

Article

A Holistic Perspective Model of Plenary Online Consumer Behaviors for Sustainable Guidelines of the Electronic Business Platforms

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Abstract: The holistic perspective model is a concept of three stages that considers the whole of online consumer behavior. It is based on dynamic aspects and overview measurement to demonstrate the preliminary of three stages, including “Pre-purchase”, “Purchase” and “Post-purchase”. There is a shared purpose for all the positive, negative, and hesitation factors that inhibit or encourage online shopping decisions. This model can capture the dynamic and fast-changing elements in online shopping platforms. Most online buying-selling platforms are gaining popularity and growing rapidly. Thus, they should maintain good levels of online customers’ satisfaction. This research presents a balanced investigation model of online consumer purchasing behaviors under uncertainty through the integration of Push-Pull Mooring (PPM) theory and the three stages of online consumer behaviors. In this study, questionnaires were collected from 525 online applications from experienced users of electronic business platforms. The outcome reveals that PPM affects three stages of online consumer behaviors. This means that PPM factors influence online customers during and after online shopping. This research can be used to develop attractive online shopping applications for prospective customers while retaining existing customers, which is the challenge faced by online shopping platforms.

Keywords: holistic perspective; electronic business platforms; Push-Pull Mooring; three stages of online consumer behaviors; dynamic behavior



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1. Introduction

Technology advancement has influenced people’s lifestyles in different ways. There have been many technological developments and inventions centered around living a convenient life. Technology is a fundamental tool for communication and it is constantly evolving. The internet and mobile phones are essential to most people’s lifestyles, including for communication and buying and selling products via online and offline channels [1,2]. There are three types of “Online commerce”, including “Electronic commerce” (E-commerce) [3–7]; “Mobile commerce” (M-commerce) [8,9]; and “Social commerce” (S-commerce) [10–15] which is generally known as “EMS Business.” [16]. Online commerce is an essential channel for the evolution of traditional trading and it offers various advantages. It changes customer behavior from offline shopping (going to the shop) to online shopping (Online commerce). At the same time, Online commerce could encourage buying–selling activity. According to the growth of E-commerce trends in Asia for 20 years [17] and digital statistics reports [18] conducted in January 2021 to survey the population aged 16–64 years old, as reported by the website “We Are Social.com” [19], Ecommerce statistics consist of: “Searched online for a product to buy” 81.5%; “Visited an online retail site or store” 90.4%; and “Purchased a product online” 76.8%. Moreover, online platform usage in Thailand, including banking and financial services applications (68.1%) ranked number one worldwide; mobile payment services (45.3%) ranked number two worldwide; M-commerce adoption (74.2%)

ranked number two worldwide; and E-commerce adoption (83.6%) ranked number three worldwide, respectively. Accordingly, the research for online shopping in Thailand could effectively reflect online consumers' concepts and behaviors more generally.

The statistics revealed that the Online commerce business is currently popular and growing rapidly. As mentioned, "EMS Business" [16] Online commerce has various advantages, including convenience for sellers and buyers, lower prices due to the lower cost of rental and hiring employees, convenient payment, and sellers' lack of need for inbound stocks. Moreover, sellers can reach target customers around the world, resulting in 24 h buying-selling activities. Therefore, the trading and post-trading process in online applications are essential for buyers and sellers [20,21] to achieve customer satisfaction and leverage existing customers. Sellers could have opportunities for selling products while gaining more customers [22,23]. Discount promotion and free shipping are also important tactics for maintaining users. Shops or sellers face challenges in maintaining customers as there are many competitors in the online market [24–26]. In terms of online customers, they must find the most attractive deals, including platform and shop promotions. For this reason, maintaining existing customers is quite challenging [27–29]. Most online customers typically purchase from offline stores and switch to using the application for online shopping [30,31] which may be caused by the COVID-19 pandemic. When customers have more online shopping experience, they tend to seek better opportunities. Sometimes, the application has problems, causing users to be dissatisfied. Nowadays, many applications exist on various channels such as web browsers, mobile phones, or social media channels with different trading characteristics. Besides, online consumer behavior has created protective shields. Most online customers usually look for product reviews and ratings before purchasing [22,31–40] to determine what experienced customers think about the product. Moreover, product quality and shop rating could boost customers' confidence and prevent further problems, e.g., the product does not meet customer requirements, the product is of low quality, and customers are unable to contact the seller. Such problems create an unpreferable online shopping experience for customers. Even if the product's price is low, it is no longer desirable to buy the product. For this reason, creating an impressive online shopping experience with customer satisfaction and seller credibility at the helm [41–43] is essential to the success of online shopping businesses and business sustainability [44,45].

According to the literature review, to understand how online consumers use shopping applications, there are two study groups.

Group 1: The study of factors describing three aspects of online consumer behavior change, including negative, positive, and Mooring, which was conducted using the "Push-Pull and Mooring theory" (PPM). PPM is the theory that customers change from user to ex-user status as part of the Online commerce application users' cycle, also known as "The Life cycle of Online commerce application" [46]. This research is related to the study of behavior change in Online commerce. The PPM model aims to explain human behavior and explore the factors that affect switching intentions and changing behavior. It can provide a more complete explanation for understanding the online customer's behavior and tendency to switch intentions. The PPM has been applied in different situations by many studies, such as in switching electronic commerce to Social commerce [47], switching online grocery provider [1], mobile phone-shopping switching behavior [48], user switching behavior when using mobile instant messaging applications [49], switching between membership cards and mobile applications [42], mobile personal cloud storage services [41], and switching behaviors in mobile payment applications. These studies have identified factors that influence both negative and positive behavioral changes, as well as the hesitation of customers or service users in various businesses. Yet, there is no study of negative factors, positive factors, and the Mooring factors influencing behavioral changes in online shopping platforms. Thus, it is impossible to explain how factors that occur during the use of these applications affect each step of the online purchasing process.

Group 2: Outcomes of online consumer behaviors based on PPM theory are the switching intention and switching behavior. However, previous research has focused on specific or

static behavior and it does not consider the holistic views of online consumer behaviors. For example, online consumer behaviors such as the decision-making process is modeled by Engel, Kollat, and Blackwell's 1978 study and Engel, Blackwell, and Miniard's 1986 study, with relevant studies as follows: the path-to-purchase framework or decision-making process for shopper segmentation [50], shopping-cycle stages for shopper marketing behavior [51], the consumer decision process for the mobile shopping revolution [31], linking sustainable product attributes and consumer decision-making [52], design on consumer purchases of on-line bookstores [53], exploring a path-to-purchase conceptualization of shoppers who are behaviorally distinct from consumers [54], the path-to-purchase framework is paved with digital opportunities [55], a path-to-purchase framework on multi-channel marketing investments in online and Mobile commerce [56], an integrated path-to-purchase framework on social platforms [34] and customers' purchase decision-making process in Social commerce [57]. These outcomes are the principles of traditional adoption intention in the form of switching behavior. However, they do not consider the holistic views of online consumer behaviors. The researcher has proposed a dynamic view from the holistic perspective of three stages ("Pre-purchase", "Purchase", and "Post-purchase").

Based on two groups of research with mentioned limitations, the researcher has produced the following questions:

RQ1: How can negative, positive, and Mooring factors influence the change of behavior in online shopping applications?

RQ2: How does the holistic perspective of customer usage behavior of online shopping applications affect the three stages (Pre-purchase, Purchase, and Post-purchase) of online shopping activity?

This research aims to acknowledge a deeper understanding of the holistic view of customer behavior on online platforms from the literature review. All factors are separated into Push-Pull and Mooring effects using Push-Pull Mooring theory for the completeness of factors influencing the three stages of online consumer behaviors, including Pre-purchase, Purchase, and Post-purchase. The study of factors affecting all purchasing processes (application operation) allows sellers or shops to understand online customer behavior in each step of using the application to shop online and to maintain and increase the number of users.

Thus, this research was developed with the Conceptual Model of Negative, Positive, and Mooring consumer behavior in online shopping. The researcher reviewed the literature that contains the perceived factors of technology acceptance related to decision making for online purchases in various channels such as E-Commerce, M-Commerce, and Social-Commerce, also known as EMS-Commerce [16]. In addition, the researcher reviewed the literature on "Push-Pull Mooring" theory toward the online purchasing decision process. After that, online questionnaire responses were generated and collected. The research target respondents were 16 years old or above in all occupations with prior experience in online shopping. The questionnaire was assessed in three phases, including a pilot test with 40 respondents, a pre-test with 40 respondents, and a main test with 525 respondents. In addition, the researcher analyzed data in the form of Descriptive Statistics such as Mean, S.D. (Standard Deviation) using PASW Statistics v.22.0.0, Inferential Statistic for Measurement Model, and Structural Model using Smart PLS V3.3.3 program. This research summarizes and synthesizes research outcomes so that system developers can implement the outcomes in practice to explore new users of online applications.

2. Literature Review

The literature review on this topic is divided into two groups. Group 1 is the study using Push-Pull Mooring theory and related to various technology acceptance adoption theories. The factors in each aspect were Push, Pull, and Mooring effects. Group 2 is the literature review on the three stages of online consumer behaviors for Pre-purchase, Purchasing, and Post-purchase.

2.1. The Life Cycle of Online Commerce Application and Push-Pull-Mooring

As mentioned in the introduction regarding the life cycle of an online customer or Online commerce user who uses an application, users can be divided into three stages, namely, Non-user, User, and Ex-user, arising from three steps as follows: Adoption, Continuous usage, and Switching behavior/Termination [46]. Figure 1 demonstrates “The Life cycle of Online commerce applications”. In the first state, people who have no experience using an application are called “Non-user”. People who have accepted technology for online shopping might have internal and external factors influencing various technology acceptance adoption theories towards the acceptance of using the application. This stage changes to users or online customers and is called “User”. Users’ continued usage and acceptance are based on Expectation Confirmation Theory [58]. This causes users to change behaviors. Behavior change theory is called “Push-Pull-Mooring Theory” (PPM), which contains various factors that cause behavior change from “User” to “Ex-user”. In this regard, the researcher applied the life cycle of the application user which shows the user life cycle on a mobile payment application, as shown in Figure 1.

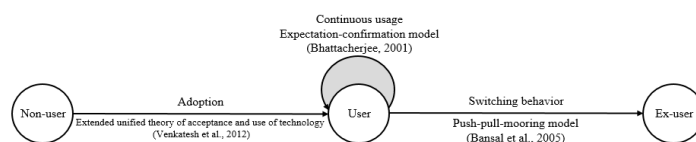


Figure 1. The Life Cycle of Online Commerce Application Adapted from [46,58–60].

According to Figure 1, the researcher was interested in the study of three factor groups of Push, Pull, and Mooring towards the change of consumer behavior based on PPM theory, with the migration (“Laws of Migration”) of humans as a result of the interaction between the impact of pushing and pulling from the source to the customers’ destinations [48]. Besides, Push factors result in negative effects, while Pull factors have a positive effect on a specific customer destination. For this reason, “Push-Pull Effect” is centered on a negative at the origin known as the repulsion “Push Effect” while a positive at the end is known as the “Pull Effect” [59]. In addition, the “Mooring Effect” is combined with the “Push-Pull Model” to cover all migration decisions’ personal, social, and cultural variables. This led to the PPM theory, which consists of a “Push Effect” factor that drives users away from active service and a “Pull Effect” factor that attracts users, as well as a “Mooring Effect”, which is a factor that inhibits or encourages behavior change. Several studies have used the PPM theory and its extensions to study the impact of user perception factors on behavioral intention. Therefore, Table 1 summarizes related studies that applied PPM theory to online shopping technology platforms. A study shown in Table 1 illustrates three groups to foresee the Push, Pull, and Mooring factors.

Group 1 (G1.1) is a group that applied PPM theory to Online commerce.

Group 2 (G1.2) is a group that applied PPM theory with various mobile applications.

Group 3 (G1.3) applied PPM theory to study the influencing factors for various services.

The factors in each aspect are negative. Further, the factors of positivity and hesitation to hypothesize the researcher’s model are based on factors from the various technology acceptance adoption theories and included additional factors.

Table 1. Comparing Push-Pull Mooring with the related literature in the scope of the study.

PPM Groups	Literature	Study	PUSH		PULL		MOORING		Outcome Variable(s)	Outcome Objective(s)
			Technology Acceptance Factors	Others Factors	Technology Acceptance Factors	Others Factors	Technology Acceptance Factors	Others Factors		
G1.1 Online commerce	Switching between E-commerce and S-commerce	[47]	Low efficiency	-	Social presence	Social support, Social benefit, Self-presentation	Personal experience	Conformity	Switching intention, Actual behavior	The intention to switch from E-commerce to Social commerce.
	Switching to online grocery and offline shop	[1]	Price perception	Customer service, Delivered products, Technical issue	-	WOM, Alternative attraction	-	Switching cost, Past switching	Switching intention	Switching behavior in online grocery retailing.
	Mobile shopping switching behavior	[48]	Perceived benefit of search, Perceived Price	Perceived costs of search, Information searching behavior, Perceived service quality, Perceived Value	-	Mobile characteristics, Perceived quality of mobile store, Attractiveness of mobile store	-	M-shopping self-efficacy, costs (Procedural, Relational)	Switching intention,	Consumer channel switching intention related to physical and mobile stores.
G1.2 Mobile application	Switching behaviors in mobile payment application	[46]	-	Privacy concern	-	Monetary rewards of alternatives	-	Perceived economic value, Past investment, Technical self-efficacy, Inertia	Switching behavior	Retain existing users for mobile payment application.
	Mobile personal cloud storage services	[41]	-	Security Risk, Privacy Risk	Perceived usefulness, Enjoyment	Referent network size, Total network size, Complementarity, Simplicity, Technical compatibility, Lifestyle compatibility	Habit	Switching cost	Switching intention	Retaining current users and attracting new users for mobile personal cloud storage services.

Table 1. Cont.

PPM Groups	Literature	Study	PUSH		PULL		MOORING		Outcome Variable(s)	Outcome Objective(s)
			Technology Acceptance Factors	Others Factors	Technology Acceptance Factors	Others Factors	Technology Acceptance Factors	Others Factors		
	User switching behavior of mobile instant messaging application	[49]	-	Fatigue with incumbent MIM, Dissatisfaction with incumbent MIM	Subjective Norm	Alternative attractiveness,	Habit	Affective commitment, Switching costs, Inertia	Switching intention	Maintaining current users as well as attracting new users for mobile instant messaging application.
	Switching between membership cards and mobile application	[42]	Poor aesthetic	-	Economic Benefit, Transaction convenience	Locatability, Gamification	-	Perceived substitutability, Inertia	Switching intention	Switching behavior between Starbucks traditional membership cards and mobile application.
G1.3 Services	Switching personal cloud storage services	[61]	-	Social Risk, Performance Risk, Financial Risk, Time Risk, Privacy Risk, Psychological Risk, Perceived Risk	-	Transfer Trust, Critical Mass	-	Perceived substitutability, Inertia	Switching intention	Switching to another cloud storage platform.
	Customer switching behavior in the telecommunication	[62]	-	Dissatisfaction	-	Alternative attractiveness	-	Inertia	Switching intention	Customer retention in the telecommunication industry.
	Shifting to green transportation	[63]	Perceived Inconvenience	Perceived environmental threats,	-	Green transport policies and campaigns, Green transport system	-	Inertia	Willingness to shift, Shifting behavior	Shifting willingness on the green transportation.
	Askers' switching from free to paid social Q&A services	[64]	-	Dissatisfaction with information quality, Dissatisfaction with system quality	-	Satisfaction with information quality, Satisfaction with system quality, Financial benefits	Subjective norms	Social ties, Network externalities, Trust, Cognitive needs, Information literacy, etc.	Switching intention	Social askers' switching from free to paid social Q&A services.
Analyzing input factors of the E-business platforms			Low quality platform	Privacy concern, Negative WOM	Usefulness, Ease of use, Enjoyment	Positive WOM	Social norms, Price value, Habit	Switching cost	-	

2.1.1. Pull Effect

According to the literature review on the positive factors of technology adoption factors to electronic business platforms, several technology adoption factors were adopted in PPM theory research such as the “Perceived Usefulness” factor and “Enjoyment” factor (similar to “Enjoyment” of technology adoption factor) for mobile personal cloud storage services [41]; “Subjective Norm” (similar to “Social Influence” of technology adoption factor) for users switching behavior on mobile instant messaging applications [49]; and “Economic Benefit” and “Transaction convenience” factors (similar to “Perceived Usefulness” and “Perceive ease of use” of technology adoption factor) for switching between membership cards and mobile applications [42]. These are positive factors adapted from technology acceptance theories as shown in Table 1. The researcher was interested in the study of four negative factors of the Pull group towards the change of consumer behavior based on PPM theory: (1) the “Usefulness” factor indicates the perceived benefit of an online application. The online user will continue using the application if the application is useful for users, for instance, if it has high system quality and convenience. Therefore, this is a positive factor that will encourage online users to continue using the online application; (2) “Ease of use” factor indicates that the online application is simple, quick, and easy to use without technical knowledge; (3) “Enjoyment” factor is a sense of having fun during use of the online application. The online user may participate in a game to obtain points that can be used to receive a discount to support purchasing or payment in the application; and (4) “Positive Word-of-Mouth” factor [71], as described in above in negative WOM factor as part of Push but this is positive WOM. The “Negative word-of-mouth” factor shows that an application has received good word-of-mouth referrals. This is a type of communication that occurs when users like an online application and communicate it to others, such as friends, family, or groups of individuals who are interested in the online application.

Table 1 shows that there are various studies using PPM theory for Online commerce. There are various technology acceptance models, such as TAM theory for Electronic commerce [4,20,62,63]; Mobile commerce [9,64–66]; Social commerce [67] and the integration of TAM, TRA, and TPB theory for internet banking [66]; advanced driver assistance system [68]; and customer purchase intention and behavior [69]. The research on the internal and external factors [70,71] influencing customers’ acceptance in using technology for online purchases includes: service quality, ease of perception, entertainment perception, price perception, social norms, personal data confidentiality, technology security, and word-of-mouth communication. In addition, there are various factors, including the Push, Pull, and Mooring effect, influencing consumer adoption and the use of technology online. All three groups were studied on the factors influencing behavior change. Therefore, it is impossible to explain how the factors during application usage affect each step of the online purchasing process. This led the researcher to review the relevant literature on the decision-making process that will be explained in the next section.

2.1.2. Push Effect

According to the literature review on the negative factors of technology adoption factors on electronic business platforms, several technology adoption factors were adopted in PPM theory research such as the “Low efficiency” factor (negative view of “Usefulness” of technology adoption factor) for switching between E-commerce and S-commerce [47]; “Perceived Benefit of search” factor (similar to “Perceived Usefulness of technology” adoption factor); “Perceived Price” factor (similar to “Price Value” of technology adoption factor) for mobile shopping switching behavior [48]; “Poor aesthetic” factor (negative view of “Enjoyment” of technology adoption factor) for switching between membership cards and mobile application [42]; and “Perceived Inconvenience” factor (negative view of “Perceived Ease of Use” of technology adoption factor) for shifting to green transportation [63]. For example, the application is frequently off-service, functions are difficult to use, there is no security in personal data or payment, shipment is late, products are poor quality, there are problems after purchasing products, and the store is poorly managed. All mentioned

problems could cause online consumers to distrust and therefore not use the application. Thus, the application owner must adopt a marketing strategy that motivates sellers and shoppers while developing the application to work efficiently in order to increase and retain online consumers [64,72–74]. These are negative factors adapted from technology acceptance theories as shown in Table 1. The researcher was interested in the study of three negative factors of the Push group toward the change in consumer behavior based on PPM theory: (1) the “Low-quality platform” factor is an indication of the perceived quality of an online application. The online user is unimpressed, dissatisfied, and will not continue using the application if the application is poor quality, for instance, if it is difficult to search for products, there is a complicated ordering processes, or payment channels are limited; (2) the “Privacy concern” factor expresses concern about the protection of users’ personal information during the registration of new users who had negative attitudes, did not trust the application, and stopped using the online application; and (3) “Word-of-Mouth” (WOM) [67,75] is the exchange of information and experience shared both offline and online, also known as electronic. WOM is a new marketing strategy that could minimize advertising costs. It makes it easy for businesses to reach customers directly and effectively. WOM significantly influences the beliefs and perceptions of target audiences as it is the rapid distribution of information by word of mouth. WOM is a strategy to grow businesses that are just starting. There is also scope for WOM among friends, family, and acquaintances. It is an emerging online consumer resource that spreads information and personal opinions about the satisfaction experience and customer feedback while assessing the positive and negative consumption values for interested target groups, as well as retaining brand awareness towards future customers. Customers who spread such information or reviews will have both positive and negative impacts on the product. The review will affect the purchase decision of future customers. The “Negative word-of-mouth” factor shows that an application has received bad word-of-mouth referrals. This is a type of communication that occurs when users dislike an online application and communicate it to others, such as friends, family, or groups of individuals who are interested in the online application. In addition, consumers may search on the internet to find information for purchasing decisions. Nowadays, online shopping applications enable visibility for product reviews that come directly from experienced customers. Product reviews, recommendations, complaints, and ratings are communicated between the consumers and sellers. It is a reliable means of communication because it expresses an opinion and feedback from real online shoppers. In addition, it depicts real feelings through user comments which express both positive and negative opinions. Significantly, product reviews affect the attitude of accepting and making decisions to shop online.

2.1.3. Mooring Effect

According to the literature review on the Mooring factors of technology adoption factors to electronic business platforms, several technology adoption factors were adopted in PPM theory research such as “Personal Experience” and “Habit” factors (similar to “Habit” of technology adoption factor) for switching between E-commerce and S-commerce [51], mobile personal cloud storage services [41], user switching behavior on mobile instant messaging applications [49], “Subjective Norm” factor (similar to “Social Influence” of technology adoption factor) for inquirers’ switching from free to paid social Q&A services [64]. These are Mooring factors adapted from technology acceptance theories as shown in Table 1. The researcher was interested in the study of four hesitation factors of the Mooring group towards the change of consumer behavior based on PPM theory: (1) “Habit” factor: with regard to information technology, when users are familiar with the system, applications, or services, they would not consider the advantages of other alternatives. On the other hand, they will act according to their habit. Such changes might happen because of stress which makes users want to maintain rather than change their habits [76]. There are various studies related to habits [77,78]. Habits are considered to be the factor with a significant impact on Online commerce. For this reason, this research paper aims to propose that

Habit is one factor of the “Mooring effect” and dramatically influences the adoption and use of technology by online consumers; (2) the “Social Norms” factor is widely believed to affect differences in substance use and abuse across cultures. Some people who engage in this may use one of the popular online shopping applications at this time. Some people make the decision to use shopping applications in order to be accepted by society; (3) the “Price Value” factor is related to the perceived benefits and cost of using an online shopping application. Price Value is also one of the online consumers’ Mooring factors that may cause them to change online purchasing behavior, either positively or negatively. Finally, the online application users continue to use the online applications if they perceive the benefits and values of the application; and (4) the “Switching Costs” factor occurs when the replacement cost is comparatively higher than the benefit of changing. Switching Cost refers to user perceptions related to service provider changes [49] or online application changes. One of the definitions of Status Quo Bias (SQB) is rational decision-making. It often takes the cost of behavior change into account and makes the most profitable decisions [79].

2.2. Types of Outcomes for Online Consumer Behaviors

2.2.1. Static Behavior: Specific Views of Switching Intention and Switching Behavior

Hesitation arises throughout the online purchasing process in forms such as product searching, product selection, and payment. For this reason, eliminating hesitation that may arise from online shopping throughout customers’ online purchases is essential in order to have a successful online shopping platform. Based on PPM, the previous literature on consumer switching intention and behavior is well-developed [47]. Previously, several studies have set the outcomes of consumers by switching behavior, e.g., switching intention [1,41,44,45,62], switching behavior [46], switching costs [64], actual behavior [42], willingness to shift, and shifting behavior [63]. Some research has focused on the service switching process and customer switching behavior in various service industries such as service drivers in an integrated model except for PPM. As mentioned earlier, their outcomes are the principle of traditional adoption intention in the form of switching behavior or immediate change. However, this concept may also be viewed as a specific or static behavior for a case-by-case study only, and it does not consider the holistic views of online consumer behaviors in terms of a realistic dynamic through the use of the E-business platforms.

2.2.2. Dynamic Behavior: Holistic Perspectives of Three Stages

As mentioned in the introduction, online consumer behaviors are a transaction for buying, selling, or exchanging products and services on the internet using the website or application as a medium for presenting products and services, and also, as the communication between buyers and sellers. For this reason, Online commerce allows visitors from all over the world to access the shop 24 h a day. Online commerce is categorized into three channels, including E-commerce, M-commerce, and S-commerce, called “EMS Business” [15]. Online purchases with the Decision-Making Process (DMP) [80,81] is a process that takes place in the mind. The DMP consists of five steps: (1) problem recognition, (2) information search, (3) evaluation of alternatives, (4) purchase decision, and (5) post-purchase behavior [82,83]. However, DMP is a traditional decision-making process with a sequence of several steps that is unable to capture the dynamic and fast-changing elements in the online environment [84]. Some specific activities can occur simultaneously. In the cases of Shopee and Lazada, whether (1) online customers can change their minds during product information searching and evaluate the alternatives before making a purchase, or (2) online customers can search on several shops, often carried out during the product searching, reviewing and evaluating stages. This issue may make it difficult to measure all stages. Nevertheless, [16] they have proposed the assessment model of online purchasing platforms using five steps of DMP and focused on the factors of TAM, Trust, and Quality to affect each process leading to the development and design of the platform. However, the paper did not point out the overview of all factors with online consumer behavior before studying the details of all processes. Therefore, an overview measurement of the online consumer behaviors is

necessary to demonstrate the preliminary three stages (“Pre-purchase”, “Purchase”, and “Post-purchase”). In this study, the researcher has combined the first three steps (problem recognition, information search, and evaluation of alternatives) into the “Pre-purchase” stage to meet the dynamic view of online consumer behaviors. The “Purchase” stage consists of such activities as final product selection, ordering, and payment activities. The after purchase (“Post-purchase”) stage involves activities such as product review, re-purchase, and recommendation.

The online buying consumer behavior consists of three stages which are, “Pre-purchase”, “Purchase” and “Post-purchase” [84]. The first stage (called the “Pre-purchase” stage and consisting of three DMP steps: (1) problem recognition, (2) information search, and (3) evaluation of alternatives), in order to make the buying decision, an online customer completes a series of actions at this stage, including defining their needs, searching for product information, visiting possible products and shops, evaluating different options, identifying alternatives, weighing the benefits, and reviewing customer comments before making a final decision. Prior research studies suggest that various aspects of the online application (including usefulness, ease of use, the look and feel of the online application, and price comparison) are necessary for online consumers to think about whether they will pay the high prices of a product and contribute to the customer experience in the “Pre-purchase” stage and have a positive/negative impact on customer satisfaction. Problem recognition occurs when the consumer desires something or is stimulated by internal and external factors [70,71,85]. Problem recognition therefore arises and makes consumers want new products to replace expired products. After consumers recognize a problem or need that can be met by purchasing such a product or service, they will start searching for information and review their memories and experiences related to the product e.g., information from other people or information published in online media, and personal experiences related to the product. Then, the consumer will enter the stage of the evaluation of alternatives. In this stage, consumers will compare the information of different products and services that could meet their needs by reviewing different products’ information and dismissing certain products to reduce alternatives. The alternatives considered will vary depending on individual factors and making a purchase decision (Purchase) when choosing a product.

The second stage (called the “Purchase” stage, consisting of the “Purchase decision” DMP step) involves completing the online order. It involves online consumers performing such activities as selecting a payment method, filling out payment information, and receiving purchase confirmation while checking out the payment transaction until they complete the payment.

The last stage (called the “Post-purchase” stage, consisting of the “Post-purchase” DMP step) includes online customer experiences such as product delivery, customer service support, product return/exchange, evaluation of product quality, and the customer providing product comments or recommendations after making an online purchase, as well as the decision about whether to pass on the positive or negative recommendation to family members and other associates. This stage is an important aspect of the online consumer experience and has an impact on customers’ future intentions or behaviors. Word-of-Mouth or repeat purchases are in the “Post-purchase” stage.

In the literature reviews in this group, the group (G2.1) found research studies that study online consumer behaviors in combination with external factors [84,86,87] and internal inputs [16], as shown in Table 2. The aim of this study was to compare online consumer behaviors based on the decision-making process perspective.

Table 2 illustrates that no studies have presented the three stages of online consumer behaviors with the Push-Pull and Mooring (PPM) theory. The researcher has divided online consumer behaviors into three groups for easier understanding using today’s online shopping applications, including Pre-purchase, Purchasing, and Post-purchase (called “Three Stages of online consumer behaviors”).

Table 2. Comparing online consumer behaviors with the related literature in the scope of the study.

Online Consumer Behavior Group	Context of Online Consumer Behaviors Related Literature	Author (Year)	Related Online Commerce	Constructs					
				Input			Output		
				Internal Factor(s)	External Factor(s)	Other Area(s)/ Variable(s)	Switching Intention/Behavior	Decision Making Process (5 Steps)	Three Stages of Online Consumer Behaviors
G2.1 Online consumer behaviors with internal/external factors	Integrated framework for online consumer behavior and decision-making process	[87]	Online commerce	-	Individual, Social, Online environment	-	-	√	-
	Antecedents and consequences of online customer satisfaction	[84]	Online commerce	-	Product Information, Ease of use, Website appearance, Ease of check out, Ease of return	Customization, Security assurance, Order fulfillment, Responsiveness of customer service	-	-	-
	Social commerce design on consumer purchase decision-making	[86]	Social commerce	-	Usability factor, Functional factor, Social factor	-	-	√	-
	Retentive Consumer Behavior Assessment Model of the Online Purchase DMP	[16]	Online commerce	Perceived usefulness, Perceived ease of use, Quality, Trust	-	-	-	√	-

3. Proposed Model and Hypothesis Development

This research aims to (1) deeply understand the behavior of online product consumers based on the factors in various technology acceptance adoption theories, the factors of which are studied by grouping negative, positive, and hesitation factors with Push-Pull Mooring Theory, and (2) study three stages of online consumer behavior of online shopping application usage during “Pre-purchase”, “Purchase” and “Post-purchase” stages to address consumer behavior change for maintaining and exploring new users. This topic describes the model in which the researchers presented a new model to answer the research questions.

3.1. Formulate Model

In this section, a model is presented by comparing previous studies demonstrated in Table 3, referring to the research groupings in Table 1 (Group of Push, Pull, and Mooring factors influencing the purchasing process), and Table 2 (Online consumer behaviors). This research was developed with the Push-Pull Mooring based theory in terms of Negative, Positive, and Mooring factors as described in the earlier section. The research was divided into two groups.

Table 3. Comparison between a proposed research model and the related literature.

Literature Reviewed/ Proposed Research Group	Push-Pull Mooring Antecedents											Outcome Variable(s)		
	PUSH			PULL				MOORING				Traditional	Proposed	
	Low Quality	Privacy concerns	Negative WOM	Usefulness	Ease of Use	Enjoyment	Positive WOM	Social Norms	Price Value	Habit	Switching costs	Switching Intention/Behavior	Decision Making Processes (5 steps)	3-Stages of Online Consumer Behaviors
G1.1 PPM Adoption for Online commerce	✓	-	-	✓	-	-	✓	✓	✓	-	✓	✓	-	-
G1.2 PPM Adoption for Mobile commerce	✓	✓	-	✓	✓	✓	-	✓	-	✓	✓	✓	-	-
G1.3 PPM Adoption for services	✓	✓	-	✓	✓	-	-	-	✓	-	✓	✓	-	-
G2.1 DMP with Internal/External Factors	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	-
Proposed Research Model	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓

The first group is related to various factors influencing online shopping decisions, which are the main factors of various technology acceptance adoption theories and complementary factors such as personal data concerns and Word-of-Mouth (WOM). The additional switching cost factors are derived from the theory of SQB or Inertia. This group includes negative, positive, and hesitation factors based on PPM theory. Hesitation is synonymous with “Mooring” which the researcher considered essential and necessary to study online consumers for an extensive understanding of customer behavior. The Push-Pull-Mooring (PPM) based theoretic model consists of three main parts: (1) input factors in terms of Positive, Negative, and Mooring (2) Behavioral Intention or Switching Intention and (3) Use Behavior or Actual Behavior. The “Switching Intention” is defined as the inclination to change consumption behavior based on the degree to which a buyer is likely to switch away [88]. The PPM model aims to explore the factors that affect the switching intention of online shopping processes that consist of three stages of online consumer behaviors. The customer’s retention which indicates the possibility of switching to other products or services is a concept opposite to that of the customer’s switching intention, which is determined by an individual’s interpretation of costs and benefits in the cause of action.

The second group is related to the three stages of online consumer behaviors. In this research, the researcher used three stages to describe an easy-to-understand application, including (1) Pre-purchase (“Stage 1”), (2) Purchase (“Stage 2”), and (3) Post-purchase (“Stage 3”). For the theory of technology acceptance adoption, there are two outputs, which are “Behavioral Intention” and “Use Behavior” by Leong, Jaafar, & Ainin (2018). The researcher adopted a hypothesis based on research by Petcharat & Leelasantitham (2021), and a comparative conclusion of the technology acceptance theories has been concluded in this referenced work. In this research, the process is applied and consolidated using the technology acceptance adoption theories. The Output section consists of three stages of online consumer behaviors which are “Pre-purchase”, “Purchase” and “Post-purchase” as shown in Figure 2.

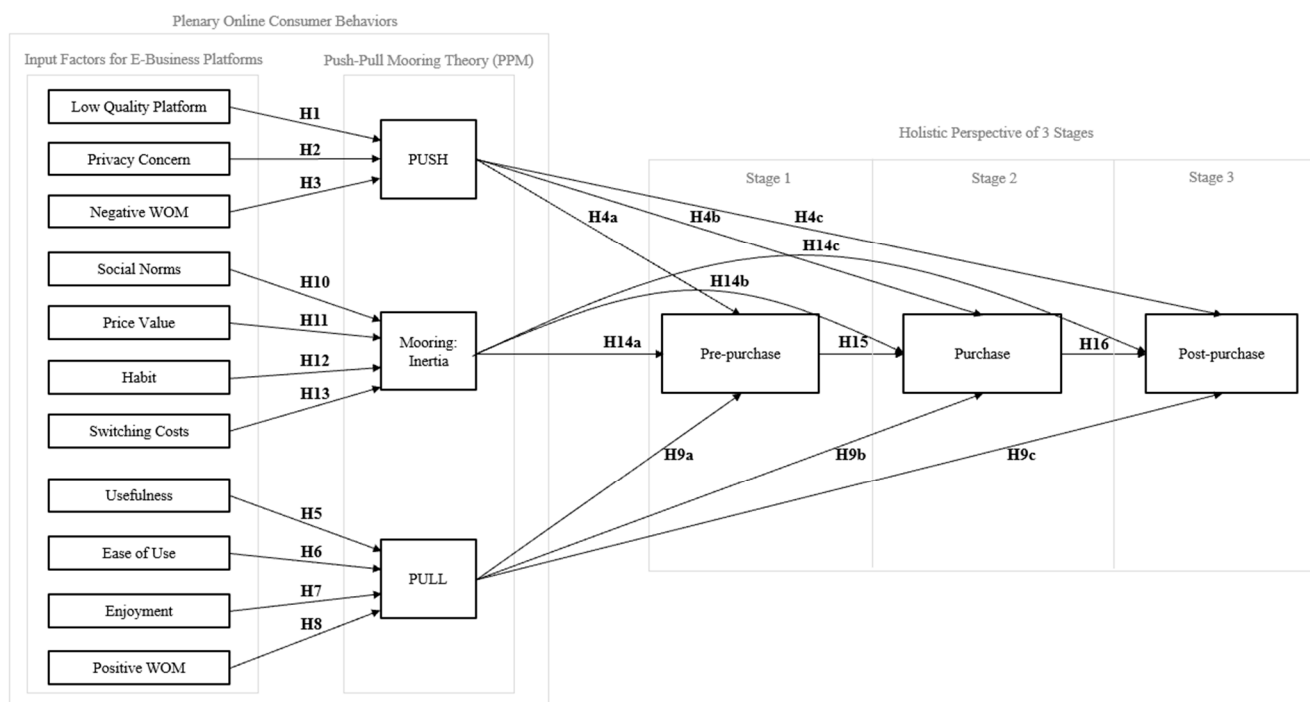


Figure 2. A holistic perspective model of plenary online consumer behaviors.

Two groups in the literature reviewed presented the completeness and differences of the research used in this study. As shown in Table 3 below, the researcher proposes a research model (see Figure 1) which presents internal and external factors mainly derived from the technology acceptance adoption theories consistent with the additional research for the completeness of the study. The inputs are grouped into negative, positive, and hesitation factors that influence the group of online consumer behaviors in all three steps of Pre-purchase, Purchase, and Post-purchase. The details of the hypothesis and its components will be explained in Section 3.2.

- G1.1, G1.2, G1.3 and G2.1 were referred from Tables 1 and 2
- Three stages of online consumer behaviors are (1) Pre-purchase, (2) Purchase, and (3) Post-purchase

3.2. Hypothesis Development

As Section 3.1 presented the model, this section describes the hypothesis as a constituent of the proposed research model, which consists of 17 constructs. Each construct is described in the following.

3.2.1. Push Effects

Low Quality Platform

Effort Expectancy (EE) means “The degree of ease associated with consumers’ use of technology” [60]. EE is a system feature that recognizes the technology’s ease of use. EE is derived from the original “Perceived Ease of Use” of the TAM theory of the technology acceptance model. If users perceive that the application is easy to use and not complicated, the application is accepted by users. On the contrary, if the application is difficult to use, it could negatively influence users. There are several research studies on EE factor [77,89], which has a strong influence on Online commerce. However, the researcher makes a negative hypothesis about the online shopping process with Low-quality; platform [43,47,88], which means the system is slow, difficult to use, complicated, and ineffective. Therefore, the “Low-quality platform” factor, which is a negative factor, instead of the “Effort Expectancy” factor, which is a positive factor in UTAUT2 theory.

Hypothesis 1 (H1). *Low Quality Platform (LQ) influences Push Effect.*

Privacy Concern

Thailand established the Personal Data Protection Act 2019, “Thailand Personal Data Protection Act B.E. 2562, (“PDPA”)” promulgated on 27 May 2019. Thus, users now pay attention to personal data stored in online-purchase applications, starting from user registration and payment information during the checkout process. Several studies on this factor [31,34,43,90–92] indicated that privacy concerns strongly influence Online commerce. The researcher, therefore, hypothesized privacy concerns or perceived personal data risks as a negative factor related to online consumers in the online shopping process.

Privacy concerns or Perceived Privacy Risk [90] is “the user’s subjective expectation of suffering a loss in pursuit of a desired outcome”. The use of users’ personal data may be unauthorized. This is related to the integrity of the service provider. Furthermore, there are risks, such as financial, operational, product, and information risks (Security and Privacy). The literature contains the following factors related to personal data concern: online grocery shopping in Thailand [3], mobile shopping applications adoption with a cross-country perspective [93], online privacy concerns of E-commerce [31], consumer’s continuance intention for mobile purchase in China [43], online retailing across four e-channel touchpoints (e.g., website, mobile shopping applications) [91], online health service use intention [94], consumers’ product evaluation in an E-commerce environment [27], privacy concerns and online purchasing behavior [95], switching behaviors in mobile payment application [46], consumer trust dimensions in E-commerce [29], safe-buy buttons and integrated path-to-purchase frameworks on social platforms [34], drivers of mobile Social commerce usage intention [90], digital marketing framework [92] and Social commerce constructs influence customers’ social shopping intention [47]. Regarding online shopping, personal data risk is the last dimension. According to previous research, both security and privacy influence consumer decisions for Mobile commerce that affect the adoption and use of technology. Moreover, privacy risk is possibly uncontrollable over personal data.

Hypothesis 2 (H2). *Privacy concerns influences Push Effect.*

Word of Mouth

Word-of-Mouth (WOM) communication is an essential reference for Online commerce, where information about comments in applications or online media is also distributed. WOM can be both positive and negative. For Positive WOM, when customers are satisfied with the product or service they will pass on the user experience to others. For this reason, Positive WOM is an essential reference source and an effective tool in promoting and supporting online businesses. Positive MOV is also a vital communication tool for public relations and saves costs when compared to other communication methods. On the other hand, for Negative WOM, if the customer is not satisfied with the product or service received they might convey dissatisfaction to other customers. Therefore, caution

should be exercised regarding the negative impact of WOM communication. Several research studies on WOM [28,32,33,35,37,38,40,67,96,97] revealed that WOM is the most influential factor in Online commerce. For this reason, this research hypothesized that WOM communication factors included the positive and negative factors of online consumers in the online shopping process.

WOM has been studied in various studies. For example, online reviews are an essential element in customer decision-making [32], word-of-mouth marketing in online social blogs [33], online customer satisfaction for online shopping experience [84], WOM in the social factor of Social commerce design on consumer purchase decision-making [86], electronic Word-of-Mouth (eWOM) and consumer purchase intentions in Social E-commerce [67], online reviews challenge the consumer's decision-making processes [35], eWOM in consumer review website on decision-making process of consumer for online social network framework [38], negative WOM in customer shopping experience [96], consumer engagement in social media WOM and luxury purchase intention [97–99], the effects of online customer reviews and product type on purchase intention [36], content of online reviews influences perceptions of helpfulness of product [40], the influence of social networks in purchase decision making in Social commerce [28], product attributes, WOM and purchase intention in online shopping [37] and effects of negative reviews on consumer price perception [100]. The literature review revealed that WOM is the most influential factor in online consumer adoption and use of technology.

Hypothesis 3 (H3). *Negative WOM influences Push Effect.*

Hypothesis 4 (H4). *Positive WOM influences Pull Effect.*

Push

Push effect is the negative perceived effect driven by the use of other services which may happen because of failure of the system, application, or service. For example, privacy disclosure issues, service provider security issues, pricing issues, or negative WOM of using the applications or services could lead to less satisfaction and trust. Push effect happens from the beginning of the process of purchasing, including the stage of searching for information, decision making, and after the purchasing of products or services. These actions can create awareness of the application's value on the side of the user. Research studies on the Push effect [1,46,47] indicated that it is a factor that strongly influences online commerce. Therefore, this research hypothesized that the Push effect influences the purchasing decision process on the online shopping application at the Pre-purchase, Purchasing, and Post-purchase stages.

Hypothesis 5a (H5a). *Push Effect influences Pre-purchase decision making.*

Hypothesis 5b (H5b). *Push Effect influences Purchase decision making.*

Hypothesis 5c (H5c). *Push Effect influences Post-purchase decision making.*

3.2.2. Pull Effects

Usefulness

Usefulness (UF) or Performance Expectancy means “The degree to which using a technology will provide benefits to consumers in performing certain activities” [60]. UF is a system feature that will benefit users. It is derived from the original “Perceived Usefulness” requirement of the TAM theory's technology acceptance model. There are several research studies on UF [78,101], where factors with a strong influence on online commerce have been reviewed, including high system quality and convenience which led to technology acceptance. For this reason, it is hypothesized that the usefulness of efficiency is a positive factor for online consumers in the online shopping process.

Hypothesis 6 (H6). *Usefulness (UF) influences Pull Effect.*

Ease of Use

Ease of Use (EU) or Effort Expectancy means “The degree of ease associated with consumers’ use of technology” [60]. The EU is a system feature that makes it convenient for users and affects their decision about whether to use online shopping applications. There are various research studies on the EU [77,89], revealing that the EU has a huge impact on Online commerce. The literature review found that EU had a significant positive effect on technology adoption. Therefore, this research set the hypothesis that EU is a positive factor for online consumers in the online shopping process. The EU is related to consumer awareness in regard to encouraging behaviors in adopting and using technology. For example, the knowledge of using a mobile phone or computer, availability of internet resources, and application installation.

Hypothesis 7 (H7). *Ease of Use (EU) influences Pull Effect.*

Enjoyment

Enjoyment (EJ) refers to “The fun or pleasure derived from using technology.” [101]. The enjoyment gained from using technology generates emotional motivation. In other words, it is “Perceived enjoyment” [60]. For example, the application can modify its options or style according to the users’ preferences, voice search, or share interesting products with other people. Furthermore, there are various studies on EJ [102] that revealed its huge impact on Online commerce. According to the literature review, the motivation for online shopping is grouped into six categories: Value, Role, Adventure, Social, Gratification, and Idea Motivation. Therefore, this research has set the hypothesis that Hedonic Motivation is a positive factor for online consumers in the online shopping process.

Hypothesis 8 (H8). *Enjoyment (EJ) influences Pull Effect.*

Pull

Pull effect is the perceived positive effect that attracts the continued use of the system, application, or service. For example, the perceived benefit of using technology, facilitation, entertainment, and positive WOM. These factors result in high satisfaction and trust. The Pull effect happens during the stage of searching for information, purchase decisions, and after purchase. For this reason, the Pull effect can create awareness of the application’s value for users. Furthermore, studies on the Pull effect [41,62,103] indicated that the Pull effect is a factor that strongly influences online commerce. Therefore, it is hypothesized that the Pull effect influences the purchasing decision process on the online shopping application at the Pre-purchase, Purchasing, and Post-purchase stages.

Hypothesis 9a (H9a). *Pull Effect influences the Pre-purchase decision making.*

Hypothesis 9b (H9b). *Pull Effect influences the Purchase decision making.*

Hypothesis 9c (H9c). *Pull Effect influences the Post-purchase decision making.*

3.2.3. Mooring Effect

Social Norms

Social Norms (SN) means “The consumers perceive that important other (e.g., family and friends) believe they should use a particular technology.” [60]. SN reflects a person’s decisions that are influenced by their social networks, such as referral groups, family, initiative leaders, friends, and colleagues as to whether to accept and use the technology [104]. For this reason, SN has a significant positive influence on online consumers’ acceptance. There are several studies on this factor [105,106] which indicated that SN has a huge impact on Online commerce. According to the literature review, SN is the most influential factor in online consumer adoption and use of technology. Thus, the hypothesis was made based on the SN factor affecting online consumers’ Mooring towards the online shopping process. Due to SN, online consumers are hesitant to use applications and make online purchases.

Hypothesis 10 (H10). *Social Norms (SN) influences Mooring Effect.***Price Value**

Price Value (PV) refers to “Consumers’ cognitive trade-offs between the perceived benefits and cost of using various applications and the monetary cost for using them.” [60]. It is the comparison between receiving benefits and the expenditure of the application. For example, the value received from low expense or using an online shopping application is beneficial compared to the financial costs of mobile devices, computers, and internet bills. Regarding M-commerce, the benefits of using the application M-commerce is higher than the financial cost of a similar transaction. For example, the mobile internet expenditure that is necessary for using an M-commerce shopping application is too high for consumers because such an application loads numerous product images, accruing higher data usage than other smartphone applications. Thus, consumers may be forced to reconsider whether such costs are reasonable by looking at the potential benefits of using M-commerce shopping applications. Moreover, many research studies on Price Value [89,107] indicated that Price Value has a strong influence on Online commerce. Price Value strongly influences the adoption and use of technology by online consumers, according to the literature review. Price Value is also one of the online consumers’ Mooring factors that may cause them to change their online purchasing behavior, either positively or negatively.

Hypothesis 11 (H11). *Price Value (PV) influences Mooring Effect.***Habit**

Habit (HB) refers to “The extent to which people tend to perform behaviors automatically because of learning.” [60]. Previous experience and routine behavior create current behavior. This research revealed that habits influence technology adoption. Furthermore, in 2021, Polites and Karahanna [108] referred to previous research on the Status Quo Bias (SQB) with regard to consciousness. The study revealed that habit is a factor before inertia. Habit is also a mental effect and automatically puts a person in the status quo. Habits are defined as “learned sequences of acts that have become automatic responses to specific cues and are functional in obtaining certain goals or end-states” by Aarts in 1999. In addition, habit and inertia have different concepts: Habit is an automatic response triggered by environmental signals without conscious control. However, inertia is a continuation of the state regardless of the presence of superior alternatives. According to changing online shopping behavior, when users are familiar with certain services they will be less cautious about comparing the relative advantages of other alternatives. Nevertheless, they often exhibit a habitual response to existing behavioral patterns [49]. Habits are inherently beneficial in reducing costs in an individual’s decision-making process. Besides, users who try to avoid engagement in habitual behaviors require fewer cognitive resources to proceed further with the status quo [76].

Hypothesis 12 (H12). *Habit (HB) influences Mooring Effect.***Switching Costs**

Switching Cost refers to user perceptions related to service provider changes [49] or application changes. One of the definitions of Status Quo Bias (SQB) is rational decision-making. It often takes the cost of behavior change into account and makes the most profitable decisions [79]. Switching Cost occurs when the replacement cost is comparatively higher than the benefit of changing. The switching costs [41,50,59,61,109,110] included sunk costs, installation, and continuity [111]. Furthermore, the switching cost can be divided into three groups of six aspects [41]. The first group is Continuity (lost performance and uncertainty costs). Continuity refers to an opportunity cost. The user loses benefits they have accumulated by continuing to use the current service. If the relationship with the service is terminated [111], continuity costs may lead to inertia. In comparison, users remain with the current service because of the specific benefits without considering other superior

alternatives that may arise. The second group is Learning costs (pre-switching search and evaluation, post-switching behavioral and cognitive, and set up costs). Learning costs consist of money, time, and effort, as well as the complication of using new services [111]. Users might hesitate to change and maintain the status quo when they realize it is not worth spending extra time and effort to restart the service, starting from before and after changing [49]. The third group is Sunk cost, which is the users' awareness of the time, money, and effort they have invested in the current service. The Sunk cost might create inertia when users think that the cost of using the current service is high. For this reason, this research hypothesized that the Switching cost influences Mooring in the online purchasing decision process.

Hypothesis 13 (H13). *Switching costs influences Mooring Effect.*

Mooring Effect

Mooring is a personal factor affected by subconscious elements such as habits and inhibiting or encouraging behavior change in online shopping applications. In addition, the cost of change is another factor that affects Mooring in both online and offline purchases.

Mooring Effect: Inertia

Status Quo Bias (SQB) theory or Inertia [112] is the theoretical aspect that explains why people are willing to maintain current habits instead of changing to other, potentially better alternatives [79]. The Inertia concept indicates the bias of decision-making due to its meaning: "user attachment to and persistence in existing behavioral patterns (e.g., the status quo), even if there are better alternatives or incentives to change" [108]. This research defines a multidimensional project of inertia, which consists of three parts, including "Behavioral-, cognitive-, and affective-based inertia". Behavioral inertia is when a person continues to use the service simply because they have been doing it, which is an automatic behavior. Cognitive inertia is a person who consciously uses the services out of a sense of duty, even if they realize it is not the best or most effective factor. In addition, affective-based inertia is the continued use of a service and a sense of enjoyment in doing so or being emotionally attached to the active service. Therefore, when behavioral inertia occurs, most users tend to rely on familiar past behaviors (habits) as a guide to choosing current and future behaviors. Therefore, when behavioral inertia occurs, most users rely on familiar past behaviors (habits) to choose current or future behaviors and find the rationalization for continuing such behaviors. Moreover, they might lose some benefits if they choose to use another application. Research studies on Mooring [64,113–117] indicated that it strongly influences online commerce. Therefore, this research hypothesized that the Mooring effect influences the online purchasing decision process.

Hypothesis 14a (H14a). *Mooring influences the Pre-purchase decision making.*

Hypothesis 14b (H14b). *Mooring influences the Purchase decision making.*

Hypothesis 14c (H14c). *Mooring influences the Post-purchase decision making.*

3.2.4. Three Stages of Online Consumer Behaviors

The decision-making process [80,81,87] consists of five steps: problem recognition, awareness, information search, evaluation of alternatives, purchase decision, and post-purchase behavior. However, online consumers' purchasing decisions are unnecessary because consumers' behavior is a discrete process [82]. Online consumers could re-arrange decision-making steps or make purchasing decisions promptly. For example, consumers buy a product through Social Commerce. The decision-making process of each consumer is different based on each person's reason and belief for their emotional decisions. According to the study on the decision-making process, there are four types of decision-making processes based on different levels of information requirement and emotion []. The research revealed that some consumers might not start the decision-making process with problem recognition or searching

for information, but they tend to make purchase decisions first. Consumers might also repeat some steps before making a purchasing decision. Research studies on the decision-making process [80,81,85,86] indicated that the decision-making process contains five standard purchasing steps as mentioned before. However, this research has categorized five steps of the decision-making process into three stages of online consumer behaviors, including Pre-purchase, Purchase, and Post-purchase [84]. (1) The first stage (“Pre-purchase”) consists of problem recognition, information search, and evaluation of alternatives; (2) the second stage (“Purchase”) and, (3) the third stage (“Post-purchase”).

Hypothesis 15 (H15). *Pre-purchase influences Purchase decision making.*

Hypothesis 16 (H16). *Purchase influences Post-purchase decision making.*

4. Research Methodology

Apart from regarding models and hypotheses in the previous section, this section presents and explains the research methodology using a quantitative analysis which consists of population and research tools for gathering research information. It includes data interpretation and statistical methods for analysis and hypothesis testing of the relationship between defined variables.

4.1. Questionnaires and Data Collection

The population used in this research was randomized using an online application. Furthermore, the questionnaire was conducted following the research methodology and research tools for the consideration of the Mahidol University Ethics Committee. The questionnaire was approved by the Institutional Review Board of Mahidol University and received the approval number MU-CIRB 2021/259.1105. The data were collected from the sample group in three phases: Pre-test, Pilot test, and Main test, respectively.

4.1.1. Pre-Testing

Pre-test data were collected before the actual data collection of 40 samples, including friends, doctoral degree students, and colleagues who have online shopping experiences. This study took approximately 7 days to collect data from 2 to 9 June 2021, to test research tools and measure the confidence of questionnaires. After that, some questions were corrected since they were unclear and need to be clarified in order to increase the understanding of the question’s objective, and data were collected in the Pilot Test.

4.1.2. Pilot Testing

The Pilot-test consisted of 40 samples which took approximately 7 days from 10–17 June 2021, to test the research tools, clarity, confidence level of research questions, and preparation before the actual data collection. In the first two phases of data collection, coefficient values were calculated using Cronbach’s Alpha Coefficient (α -Coefficient) [118] with a significance of more than 0.70 to improve the questionnaire. Therefore, the questionnaire is considered to be reliable. Moreover, all elements of the questionnaire had Cronbach’s alpha in the range of 0.764–0.943, indicating a satisfactory level of reliability. Then, we proceeded to collect actual data in the Main-test step.

4.1.3. Main Testing

Main test data were collected from 525 samples. It took 40 days for data collection, starting from 18 June 2021–27 July 2021. In all three phases, the online questionnaires were distributed using “Google Form” and information was collected from social media platforms such as Facebook and LINE. Then, the researcher checked the data accuracy, statistical analysis, and processing for research purposes. The researcher rewarded research respondents with a Grab Food discount coupon due to the COVID-19 pandemic in Thailand.

4.2. The Scope of Survey and Sample

This research aimed to target consumers with online shopping experiences. Statistical formulas calculated the sample size. However, the exact population was unknown. Thus, the formula for calculating samples without limiting the population size was based on the Cochran principle [119]. According to the formula below, the sample size can be shown using the Cochran formula with the Confidential level at 95%, with Z Score = 1.96, while the acceptable Sampling error is at 5% ($e = 0.05$). The sample size calculated from the statistical formula is 384 samples as shown in (1) below.

$$n = \frac{P(1-P)Z^2}{e^2} = \frac{(0.5)(1-0.5)(1.96)^2}{(0.05)^2} = \frac{0.96}{0.0025} = 384 \quad (1)$$

In this research, a Convenience Random Sampling Method was selected. The sample group was selected from the voluntary respondents and the users consuming the online trading system for goods or services. However, this research collected 525 samples for the simulated analysis, including 151 males (28.76%), 345 females (65.71%), and 29 LGBTQ+ people (5.53%). All respondents were Thai. The first three ranks of age groups identified 25–34 years containing 221 respondents (42.10%), under 24 years containing 156 respondents (29.71%), and 35–44 years containing 124 respondents (23.62%), respectively. The first three ranks of the duration-of-use of online commerce groups identified 1–3 years containing 161 respondents (30.67%), 3–5 years containing 132 respondents (25.14%), and over 5 years containing 130 respondents (24.76%), respectively (see details in Table 4).

Table 4. The demographic data of main testing respondents (N = 525).

Variables	Level	Respondents (N = 525)	
		Frequency	Percentage
Gender	Male	151	28.76%
	Female	345	65.71%
	LGBTQ+	29	5.53%
Nationality	Thai	525	100%
Age	<24	156	29.71%
	25–34	221	42.10%
	35–44	124	23.62%
	45–54	21	4.00%
	>55	3	0.57%
			4.76%
Education	Under bachelor's degree	25	4.76%
	Bachelor's degree or equivalent	309	58.86%
	Master's degree	162	30.86%
	Doctorate degree or higher	29	5.52%
Length of using Online commerce	<3 months	50	9.52%
	3–6 months	27	5.14%
	6 months–1 year	25	4.76%
	1–3 years	161	30.67%
	3–5 years	132	25.14%
	>5 years	130	24.76%
			18.48%
Average frequency in the use of online shopping application	Approximately once or twice a month	97	18.48%
	Several times a month	359	68.38%
	Several times a week	69	13.14%
	Shopee	467	89.00%
	Lazada	392	74.70%
Online shopping applications (multiple choices)	Grab	309	58.90%
	LINE MAN	262	49.90%
	7-Eleven	247	47.00%
	Instagram	242	46.10%
	Facebook Live	179	34.10%
	JD Central	118	22.50%

4.3. Questionnaire Design

The research tool for this study was an online questionnaire. All questions were developed from the related literature review. The questionnaire was divided into six parts. Part 1 included general information about respondents such as gender, age, education, average income per month, experience, and frequency of online commerce application usage with a total of seven questions. Part 2 included questions asking respondents to express their opinions about negative factors (Push effect) with a total of 13 questions, using a 5-point Likert Scale of Mostly Agree, Strongly Agree, Moderately Agree, Disagree, and Mostly Disagree. Part 3 included questions asking respondents to express their opinions about positive factors (Pull effect) with a total of 15 questions, using a 5-point Likert Scale of Mostly Agree, Strongly Agree, Moderately Agree, Disagree, and Mostly Disagree. Part 4 included questions asking respondents to express opinions about the Mooring effect with a total of 15 questions, using a 5-point Likert Scale of Mostly Agree, Strongly Agree, Moderately Agree, Disagree, and Mostly Disagree. Part 5 included questions related to the Decision Making Process (DMP) with a total of nine questions, using a 5-point Likert Scale of Mostly Agree, Strongly Agree, Moderately Agree, Disagree, and Mostly Disagree. Lastly, Part 6 included recommendations and suggestions.

4.4. Statistical Data Analysis

This research uses descriptive statistics to analyze data, including the valid percent, frequency, average, and standard deviation. Descriptive statistics were also used to analyze respondents' opinions and measure the reliability of research instruments. The research used Cronbach's Alpha coefficients ranging from 0 to 1. When Cronbach's Alpha coefficient approach is 0, the research instrument is relatively less reliable. However, if Cronbach's alpha coefficient approach is 1, the research instrument is highly reliable. The acceptable level for the research is that Cronbach's alpha coefficient must not be less than 0.7.

The questionnaire composition analysis helps to group correlated variables for the questionnaire's validity using criteria for determining the Factor Loading of the questionnaire that is used for collecting data from the sample size, the value of which must be greater than 0.7. If the value of the questionnaire composition is less than 0.7, that factor is cut from the questionnaire. Furthermore, this research uses inferential statistics to analyze with a Structural Equation Model (SEM) in the form of PLS-SEM (Partial Least Squares Structural Equation Modeling). PLS is a multivariate structural model validation method that combines Regression and Confirmatory Factor Analysis (CFA) of all variables in the conceptual framework and Path analysis for hypothesis testing and structural models [120]. In addition, a SmartPLS Program version 3.3.3 [121,122] was used for the analysis of this research. The analysis outcome is explained in Section 6.

5. Results

Data analysis follows a two-step approach [123] to test the reliability and validity of the measurement model, consistent with research hypotheses and the Conceptual Model.

5.1. Measurement Model

In this study, a SmartPLS Version 3.3.3 was used for the PLS analysis, and Bootstrapping [118] in 5000 sub-samples was used to assess the significance of indicators and path coefficients. Table 5 demonstrates the reliability and composition test results of 52 questions of 17 constructs with Mean values between 3.373–4.695, S.D. between 0.550–1.290, and Loading between 0.705–0.948, all of which are greater than 0.70 [118]. In addition, Outer Variance Inflation Factor (VIF) is between 1.132–2.917, all of which are less than 5.00 [121,122,124]. The maximum VIF of 2.917 was below the cut-off point of 3.3 [125]. Thus, it could be displayed in 52 questions, as shown in Table 5 below.

Table 5. Results of reliability and convergent validity of measurement model.

Abbr.	Measurement Items	Mean	S.D.	Loading (>0.70)	Outer VIF (<5.00)
Push effect: Low Quality Platform (LQ)					
LQ1	Slow performance on online shopping application has made you think about switching to another application [43,88].	4.568	0.704	0.782	1.523
LQ2	If online shopping application provides inaccurate information, it will influence your decision to use another application [43,88].	4.611	0.688	0.818	1.594
LQ3	I may suffer on my purchase decision from unstable service, low speed or too much effort required on online shopping application [43,88].	4.495	0.704	0.793	1.446
Push effect: Privacy Concern (PC)					
PC1	I think online shopping application service providers could provide my personal information to other companies without my consent [43,107].	4.236	0.847	0.759	1.771
PC2	I think online shopping application services endanger my privacy by using my personal information without my permission [43,107].	4.250	0.843	0.857	2.343
PC3	My privacy would be compromised on the online shopping application [43,107].	4.302	0.785	0.864	2.175
PC4	I am concerned that the information I disclosed to this mobile vendor may be misused [49,93].	4.273	0.876	0.826	1.940
Push effect: Negative WOM (NW)					
NW1	Negative reviews and feedback about online shopping application have made you think about switching to another application [1,38].	3.707	1.115	0.749	1.934
NW2	Negative reviews and feedback about online shopping application have had influenced your decision to use another application [1,38].	3.920	0.970	0.841	2.315
NW3	The negative WOM information about the product in online shopping application has a bad effect on my purchase decision [1,38].	4.259	0.848	0.743	1.577
PH1	I think that negative factors such as low-quality platform, privacy concerns or negative word-of-mouth will cause me to search for products less frequently [1].	4.695	0.550	0.705	1.534
PH2	I think that negative factors such as low-quality platform, privacy concerns or negative word-of-mouth will cause me to make fewer purchases using an online application [1].	4.564	0.615	0.756	1.797
PH3	I think that negative factors such as low-quality platform, privacy concerns or negative word-of-mouth will drive me to not suggest an online application to another person [1].	4.541	0.642	0.740	1.706
Pull effect: Usefulness (UF)					
UF1	I would find the online shopping application useful in my purchase [78,107].	4.182	0.783	0.847	1.663
UF2	I think online shopping application is valuable and time saving to me [78,107].	4.227	0.741	0.851	1.707
UF3	Using the online shopping application would enhance channel and effectiveness on my purchase [78,107].	4.345	0.680	0.790	1.465

Table 5. Cont.

Abbr.	Measurement Items	Mean	S.D.	Loading (>0.70)	Outer VIF (<5.00)
Pull effect: Ease of Use (EU)					
EU1	I think my interaction with online shopping application will be clear and understandable [126].	3.530	1.061	0.847	2.706
EU2	I think the online shopping application will be easy to use [126].	3.373	1.115	0.851	2.805
EU3	When I shop on shopping application, there is no need high effort to use online shopping application [126].	3.566	1.016	0.790	2.755
Pull effect: Enjoyment (EJ)					
EJ1	Using online shopping application for online purchase is fun [77,102,127].	4.384	0.733	0.750	1.557
EJ2	Using online shopping application for online purchase is enjoyable [77,102,127].	4.627	0.578	0.892	1.531
EJ3	Using online shopping application for online purchase is very entertaining [77,102,127].	3.939	0.962	0.788	1.250
Pull effect: Positive WOM (PW)					
PW1	Positive Reviews and feedback about online shopping application have made you feel confident to use the current application [28,38].	4.223	0.812	0.851	1.739
PW2	Positive Reviews and feedback about online shopping application have had influenced your decision about purchasing process on the application [28,38].	4.189	0.788	0.845	1.605
PW3	I find a sense of belonging through using the same online shopping application that others use [28,38].	4.341	0.734	0.810	1.587
PL1	I think that positive factors such as being useful, advantageous, valuable, time saving and positive word-of-mouth will cause me to search for products more frequently [1].	4.050	0.821	0.705	1.656
PL2	I think that positive factors such as being useful, advantageous, valuable, time saving and positive word-of-mouth will encourage you to utilize an online application to make additional purchases [1].	4.002	0.888	0.756	1.992
PL3	I think that positive factors such as being useful, advantageous, valuable, time saving and positive word-of-mouth will drive you to suggest an online application to another person [1].	4.218	0.802	0.740	1.342
SN1	People who influence my behavior would think that I should use the same online shopping application that they use [50,102].	4.023	0.963	0.791	1.832
SN2	People who are important to me would think that I should use the same online shopping application that they use [50,102].	4.186	0.870	0.855	1.764
SN3	My friends and acquaintance expect me to use the same online shopping application that they use [50,102].	3.714	1.104	0.769	2.917
PV1	I can save money by examining the prices of products on different online shopping applications [77,78,101].	3.609	1.133	0.898	1.919
PV2	I like to search for cheap products in different online shopping applications [77,78,101].	3.441	1.290	0.859	1.933
PV3	Online shopping applications offer better value for money [77,78,101].	3.602	1.181	0.761	2.754

Table 5. Cont.

Abbr.	Measurement Items	Mean	S.D.	Loading (>0.70)	Outer VIF (<5.00)
HB1	Choosing my incumbent online shopping application has become automatic to me [102,127].	3.895	1.074	0.948	2.123
HB2	Using my incumbent online shopping application is natural to me [102,127].	3.882	1.079	0.908	2.123
HB3	I must use online shopping application for online purchases [102,127].	3.491	1.247	0.914	2.883
Mooring effect: Switching Cost (SC)					
SC1	In general, it would be a trouble to switch to other online shopping applications [30,112].	3.705	1.189	0.863	2.795
SC2	It would take a lot of time and effort to switch to other online shopping applications [30,112].	3.557	1.225	0.919	2.311
SC3	I would lose a lot if I were to switch to other online shopping applications [30,112].	3.641	1.163	0.909	1.132
MR1	I will continue using my incumbent online shopping application because it would be stressful to change [1,112].	4.520	0.677	0.906	1.579
MR2	I will continue using my incumbent online shopping application simply because it is what I have always done [1,112].	4.473	0.697	0.885	1.579
MR3	I will continue using my incumbent online shopping application even though I know it is not the most effective way to do things [1,112].	3.643	1.076	0.792	2.658
Pre-purchase (PP)					
PP1	It would help me with product awareness if an online shopping application provides product/service recommendation [79,86].	4.414	0.787	0.895	2.310
PP2	It would help my product search if complete information is provided by an online shopping application [79,86].	4.327	0.819	0.878	2.156
PP3	It would help me to evaluate a product if quality information is provided by an online shopping application [79,86].	4.380	0.762	0.884	2.153
Purchase (PU)					
PU1	It would encourage me to purchase a product if an online shopping application is designed aesthetically [79,86].	4.532	0.646	0.844	1.704
PU2	It would encourage me to purchase a product if an online shopping application is easy to use [79,86].	4.366	0.760	0.801	1.489
PU3	It would encourage me to purchase a product if customers' personal information on an online shopping application is protected [79,86].	4.464	0.731	0.859	1.781
Post-purchase (PO)					
PO1	It would encourage me to engage in post-purchase activities if customers' feedback is presented on an online shopping application [79,86].	3.986	1.020	0.877	1.224
PO2	It would encourage me to engage in post-purchase activities if an online shopping application provides product/service recommendation [79,86].	4.286	0.826	0.711	1.421
PO3	It would encourage me to engage in post-purchase activities if online product return is available on an online shopping application [79,86].	4.514	0.707	0.752	1.402

All question's components had Cronbach's alpha between 0.761 and 0.943, which was higher than the acceptable threshold of 0.700 [118]. The Composite Reliability (CR) was

at 0.784–0.936, which is higher than the acceptable threshold of 0.700 as well. Average Variance Extracted (AVE) was between 0.559 and 0.862, which is higher than the benchmark of 0.500 as shown in Table 6 below.

Validity evaluation of the model was conducted using Fornell-Larcker criteria in 1981. The diagonal is the highest value in each column with a value not less than 0.70, and it is the square root of the AVE value in each construct. Therefore, the research model is suitable based on Fornell-Larcker criteria, 1981, as shown in Table 7 below.

Table 6. Construct reliability and validity.

Constructs	Item Code	Cronbach's Alpha (>0.70)	Composite Reliability (CR) (>0.70)	Average Variance Extracted (AVE) (>0.50)
Low Quality Platform	LQ	0.796	0.784	0.643
Privacy Concern	PC	0.846	0.896	0.685
Negative eWOM	NW	0.786	0.818	0.752
Push	PH	0.819	0.868	0.624
Usefulness	UF	0.773	0.869	0.688
Ease of Use	EU	0.898	0.936	0.830
Enjoyment	EJ	0.776	0.813	0.724
Positive eWOM	PW	0.784	0.874	0.698
Pull	PL	0.863	0.896	0.591
Social Norms	SN	0.761	0.834	0.559
Price Value	PV	0.943	0.936	0.747
Habit	HB	0.842	0.926	0.862
Switching Cost	SC	0.797	0.795	0.584
Mooring (Inertia)	MR	0.764	0.890	0.802
Pre-purchase	PP	0.862	0.916	0.784
Purchase	PU	0.782	0.873	0.697
Post-purchase	PO	0.812	0.813	0.567

5.2. Structural Model

Hypothesis testing is based on the Proposed Research Model in Figure 2 in Section 3.1 using the PLS Algorithm of 525 samples and Bootstrapping [118] in 5000 re-samples with a Significance level at 0.05. for the Path coefficient (β), t -value and p -value. Path coefficient (β) acceptance criteria are >0.10 , t -value >1.96 , and p -value < 0.05 , <0.01 , and <0.001 , respectively. The study outcome of the hypothesis test is shown in Table 8, indicating that H1, H2, H3, H4a, H4b, H4c, H5, H6, H7, H8, H9a, H9b, H9c, H10, H11, H12, H13, H14a, H14b, H15, and H16 are supported, but H14c is rejected from the SmartPLS 3.3.3 program. Moreover, H11 has a negative Path coefficient (β) of -0.224 , as shown in Figure 3 below.

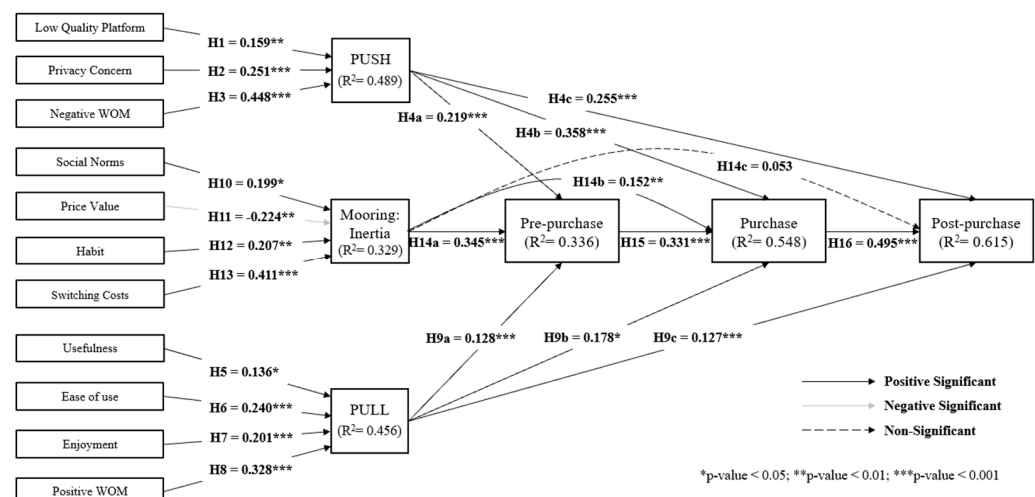


Figure 3. Summary of hypothesis testing results.

Table 7. Fornell-Larcker criterion (Results of discriminate validity analysis).

CN *	LQ	PC	NW	PH	UF	EU	EJ	PW	PL	SN	PV	HB	SC	MR	PP	PU	PO
LQ	0.802																
PC	0.259	0.827															
NW	0.352	0.573	0.867														
PH	0.382	0.549	0.648	0.790													
UF	0.255	0.452	0.549	0.530	0.830												
EU	0.215	0.071	0.266	0.004	0.119	0.911											
EJ	0.281	0.517	0.656	0.647	0.694	0.139	0.851										
PW	0.246	0.487	0.590	0.538	0.652	0.171	0.661	0.835									
PL	0.139	0.371	0.543	0.380	0.519	0.340	0.546	0.591	0.769								
SN	0.394	0.189	0.413	0.194	0.256	0.608	0.260	0.283	0.427	0.748							
PV	0.031	0.175	0.342	0.101	0.291	0.422	0.252	0.318	0.461	0.368	0.864						
HB	0.047	0.283	0.469	0.269	0.336	0.228	0.339	0.449	0.420	0.279	0.554	0.928					
SC	0.374	0.416	0.587	0.563	0.482	0.235	0.500	0.494	0.464	0.361	0.451	0.394	0.764				
MR	0.322	0.479	0.484	0.624	0.391	0.046	0.433	0.392	0.315	0.223	0.112	0.273	0.427	0.896			
PP	0.289	0.497	0.409	0.489	0.389	0.022	0.403	0.348	0.323	0.142	0.160	0.203	0.420	0.531	0.885		
PU	0.332	0.586	0.544	0.644	0.514	0.063	0.538	0.471	0.368	0.134	0.098	0.232	0.467	0.575	0.611	0.835	
PO	0.313	0.626	0.613	0.656	0.564	0.014	0.601	0.579	0.423	0.178	0.212	0.347	0.523	0.538	0.565	0.737	0.753

* CN is construct name.

Table 8. Results of hypotheses testing.

Hypothesis	Path	Path Coefficient (β) (>0.10)	t-Value (>1.96)	p-Value (<0.05)	Inner VIF (<5.00)	Supported
H1	LQ -> PH	0.159	3.114	0.002	1.147	Yes
H2	PC -> PH	0.251	4.543	0.000	1.498	Yes
H3	NW -> PH	0.448	7.723	0.000	1.594	Yes
H4a	PH -> PP	0.219	3.957	0.000	1.745	Yes
H4b	PH -> PU	0.358	7.515	0.000	1.817	Yes
H4c	PH -> PO	0.255	5.558	0.000	2.098	Yes
H5	UF -> PL	0.136	2.173	0.030	2.217	Yes
H6	EU -> PL	0.240	6.084	0.000	1.031	Yes
H7	EJ -> PL	0.201	3.518	0.000	2.261	Yes
H8	PW -> PL	0.328	5.813	0.000	2.057	Yes
H9a	PL -> PP	0.128	3.214	0.001	1.182	Yes
H9b	PL -> PU	0.178	2.169	0.030	1.207	Yes
H9c	PL -> PO	0.127	3.789	0.000	1.210	Yes
H10	SN -> MR	0.199	2.138	0.033	1.228	Yes
H11	PV -> MR	-0.224	3.302	0.001	1.654	Yes
H12	HB -> MR	0.207	3.069	0.002	1.503	Yes
H13	SC -> MR	0.411	6.660	0.000	1.372	Yes
H14a	MR -> PP	0.354	5.893	0.000	1.658	Yes
H14b	MR -> PU	0.152	2.601	0.009	1.847	Yes
H14c	MR -> PO	0.053	1.094	0.274	1.796	No
H15	PP -> PU	0.331	5.394	0.000	1.506	Yes
H16	PU -> PO	0.495	10.154	0.000	1.907	Yes

According to Table 8, the analysis outcome can be explained as follows:

1. Low Quality Platform (LQ): H1 has influenced Push (PH) ($\beta = 0.159$, t -value = 3.114, p -value = 0.002, Inner VIF = 1.147)
2. Privacy Concern (PC): H2 has influenced Push (PH) ($\beta = 0.251$, t -value = 4.543, p -value = 0.000, Inner VIF = 1.498)
3. Negative WOM (NW): H3 has influenced Push (PH) ($\beta = 0.448$, t -value = 7.723, p -value = 0.000, Inner VIF = 1.594)
4. Push (PH): H4a, H4b and H4c have influenced Pre-purchase (PP) ($\beta = 0.219$, t -value = 3.957, p -value = 0.000, Inner VIF = 1.745); Purchase (PU) ($\beta = 0.358$,

- t -value = 7.515, p -value = 0.000, Inner VIF = 1.817); and Post-purchase (PO) (β = 0.255, t -value = 5.558, p -value = 0.000, Inner VIF = 2.098)
5. Usefulness (UF): H5 has influenced Pull (PL) (β = 0.136, t -value = 2.173, p -value = 0.030, Inner VIF = 2.217)
 6. Ease of Use (EU): H6 has influenced Pull (PL) (β = 0.240, t -value = 6.084, p -value = 0.000, Inner VIF = 1.031)
 7. Enjoyment (EJ): H7 has influenced Pull (PL) (β = 0.201, t -value = 3.518, p -value = 0.000, Inner VIF = 2.261)
 8. Positive WOM (PW): H8 has influenced Pull (PL) (β = 0.328, t -value = 5.813, p -value = 0.000, Inner VIF = 2.057)
 9. Pull (PL): H9a, H9b and H9c have influenced Pre-purchase (PP) (β = 0.128, t -value = 3.214, p -value = 0.001, Inner VIF = 1.182); Purchase (PU) (β = 0.178, t -value = 2.169, p -value = 0.030, Inner VIF = 1.207); and Post-purchase (PO) (β = 0.127, t -value = 3.789, p -value = 0.000, Inner VIF = 1.210)
 10. Social Norms (SN): H10 has influenced Mooring:Inertia (MR) (β = 0.199, t -value = 2.138, p -value = 0.033, Inner VIF = 1.228)
 11. Price Value (PV): H11 has negative influenced Mooring:Inertia (MR) (β = −0.224, t -value = 3.302, p -value = 0.001, Inner VIF = 1.654)
 12. Habit (HB): H12 has influenced Mooring:Inertia (MR) (β = 0.207, t -value = 3.069, p -value = 0.002, Inner VIF = 1.503)
 13. Switching Cost (SC): H13 has influenced Mooring:Inertia (MR) (β = 0.411, t -value = 6.660, p -value = 0.000, Inner VIF = 1.372)
 14. Mooring:Inertia (MR): H14a and H14b have influenced Pre-purchase (PP) (β = 0.354, t -value = 5.893, p -value = 0.000, Inner VIF = 1.658) and Purchase (PU) (β = 0.152, t -value = 2.601, p -value = 0.009, Inner VIF = 1.847), respectively, but H14c has not influenced Post-purchase (PO) (β = 0.053, t -value = 1.094, p -value = 0.274, Inner VIF = 1.796)
 15. Pre-purchase (PP): H15 has influenced Purchase (PU) (β = 0.331, t -value = 5.394, p -value = 0.000, Inner VIF = 1.506)
 16. Purchase (PU): H16 has influenced Post-purchase (PO) (β = 0.495, t -value = 10.154, p -value = 0.000, Inner VIF = 1.907)

Table 8 illustrates that all input hypothesis factors positively influenced negative factors, positive factors, and Mooring. It consists of LQ, PC, NW, UF, EU, EJ, PW, SN, HB, and SC, except for the “PV” factor that negatively influences Mooring (MR).

All Push and Pull inputs mentioned influenced the process of Pre-purchase, Purchase, and Post-purchase of products. At the same time, the Mooring factor influenced Pre-purchase and Purchase, but it did not influence Post-purchase, as shown in Figure 3 below.

5.3. Model Fit

Model fit is based on all proposed model structures. The analysis results of Model fit can be divided into three parts. The first part is the determination coefficient (R^2) [128] with the criteria that if the determination coefficient (R^2) < 0.19, the model is unacceptable. If the value is between 0.19–0.33, the model is acceptable at a low level. If the value is between 0.33–0.67, the model is acceptable at a moderate level, and if the value > 0.67, the model is acceptable at a good level. Besides, the R^2 value of all constructs will be acceptable at a moderate level when Post Purchase (PO), Purchase (PU), PUSH (PH), PULL (PL), Pre-purchase (PP), IN-Mooring (MR) are 0.615, 0.548, 0.489, 0.456, 0.336, and 0.329, respectively, as shown in Figure 3. The second part is that the Standardized Root mean square residual (SRMR) value is not greater than 0.08 [118,129–132] with the value of 0.042 considered an acceptable value. The third part is the Goodness of fits (GoF) value which is calculated from the square root of the multiplication between the mean of the determination coefficient (R^2) and AVE, where the acceptable threshold is <0.1 No FIT, 0.1–0.25 Small, 0.25–0.36 Medium, >0.36 Large [133] with a GoF value of 0.567 as shown in (2) below.

$$GoF = \sqrt{\bar{R}^2 \times \overline{AVE}} = \sqrt{0.462 \times 0.696} = \sqrt{0.322} = 0.567 \quad (2)$$

6. Discussion of Findings and Interpretation

This research aims to study the negative factors (Push effect), positive factors (Pull effect), and Mooring factors that influence Pre-purchase, Purchase, and Post-purchase decisions in users buying products from online shopping applications. Furthermore, this research demonstrates an in-depth understanding of online consumers' changing behavior at each purchasing decision stage that can help to develop applications to retain current users while acquiring new users. Previous studies have not examined the influence of the purchasing process on customers' use of online applications. However, negative factors, positive factors, and Mooring factors are studied in various aspects such as offline-to-online shopping, Social commerce, cloud storage usage, and application usage on a mobile phone.

6.1. Comparisons between a Proposed Research Model and Previous Works

The analysis outcomes of the 22 hypotheses in Section 5.2 revealed that all negative, positive, and Mooring factors directly affected the Pre-purchase, Purchase, and Post-purchase behaviors of customers who were online shopping on the application. In addition, the Mooring factor had a significant direct effect on Pre-purchase and Purchase behavior but did not significantly affect the Post-purchase process. The analysis outcome can be adapted for SME-Commerce applications because using an application to purchase involves various processes. Therefore, SME businesses could understand online consumer behavior regarding hypothetical factors and the study outcomes obtained. The results from this research can be compared with the previous research by division into two groups as follows:

The first group is a research group that combines technology acceptance adoption theories with PPM theory to study the adoption and use of technology by grouping negative, positive and Mooring factors that influence various inputs. Both internal and external factors affect the changing of online consumer behavior for Online commerce. This research categorized all inputs into 11 factors and 3 groups as follows:

- (1) Push effect consists of three factors (LQ, PC, NW) which have a positive influence on PUSH factor (PH) with three negative factors based on the literature review: (1.1) Low-quality platform (LQ) with related studies showing LQ influences consumer behavior to change from E-commerce to Social commerce [47]; travelers' switching behavior in the airline industry [88]; and Mobile commerce in China [43]; (1.2) Privacy concern (PC) with related studies showing that PC influences behavioral changes of mobile instant messaging applications in China [49], PC for Online commerce [107], and Mobile Commerce in China [43]; (1.3) Negative WOM (NW) with related studies showing NW influences the social network usage [38], and Facebook commerce usage [28].
- (2) Pull effect consists of four factors (UF, EU, EJ, PW) which have a positive influence on the PULL factor (PL) with four positive factors based on the literature review: (2.1) Usefulness (UF) with related studies showing that UF influences mobile payment application usage acceptance [78] and the intention of consumers in the US and India to buy products on a mobile phone [93]; (2.2) Ease of Use (EU) with related studies showing that EU influences the purchase of plane tickets on the website [126]; (2.3) Enjoyment (EJ) with related studies showing that EJ influences mobile payment application usage acceptance in Cameroon [105], and the acceptance of Social commerce usage in Saudi Arabia [101]; (2.4) Positive WOM (PW) has related studies showing that PW influences the change of consumer behavior from offline to online [1], social network usage [38], and Facebook commerce usage [28].
- (3) Mooring effect consists of four factors (SN, PV, HB, SC). There are three factors (SN, HB, SC) that positively influenced Mooring (MR). However, there is one factor (PV) that negatively influenced Mooring (MR). The literature review related four positive factors. These include: (3.1) Social Norms (SN). SN has related studies indicating that it influences online purchasing in men and women, for both digital goods and non-digital goods [107]; (3.2) Price Value (PV). PV has related studies showing that it influences the purchase of plane tickets on the website [126]; (3.3) Habit (HB) has related studies showing that it influences the acceptance of Social commerce usage [77];

(3.4) Switching Costs (SC) has related studies showing that it influences the changing of mobile personal cloud storage services behavior [41,61], the changing of mobile shopping behavior [48], online health services [109], and the changing of Starbucks mobile application usage behavior [42].

According to the studies mentioned before, seven main factors from technology acceptance adoption theories, including four additional input factors all influenced the adoption and use of technology. The research outcome is consistent with this research. The result shows that all 11 inputs have a negative influence. However, Price Value is the only factor in this study that negatively influenced Mooring since the Price Value may not be a factor that promotes Mooring. It is the indirect effect that affects a negative factor or a positive factor.

The second group brings three factors together. Namely, the negative factor, positive factor, and Mooring factor from PPM theory integrated with the three stages of online consumer behaviors for Online commerce. This research revealed that:

- (1) Positive factors influenced three main purchasing processes: the Pre-purchase, Purchase, and Post-purchase stages of online purchasing. However, according to the literature review of related studies, TAM theory (Perceived Usefulness and Perceived Ease of Use) was mentioned as a positive factor influencing five Decision Making Processes (DMPs) in Online commerce [16].
- (2) Negative factors influenced three main purchasing processes: the Pre-purchase, Purchase, and Post-purchase stages of online purchasing. In addition, Mooring factors influenced two purchasing processes (the Pre-purchase and the Purchase process of online purchasing) but they did not influence the Post-purchase stage.

In the literature review of the two mentioned groups in this second group, there is no research related to this group that can be compared. The reason for this is that previous research used PPM for changing online consumer behavior only.

This research was analyzed clearly in order to apply the results for the application development of Online commerce to be more concrete. The theoretical and practical are explained in the next section.

6.2. Implications

6.2.1. Theoretical Implications

The previous research applied Push-Pull Mooring Theory to study factors that influence the changing behavior in various fields, including E-commerce, M-commerce, and S-commerce, and to acknowledge the factors that influence the products and services that were purchased. However, based on the literature review, there is no research related to factors influencing the decision-making process through application usage. This research studies consumer behavioral changes resulting from negative, positive, and Mooring factors that influence the decision-making process of online shopping application usage through PPM theory and inputs from technology acceptance adoption theories. Other factors have also been considered in this study in order to acquire a profound understanding of factors and online consumers' behavior in Online commerce. This research uses both internal and external factors from technology acceptance adoption factors and other factors influencing online shopping, as well as negative, positive, and Mooring factors. The research has been categorized to cover factors that influence consumer behavior and to deeply understand it. Moreover, this study is the first research that applied the in-app purchase process to reach a better understanding of how consumers use applications step-by-step, in order to develop applications to retain current users and acquire new users in the future.

6.2.2. Sustainable Guideline for Practical Implications

The previous section explained the implications of the theories applied to this research. This section explains the descriptive analysis in terms of practical usage. The details are described as follows.

For the research summary, application service providers could use research outcomes to develop systems or online shopping platforms in three ways. First, in the efficiency of

application design and support function. (1.1) The online application must be stable and secure, starting from the application process, first usage, and the privacy of the applicants' data (PC factor). The application service providers must request only the information that is necessary for member registration. They should also specify the purpose of requesting this information and obtain consent from the applicant. (1.2) The application service providers must create security for payment methods, user interface design, and application layout to be user-friendly, convenient, and easy to use. For example, member registration, products, or shop searching perform closely with the search engine to find products accurately. In addition, searching for products based on pictures, stock shows, and product filters only present results that are of interest to the searcher. For example, interesting products, prices, promotions, deals, payment, and active voucher redemption. An after-sales service could make users feel that the application is easy to use. The application service providers could create a short video clip for users in order to introduce the application's functions. Thus, users will become familiar with future purchases. This reduces Mooring caused by unfamiliarity with the application. The HB factor can change online purchasing behavior. (1.3) Using modern technology to facilitate applications (EU factor) such as Artificial Intelligence (AI) or Machine Learning (ML) is related to comparing the same type of product by price (PV factor), sales, and rating (Negative and Positive WOM) from buyers who have bought the same product in each shop according to its popularity. The reason for this is that many shops may use the same product pictures and descriptions. Thus, it is difficult and time-consuming for customers to decide which products they will add to their shopping cart. (1.4) Various payment methods such as credit card, bank transfer, and cash on delivery (COD) allow customers to select their applicable payment method and personal data privacy (PC factor) while making a payment.

Second, the strengthening of marketing strategies can build customer satisfaction with online shoppers. (2.1) Special deals that encourage customers' purchasing, such as discount promotions, vouchers, and a voucher redemption system that is not too difficult to use (LQ factor), or auto-apply the best voucher for users are called "Ease of Use" factors (EU factor). These are marketing strategies that could encourage users to use the application and lead to re-purchasing and recommendations to others in order to attract new users. (2.2) Free shipping or discount on shipping: since some product prices are lower than the shipping price, free shipping or a shipping discount is attractive to customers as it creates a sense of value gained from lower price (PV factor). Alternatively, offering the retail price and wholesale price can lead to more customers. When customers purchase more, it causes the product's price to decrease. (2.3) Motivating customers through entertainment (EJ factor) could make them perceive enjoyment in the user experience. Application service providers should use technologies that help to process reviews and analyze customer purchase data accurately to improve products and satisfy shoppers (EJ factor). (2.4) The selection of a brand ambassador of the application/platform to reflect the brand image. Thus, most brand ambassadors are celebrities or famous people as they can entertain people. The platform might also conduct activities for brand ambassadors and users (SN factor). (2.5) Offering more shipping services results in faster delivery within 1–2 days. This makes users feel that shopping online is good. They could be confident when shopping online (UF factor). (2.6) Ensuring post-payment processes (UF factor) through the payment holding system for "Seller or shop" until the product is shipped to buyers safely, for example. For the refusal of shipment from the seller or the store due to the seller's own feed, customers can chat with the seller directly. When the customer wants to return, they have to pay for the return shipping cost by themselves. (2.7) The opportunity for both positive and negative purchase opinions (Positive and Negative WOM factors) to let customers review "sellers or shops": The review could confirm the satisfaction of product quality and good service provided by sellers for business sustainability [134].

The third use of research outcomes is to empower the application service providers, sellers, and buyers. (3.1) For the application service providers, one could expand channels to reach new buyers such as web applications, mobile applications, or social media applica-

tions including Facebook or LINE to reduce the purchase decision making and improve the convenience for shoppers when buying products (UF factor). Moreover, the system or platform can be expanded in other countries for members, sellers, or shoppers to strengthen the business potential and credibility. (3.2) Sellers or shops that receive popularity and reviews (Positive WOM) from buyers will receive special benefits from the application provider. The shop level could be categorized into Gold, Silver, and Platinum with different benefits. For example, the seller can allocate special deals for buyers who want to buy products in large quantities. The seller can also feature products on the homepage banner where customers can see products clearly, as well as running a stock management service provided by the application for faster shipment. (3.3) Buyers who frequently purchase products by the application will receive special privileges from the application service provider. The membership level is Gold, Silver, or Platinum. Buyers at different levels will receive different benefits, such as discount coupons, shipping discounts (PV factor), or other benefits to reduce the chance of buyers buying products (SC factor) from other applications.

All of the above-mentioned practical implications can be summarized as the significant input factors, as shown in Table 9 below.

Table 9. Outcomes of significant input factors effects to three stages of online consumer behaviors.

Significant Input Factors	The 1st Stage ("Pre-Purchase")	The 2nd Stage ("Purchase")	The 3rd Stage ("Post-Purchase")
Push effect	LQ, PC, NW	LQ, PC, NW	LQ, PC, NW
Mooring effect	SN, PV, HB, SC	SN, PV, HB, SC	-
Pull effect	UF, EU, EJ, PW	UF, EU, EJ, PW	UF, EU, EJ, PW

Push Effect and Three Stages of Online Consumer Behaviors

Changing Pre-purchase, Purchase, and Post-purchase behavior is influenced by three negative factors, including "LQ", "PC" and "NW", which can be described with the functional design of the application [74] in each process as follows:

The Pre-purchasing process on a web or mobile application starts from problem recognition, awareness, information search, or the evaluation of alternatives to add products to a shopping cart, and finds whether online consumers are dissatisfied with the application. For example, if the application is difficult to use; if it contains incorrect product information; if there is difficulty finding the product information; if the incorrect product price is displayed; if the application does not perform sufficiently (LQ factor); or if the user receives privacy (PC factor) concern notifications or negative comments about the application (NW factor). These factors could cause customers to use other applications or not want to use the application in case customers did not register yet.

The Purchase decision process includes whether the application displays product information or product price information incorrectly (UF factor); involves complicated payment methods (EU factor); offers no variety of payment methods; lacks a security system; and has issues with the privacy of user data (PC factor), or negative feedback (NW factor) on the payment process. These factors could make customers switch to other applications.

In the Post-purchase process, users who have used the application or made purchases through the application expect to review the product received in the section that represents product reviews or ratings (WOM) on that product. In addition, negative feedback from users has a significant impact on current users and new users. In some cases, ineffective management from application service providers that could not satisfy customers also leads customers to use other applications in order to avoid the same and further problems.

Pull Effect and Three Stages of Online Consumer Behaviors

Changing Pre-purchase, Purchase, and Post-purchase behavior is influenced by four positive factors: “UF”, “EU”, “EJ” and “PW”, which can be described with the functional design of the application [74] in each process as follows:

Usefulness (UF) positively affects application usage since consumers have received information from advertisements that purchasing products through the application is convenient and safe until they are expected to try products. If users can search products (information search) or evaluate products (evaluation of alternatives), and then put products in the shopping cart with a convenient, fast, and efficient process, it will result in customer satisfaction. For the Ease of Use (EU factor), users will be happy to use the application if the application has a support function to facilitate the purchase process. Moreover, effective operating conditions give consumers a better feeling of using the application as it is more user-friendly, starting from registration, product search, and the decision-making process for purchasing.

Regarding the Enjoyment (EJ factor), users will feel entertained by searching for products or looking at other products in the application and selecting products from various shops in the Purchasing decision process. The reviews of applications available on various sources such as social media, (Positive WOM (PW factor)) will affect the attraction of users, making them enjoy using the application. Positive reviews on products that users have previously bought and reviewed with positive ratings make users interested in that product. The product might be added to the shopping cart and wait for the decision-making process.

During the Purchase decision, when customers select a product and wait to check out, visible product price details, price, and various payment methods would be convenient for the customers (EU factor). Moreover, auto-apply vouchers or coupons could satisfy customers and lead to Enjoyment (EJ factor). If the payment method is safe on the check-out page, customers will perceive that the application is convenient and beneficial to them (UF factor). For this reason, positive factors directly influence the Purchasing process. If users are satisfied with the application there is an opportunity that they will continue using the application in the future.

In the Post-purchase process, the customer has completed the payment. Then, the seller will ship the products. If the product is shipped to customers without problems with fast shipment and in good condition, customers will be satisfied and perceive that online shopping is convenient (EU factor), fast, and useful (UF factor), leading to acceptance of the technology and perceived Enjoyment (EJ factor). Therefore, there is a chance that they will continue using the application. Customers might want to review products or share their experience of using the application in a positive way (PW factor). They might recommend applications to others and re-purchase products through the application.

Mooring Effect and Three Stages of Online Consumer Behaviors

Changing Pre-purchase, Purchase, and Post-purchase behavior is influenced by four Mooring factors: “SN”, “PV”, “HB” and “SC”, which can be described with the functional design of the application [79] in each process as follows:

In the Pre-purchase stage, starting with awareness, pressure from surrounding people who used the application influences users who aim to use the application to a Mooring (SN factor). For information search and the evaluation of alternative products to add to a shopping cart, users will use their habit of application usage on various menus on the product search bar to achieve the goal of searching for the product or shop (HB factor). Moreover, visible product price in the application of each shop, seasonal discounts (PV factor), and other marketing plans are essential to creating Mooring for customers to change applications for online shopping. At the same time, in the Pre-purchase process, customers are also Mooring to change the application. However, they may regret the opportunity to lose the benefits they can receive (SC factor), such as reward points or discounts that customers have collected while using the application.

The Purchase stage is the essential stage for the decision-making process. Customers might engage in Mooring when people around them influence customers' decision-making (SN factor). Marketing planning related to social norms increases the pressure on individuals to change their application usage behavior, e.g., promotions, discounts, or other benefits that might be worth acquiring (PV factor). They also regret the loss of benefits that they could receive (SC factor), such as using credit card points to pay for products, payment via credit card with installments without paying interest, and double credit card points. These factors cause customers' Mooring that may change the behavior of application usage.

Mooring does not affect the Post-purchase process due to factors such as Social Norms (SN factor), benefits that may arise (PV factor), regrets from losing opportunities in self-benefits (SC factor), or automatic responses to behavior (HB factor). These factors do not significantly influence online consumer behavior because the user has gone through the purchase, so there is no Mooring in the post-purchase process, including the application usage for re-purchase or application recommendation to other people.

7. Conclusions, Limitations and Future Research

7.1. Conclusions

According to the analysis of this research, the study of factors in various fields can be concluded as (1) the impact of the Push factor in terms of low-efficiency systems (negative Ease of Use/Effort Expectancy) and negative WOM; (2) Pull factor in regard to system benefits facilitation, entertainment, and positive word-of-mouth significantly affects Pre-purchase, Purchase and Post-purchase behaviors of online purchasing on applications; and, (3) the results also show Mooring factors in terms of social norms, habit, and switching cost affecting online consumers' pre-purchase, Purchase, and Post-purchase purchasing behavior. On the other hand, the cost-effectiveness factor could reduce consumer behavior change as well. However, the Mooring factor has no significant influence on the Post-purchase process.

The summary of this research provides an in-depth understanding of the Push-Pull Mooring theory based on factors from technology acceptance adoption theories that influence behavioral changes (Change the shopping application) for three stages of online shopping behaviors (Pre-purchase, Purchase, and Post-purchase). The Push effect influences the online shopping decision process through the application. Behavioral changes in the Pre-purchase, Purchase, and Post-purchase stages were influenced by three negative factors, including "Low-quality platform", "Privacy concern", and "Negative WOM". The Pull effect influences the online shopping decision process on the application. Behavioral changes in Pre-purchase, Purchase and Post-purchase were influenced by four negative factors, including "Usefulness", "Ease of use", "Enjoyment", and "Positive WOM". The Mooring effect influences the online shopping decision process through the application. Behavioral changes in Pre-purchase, and Purchase were influenced by four negative factors, including "Social Norms", "Price Value", "Habit", and "Switching Costs", while four Mooring factors do not influence the Post-purchase process.

7.2. Limitations and Future Research

There are some limitations to this research which can provide guidance and insights for future research.

First, the factors studied in this model include 11 positive factors, negative factors, and Mooring factors which may not be complete. The research led to the formulation of a hypothesis based on factors from the literature review, and added the most suitable factors for this research. However, future studies may add factors in all three aspects for a more complete analysis and further applications.

Second, shopping through social applications (Social commerce) differs between web and mobile applications. For example, the lack of a product search bar, and no shopping carts. In addition, different influencing factors prevent the use of research models in

analytics for social applications. Future studies may hypothesize the appropriateness of the purchase channels through Social commerce.

Finally, this research did not specify the types of products studied. The purchase of certain products may be different. Moreover, the research model does not meet the assumptions, including various factors, such as input factors or even the process of making a purchase decision. Therefore, future studies may identify specific product categories or high-priced products which could bring about different research outcomes.

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