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What's Up Omni?
The Relationship Between Omni-Channel Supply Chain and Logistics Service Quality in Influencing Online Purchasing Behaviour

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Abstract— **Consumer behavior had been affected by the evolution of digital technologies and the internet. Online shopping is becoming more popular, with e-commerce market growth that encourages the involvement of retailers. However, consumers' satisfaction is still the same as they request for a seamless and frictionless shopping experience, an 'Omni-channel supply chain.' Retailers need to understand the new phenomenon and how the concept is influencing customer purchasing behavior, especially online shopping. Several types of research had highlighted the importance of logistics service quality in predicting online purchasing behavior. Thus, this study investigates the relationship between the Omni-channel supply chain and logistics service quality in influencing online purchasing behavior. A survey-based approach is used to collect data from consumers about their perceptions. Overall, the study had enhanced the understanding of the relationship between the Omni-channel supply chain and logistics service quality with online purchasing behavior. Besides, the knowledge of online purchasing behavior in the Omni-channel context has enabled a retailer to allocate resources in designing new strategies.**

Keywords— *online purchasing behavior, omni-channel, supply chain, logistics service quality*

1.   Introduction

Over half of the century, Malaysia had sustained quick and comprehensive economic growth. However, it still needs to keep up with the developed countries, especially in the service sectors [1]. Besides that, the CEO of SME Corp. Malaysia, in 2015 underlines that Malaysian SMEs must continuously strengthen and develop themselves so that they have sufficient capacity and capability to conquer the obstacles and to compete with a competitor, not only locally, but globally too. Ergo, the effectiveness and efficiency of the supply chain in delivering their products is essential to sustain and compete in the market. It is time for companies need to rethink their supply chain or their business would not survive the global trend of highly customized customer and advancement of the internet [2]. Supply Chain Management is a process that includes planning, implementing, and controlling efficient, effective delivering and returning flow and storing of goods, services, and related information between the point of origin and destination to meet requests by customers [3].

The application of new technologies such as smartphones and increasing significance of online stores such as Lazada have created new opportunities and novel threats for brick & mortar retailers [4]. As the boundary between online and physical channels is blurred, a new concept, 'Omni-channel,' appears, which presents a seamless customer experience regardless of the channel (Fig.1). Based on the research by Mosquera, et al., shoppers used the omni-channel platform to spend 15-30 percent more than traditional shoppers and retailers. Companies with robust omni-channel customer service strategies had a 91 percent better customer retention rate than those with traditional channel strategies [5].
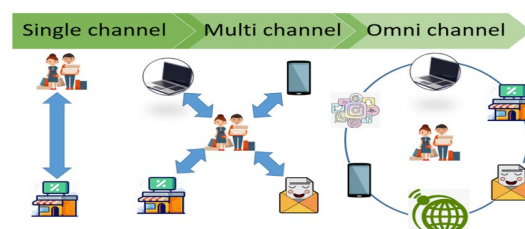

Figure 1: Overview of differences between Single, Multi-, Omni- Channel Weiland (2016)

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Customers will evaluate the purchasing process by the logistics service quality index. In other words, logistics service quality is an essential element in shoppers' behavior [6]. Therefore, in this paper explains the relationship between the Omni-channel supply chain and logistics service quality that influences online purchasing behavior. Understanding consumers' perceptions are the key for companies to understand where to allocate resources to adapt their logistics operations in executing an Omni-channel fulfillment strategy. Similarly, recent investigations into Omni-channel logistics issues highlight the unique nature of Omni-channel distribution and the need to explore customer responses to the shift from traditional to Omni-channel distribution processes [7].

2.   Literature Review
2.2   Consumer Purchasing Behaviour

In previous studies, there are ample researches to clarify the determinants that could predict consumer behavior. Purchase intention had been defined as a customer's willingness to purchase a particular good or service. The most popular theory that had been applied to explaining consumer behavior is the theory of planned behavior [8,9]. According to the theory of planned behavior, consumer behavior could be forecasted from its relevant intentions.

Besides the theory of planned behavior, based on the research by Mirabi et al. [10], they identified the purchase intention as a kind of decision-making process that figures out the reason for buying a particular product or engaging with the service provider. They had stated that the customers' purchase process is a complex model. It is always related to their behavior, perception, and attitudes. Purchase intention is a useful tool to predict buying behavior because the possibility of the consumer performing the behaviors relies on the strength of their intentions. So, the stronger the intention of the customer to perform a specific behavior, the higher the probability that s/he will perform the intended behavior [11], especially in the context of online shopping/purchasing.

2.3 Online Purchasing Behaviour

With the development of internet technology and online applications, consumers could easily experience the purchasing process online. Online purchasing had also been broadly defined as online shopping or online consumption that shows the process that sellers offer goods or services to their consumers while at the same time, delivering critical information on the goods or services that are being offered [12]. In the research of Uzan [13], the author mentioned that different shopping platforms or channels enabled different value propositions to the customers. Whereby customers could experience different shopping channels during the purchasing process [13]. During the purchasing process, a customer would go through need awareness, information searching process, decision-making process, alternative evaluation process, and post purchasing behavior [14]. The Omni-channel supply chain could provide customers with convenience and interaction in their shopping experience. There are many types of research that had investigated different channels of supply chain towards consumer behavior [15-16]. In the research of Pookulangara & Natesan [16], they discovered that the online channels have a positive relationship with customer behavior, particularly in providing the customer with a variation of services [15].

2.4 Omni-channel Supply Chain

Ailawadi & Farris mentioned that an omni-channel supply chain is the supply chain that provides a boundaryless and consistent buying experience across different channels and facilities [17]. In an Omni-channel environment, there are multifaceted mode of deliveries [18] from different platform or channel of distribution (drop shipments and pickup shipments). Payment services are also crucial in the Omni-channel context; giving multiple options [19] on payment modes affected customer online purchasing experience (bank transfer, online wallet, digital wallet, cash on delivery, and credit card). Furthermore, return management (exchange, refund, and free return services) has also been found to influence the online purchasing experience [4]. Meanwhile, from the customer's perspective, Omni-channel could provide them with more convenient ways to obtain information and transaction with the companies [5,20].

2.5 Logistics Service Quality (LSQ)

Service quality had been identified as an effort to understand from the perception of the variance between customer expectations and actual customer service by the attributes [21-22]. Logistics service

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quality can gain and maintain customers in the business by measuring the quality in terms of the service provided to derive customer satisfaction [22-23]. Based on past research, three standard dimensions are used to measure logistics service quality (LSQ), usually are availability, condition, and timeliness [16, 24] has different levels of importance in an Omni-channel context. Availability in the logistics service quality, as defined by Steinhart et al. [25], is the obtaining of sufficient goods to fulfill the amount that is requested by the customers. The availability also points to the responsiveness to the customers' needs and requirements [26]. Companies should have the capability to understand the needs and requirements of their customer orders and provide the service and information to fulfill their demand [7, 25-26].

Some researches stated the importance of the condition of the goods and services ordered. It is about the punctuality and quality of the order. Some researches include delivery accuracy and product condition in the dimension of condition for logistics service quality [27]. Product condition refers to the order condition and a part of the quality of the goods. The condition refers to the delivery of the product where it should be in the same quantity, quality, and arranged based on the request by the customers [16]. Nowadays, the case of missing items or damage to customers' orders is rampant. Most of the errors in shipments are caused by human error before packing the parcel [28]. Damaged products during delivery will influence the logistics service quality, thus influences customer behavior for decision making. If the product is damaged, it may divert the attention of the customer to other brands, which could provide a better condition of products [16, 26 - 29].

The most critical component in the logistics service quality is timeliness that had been defined as the receipt of the order by the customer at the speculated time [21, 23]. The concept of timeliness is divided into different components, such as the options of delivery time and date, the ability of fast delivery, and on the specific time slot and date [26-30]. Besides that, customers also prefer that the company could provide them with the availability of flexible delivery time based on the request of the customer. Due to the increasing customer expectations, timeliness had been defined as the dimension of logistics service quality that the

company should recognize [22-26]. The previous literature has concluded that two significant factors Omni-channel supply chain and LSQ has an impact on online purchasing behavior. However, those factors were investigated in a different context individually, and the paper tries to encapsulate them both in the logistics perspective (Fig. 2).
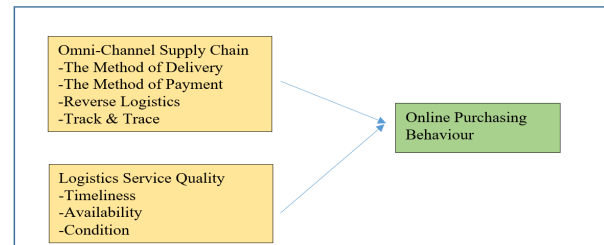

Figure 2: Theoretical Framework Adopted and Modified from Murfield, Boone, Rutner & Thomas (2017)

3 Methodology

In this study, a quantitative survey is used as it can compute the problem through generically numerical data and transform them into useable statistics [31]. The targeted sample population was among urban residents (North Klang Valley, Selangor, Malaysia) that at least had undergone an online shopping experience. The survey design used questionnaires distributed through an offline and online platform [31]. The online questionnaire was published through popular social media platforms, and a printed questionnaire was distributed in populated urban areas. The demographic profiles of the sample taken were diverse in their ethnic background (Table 1). There are 50.5% or 495 Malay respondents, 34.9% or 342 Chinese respondents, 7.9% or 77 Indian respondents, and 6.7% or 66 respondents of other races such as Ibans and other minorities. The same table also shows, there are 45.3% or 444 male respondents, while the rests are female. Akhlaq & Ahmed [32] stated that females are more willing to use the internet for online shopping compared to males because of their confidence and interest. There are 65.7% of the demographic age group between 21 to 30 years old. Some studies show that younger individuals have more experience with the internet, especially between 25 years to 36 years [33-34]. Older consumers are reluctant to purchase products online due to the resistance to change and lack of IT experience.

Table 1: Demographic profile (n=980)

		Frequency	Percent
Ethnicity	Malay	495	50.5
	Chinese	342	34.9
	Indian	77	7.9
	Other	66	6.7
Gender	Male	444	45.3
	Female	536	54.7
Age Group	<17	24	2.4
	17-20	84	8.6
	21-30	644	65.7
	31-40	190	19.4
	41-55	34	3.5
	>56	4	0.4

4 FINDINGS AND DISCUSSIONS

Reliability tests should be determined before the data could be used for research [35]. The Cronbach's alpha value derived from the study exceeded 0.7, which considered the variables can be trusted in the study [36] (Bhatnagar et al., 2014). In order to explore the relationship between Omni-channel SC (OC) factors and LSQ in determining online purchasing behavior (OPB), the use of Pearson Correlation analysis is essential to examine the relationship between numerous independent and dependent variables. The results in the table below had indicated the strength of the linear relationship between variables (Table 2). In this study, the Significant value (2-tailed) determines whether the two or more variables have statistical significance. If the Sig (2-Tailed) values of the table are larger than 0.05, there is no statistically significant correlation between the variables. Thus, if the Sig (2-Tailed) value is less than or equal to 0.05, this means that there is a statistical significance between variables.

Table 2. Pearson Correlation Table (n=980)

Factors	Online Purchasing Behaviour (Sig. 2-tailed)
OCDelivery	0.386**_(0.000)
OCPayment	0.468**(0.000)
OCReverse	0.658**(0.000)
OCTrackTrace	0.610**(0.000)
LSQTimeliness	0.731**(0.000)
LSQAvailability	0.765**(0.000)
LSQCondition	0.787**(0.000)

Based on the table above, the condition of logistics service quality has the most definite relationship with online purchasing behavior (r=0.787), followed by the availability of logistics service quality (r=0.765) and timeliness of logistics service quality (r=0.731). After that, the Omni-channel supply chain of sales return and track and trace have a moderate relationship with online purchasing behavior, which is r=0.658 and r=0.610. However, the method of delivery has the weakest linear relationship with online purchasing behavior (r=0.386), while the method of payment is the second weakest (r=0.468). Customers will be more likely to buy if the retailers could provide sufficient methods for customers to track and trace their orders. This finding indicates that a high level of a method of track and trace gives better encouragement for the customers to make a purchase, consistent with the researches, which revealed that method of track and trace is significantly related to online purchasing behavior. Tracking directly by the company's website, email, or text notifications are the most critical tracking service for customers. Customers had also viewed that mobile is essential in track and trace methods, as they want text notifications using a tracking number and text alerts of when their shipment will be delivered [2]. Therefore, the desire of customers to control their shipments had been included as a significant factor in predicting online purchasing behavior [21-26].

Furthermore, it is found timeliness has a strong linear relationship with OPB that similar to the findings of [22-29]. Timeliness had been highlighted as the most important key to drive the purchasing behavior of consumers in the United States [24]. At the same time, it will improve the satisfaction and loyalty of customers, and they will be more likely to repurchase from the retailers [24-28], indicating that timeliness of logistics service quality plays an important role to predict the online purchasing behavior. The relationship of availability of logistics service quality with online purchasing behavior is tested. Results in previously showed that availability has a positive linear relationship with online purchasing behavior, with that r=0.765 and p=0.00 being significant, in line Steinhart et al. [25]. The study confirmed that purchasing decision is triggered by the product availability which the consumers could decide to buy or otherwise. Uzan [13] also indicated that product availability is an essential factor as online shopping will be convenient for consumers to find products available to them. From this research, we can see that high involvement of availability in the construct for online purchasing behavior that aligns with findings from [24-28].

The product condition is also found statistically significant to OPB, which is parallel to findings of other studies that customers will be loyal to purchase if retailers could always provide products in good condition when they buy online [22-24]. Furthermore, Ayensa et al. [19] stated that conditions had influenced consumers' behavior in terms of purchase, repurchase, and switching intentions. Order conditions also have an indirect relationship to influence the purchasing behavior of consumers [1, 10-12]. Furthermore, to extend the analysis in examining the interaction between OC

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and LSQ in determining the OPB, multiple regression analyses are the best to test the framework by applying the details of independent variables on the accuracy of predicting the dependent variables [39].

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.835ᵃ	0.697	0.694	0.43908

a. Predictors: (Constant), LSQCondition, OCDelivery, OCTrackTrace, OCPayment, OCReverse, LSQTimeliness, LSQAvailability

The table above shows that R2 is 0.697, meaning that 69.7% of online purchasing behavior (dependent variable) can be explained by the method of delivery, method of payment, method of sales return, method of track and trace, timeliness, availability, and condition (independent variables). Based on Moore et al. (2013), R2 >0.7 is generally considered a strong effect size. Thus, 0.697 of value R2 showed that the OC factors are strong in predicting the trend of online purchasing behavior (Table 3).

Table 4: ANOVA & Coefficient table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	430.353	7	61.479	318.887	0.000ᵇ
	Residual	187.394	972	0.193		
	Total	617.747	979			

a. Dependent Variable: Online Purchasing Behaviour
b. Predictors: (Constant), LSQCondition, OCDelivery, OCTrackTrace, OCPayment, OCReverse, LSQTimeliness, LSQAvailability

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.801	0.117		6.818	0.000
	Method of Delivery	**0.069**	**0.015**	**0.115**	**4.518**	**0.000**
	Method of Payment	0.030	0.020	0.042	1.465	0.143
	Method of Sales Return	0.030	0.026	0.035	1.142	0.254
	Method of Track & Trace	0.018	0.023	0.022	0.774	0.439
	LSQTimeliness	**0.218**	**0.032**	**0.246**	**6.879**	**0.000**
	LSQAvailability	**0.129**	**0.036**	**0.140**	**3.608**	**0.000**
	LSQCondition	**0.390**	**0.033**	**0.393**	**11.903**	**0.000**

a. Dependent Variable: Online Purchasing Behaviour (OPB)

The F-value of 318.887 is significant at the 0.05 level. Thus, predictor variables such as the method of delivery, method of payment, method of sales return, method of track and trace, timeliness, availability, and condition are significant predicting the online purchasing behavior ($P < 0.05$). According to the result above, the method of delivery has a positive and significant impact on online purchasing behavior (Beta=0.069). The beta of the method of payment, sales return, and track & trace are 0.030, 0.030, 0.018, while the variables are not significant as P is larger than 0.05 (P=0.143, P=0.254, P=0.439). Due to the insignificant value, these variables may not be the predictor factors. However, they show a significant relationship in Pearson correlation analysis, and they serve more as underlying rather than predictor factors. Thus, using a multivariate analysis of variance to determine the characteristics of variables. From the

aspect of logistics service quality, the variables show a strong determinant factor on OPB with timeliness (beta=0.218), availability (beta=0.129), and condition (beta=0.390), and the variables being significant (P=0.000). Product condition, having a larger effect on the OPB, indicates that every unit that increases in product condition will increase 0.390 in OPB. The finding corresponds with the study of [38, 47-48]. A customer could choose their preferred method of delivery for online shopping, which is the one with the most convenient [43-45]. Consumers expect a delivery method that delivers fast, conveniently, and at low price and time saving. These are the primary reasons they are willing to shop online [1, 3, 10-11, 19, 25, 50-51].

Besides that, the findings correspond with the studies of [38-40, 50-51], which proved that method of payment influences the online purchase behavior because consumers are concerned with the reliability and security of payment system [40-44, 50-51]. Adrita and Shahjahan [38] had shown in his research that the dark sides of online payment, such as complexity in the online payment system and lack of trust and privacy in the payment system, would discourage consumers in online purchasing. Furthermore, reverse logistics is found significant predictor as [40-44, 50-51]. Consumers will analyze online stores for their return policies and options before they purchase any products.

5 CONCLUSIONS

In conclusion, this study had proved that the framework is significant in predicting online purchasing behavior. The findings had shown that the Omni-channel supply chain should be applied to the business model to fulfill customers' needs. Customers look forward to a seamless and holistic purchasing experience without limitation of channels because of the technological advancement [38, 49]. However, the study also had shown the importance of logistics service quality, such as timeliness, availability, and condition consist of the Omni-channel context towards the influence of online purchasing behavior. Thus, the understanding of the perception in online shopping is crucial for companies to make the right strategies and decisions to encourage and attract more customers to purchase online [24, 47]. Furthermore, this study also had provided a direction for future studies that focused on the Omni-channel context and considerations of logistics service quality in the supply chain that could empower the demand of customers.

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