales, single-channel offline electronics retailers are the lowest. Therefore, this study suggests that in order to sustain business growth, electronics retailers should consider switching from a single channel offline retailer to a multi or omni-channel retailer that offers better sales and financial performance. This finding supports previous research by Saghiri *et al.* (2017) who show that technology has enabled customers to connect with businesses across multiple channels and another study by Sit *et al.* (2018) who found that customers are increasingly

engaging with retailers across multiple channels during the same shopping process.

The second finding of this study is different from previous research by PWC (2015) and Jocevski (2019) which states that an omni-channel logistics strategy is important for the success and prosperity of the retail industry in the future. Also, Rouquet *et al.* (2018) who argue that retailers need to develop an integral "omni-channel" strategy and change from a multi-channel strategy. Based on the results of testing the first hypothesis, there is sufficient evidence that at least one store profile has different sales performance. The shop in question is an offline and online shop without integration, or a multi-channel logistics store. The results of descriptive data analysis show that this type of retail has the highest monthly income compared to other types of retail stores. This suggests that retail stores in Indonesia may not yet need an omni-channel logistics system. As suggested by Joong-Kun Cho *et al.* (2008), the logistics performance of a company can be improved by entering the e-commerce market or online, without the need to integrate with existing operations. A recent study by Saha & Bhattacharya, (2020) also found that customers are still heterogeneous in their assessment of the benefits of omni-channel retailers. To achieve flexibility in omni-channel offering requires high service integration costs, and these higher operating costs reduce the competitiveness of its business against non omni-channel competitors, especially multi-channel retailers.

The result of the hypothesis test can also imply that offline retail stores without any branch in Indonesia have two ways to increase their sales. The first way that can be done is by opening branches or warehouses in different places. However, this first way is hard to do due to the requirement of high capital. The second way that can be done is to open an online store to reach more customers in other places.

This study also tested the hypothesis to find out how the logistics operations of retail stores can be explained by the four logistics variables. From the four hypothesis testing (H2, H3, H4 and H5), there are significant results in H2 and H3 where offline and online stores without integration, or multi-channel logistics stores have differences with other types of stores. The difference is in terms of delivery and distribution service arrangements. Here this type of retail store has a difference in terms of:

- Offers a more varied delivery service, both in the form of pick-up of goods at the store and goods will be sent to the buyer's location, but the buyer does not have to specify the hour / time the item purchased is received.
- Utilization of warehouse in branches as locations for collecting and allocating supplies so that goods can be scattered and do not pile up.
- Reaching a broad national retail market.

Therefore, it is reasonable to assume that these differences in logistics approaches have enabled multi-channel logistics strategy, such as these offline and online stores without integration, able to perform better that other type of electronic stores.

Finally, as suggested in the results of the third hypothesis, this study demonstrates the importance of using dedicated resources when implementing omni-channel strategies in electronics retail. The results of this study

indicate that 50% of retailers of this type have used such resources to fulfill customer orders, a higher percentage figure than other types of retailers. Previous studies such as by Saghiri *et al.* (2017) mention the trend of customers using various channels such as websites, smartphones, PCs or laptops, on TV and in-store to connect with retailers. Here, the dynamic behaviour of customers increases uncertainty and therefore these stores need to have dedicated resources (space and staff) to stabilize their sales with their stock and waiting time.

5. CONCLUSIONS

This study shows the stage and operational nature of logistics operations in traditional electronic retailers. Differential demographic, behavioral, and attitudinal characteristics of respondents are provided. Handphones and Laptop are the two most popular products for electronic retailers. Omni-channel logistics strategy is increasingly popular in the electronic retail industry in Indonesia which is represented by 36.8% of store profiles providing offline and online services with integrated buyer order fulfilment, followed by multichannel retailers with 24.6%. However, offline and online stores without integration in fulfilling buyer's orders have the highest range of average revenue for both products while stores with the lowest average revenue is offline only stores without branches for both products. The result of the analysis also shows that most transactions (80%) are offline, which means that buyers have to go to the retail stores to claim their products. Multichannel retailers tend to have bigger revenues than omni-channel retailers and offline stores only. The main reason for this phenomenon is probably the multi-channel retailers are most likely big stores, while omni-channel retailer is a novel thing in Indonesia; these stores tend to be in the development stage. In addition, the implementation of omni-channel strategy requires extra cost, resulting in higher selling prices (Saha & Bhattacharya, 2020); and it is assumed that the market in Indonesia has not responded positively to the enhanced services. Therefore, implementing a multi-channel logistic strategy shows a favorable trend for the current situation while preparing an omni-channel logistic strategy for future development.

After conducting an analysis test using the SPSS application, it can be concluded that there are three important factors that can increase total sales and revenues of retail stores. These three factors are time slots that have different prices in product delivery, the existence of dedicated resources (space and staff) that are optimally used in terms of work time efficiency and buyer service, and the ability for consumers to see every good / stock in all shops / warehouses (not limited in only 1 shop). In the Marchet table (2018), time slots with different prices are the "yes" option in the delivery service category with the slot price differentiation logistics variable. The existence of dedicated resources (space and staff) that are optimally used in terms of work time efficiency and buyer service are the "capacity-optimized and integrated" option in the fulfilment strategy category with integration logistics variable. The last factor, which is the ability of consumers to see every good in all

shops/warehouses, is the "dynamic" option in the fulfilment strategy category with order allocation logistics variable.

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