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Research article

A retentive consumer behavior assessment model of the online purchase decision-making process

Thanatchaphan Petcharat, Adisorn Leelasantitham *

Technology of Information System Management Division, Faculty of Engineering, Mahidol University, Nakhon Pathom, Thailand

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ABSTRACT

Nowadays, most shoppers use e-business online platforms. However, consumer behaviors need to be studied in terms of satisfaction and the intention to purchase and re-purchase according to the online shopping process because online shopping platforms still have influenced their usage behaviors. This work proposes a retentive consumer behavior assessment model of the online shopping platforms through integration of Technology Acceptance Model and Online Purchase Decision-Making Process with two input factors: Trust and Quality. A questionnaire designed according to all factors from the proposed conceptual model is used to collect data from a sample group. The participants of this study are 384 respondents who have experienced using online shopping platforms. The data is used to analyze causal relationships through the use of structural equation modeling. The results showed that the proposed model can be explained for the relationship with consistent E-Business platforms affecting purchase and continue to purchase (re-purchase or recommend) behaviors of online trading users, and it also can be used to assess purchasing behaviors and repeating purchases of online consumers through 3 types of E-businesses: E-commerce, M-commerce, and S-commerce. The benefit of this study will help online shopping businesses to strategize the development of designed platforms for consumers' needs.

1. Introduction

With the rapid and continuous advancement in ICT technology, the traditional business has been transformed into online business (electronic business or e-business) with the help of the internet (Google et al., 2019; Keenan, 2019). On average, internet users spend 6 h and 42 min daily online (Wearesocial, Digital, 2019; Kemp, 2020). In addition to these additional times, the latest data suggests that social platforms also expanded their active user based on the first three months of 2020. The ranking of the top 3 social platform users in descending has ordered as Facebook, YouTube, and WhatsApp (Wearesocial, Digital, 2020). Thailand has ranked 3rd for spending 9 h and 11 min daily online (Driediger and Bhatiasevi, 2019). Moreover, Thailand has achieved the first rank for using the Internet via a cell phone for an average of 5 h and 13 min daily, more than the global average of 3 h and 14 min (Sugla et al., 2015; Statista.com, 2020a; Statista.com, 2020b).

For decades, the activity of electronically buying or selling products through online services or via the Internet, called E-commerce, has been established (Sullivan and Kim, 2018; Li and Ku, 2018). Statically, more Americans prefer online shopping than physical in-store shopping whilst 51% of them choose to click to shop. Moreover, 96% of Americans have made an online purchase at least once in their lives whilst 80% of them have purchased in the last month. Amazon is reported for 44% of all E-commerce sales in the US from 2017 to 2021, and the growth rate of the year by year is at 23% in the US. It can be shocking that 46% of American businesses do not use their website for selling products and services, but they will use online shopping platforms (Osman, 2021). Centre for Retail Research (2019) reports that 84% of Internet usage is for searching products and services while 75% of Internet usage is for purchasing online products and services. Thailand has ranked 5th in using the Internet for E-commerce with about 80%. Why does mobile commerce matter? Mobile e-commerce sales are reported for 34.5% of the total e-commerce sales from 2017 to 2021, and the number is growing. In 2021, mobile e-commerce sales are expected to include 54% of the total e-commerce sales. Moreover, the users of mobile have influenced the decision of their buying even though they are in a physical brick-and-mortar store. One third of the decision to purchase is influenced by information search on a product via their mobile device (Mali, 2021). In addition, Figure 1 shows that the demand for internet data services has increased to accommodate the shift to online activities,

* Corresponding author.
E-mail address: adisorn.lee@mahidol.ac.th (A. Leelasantitham).

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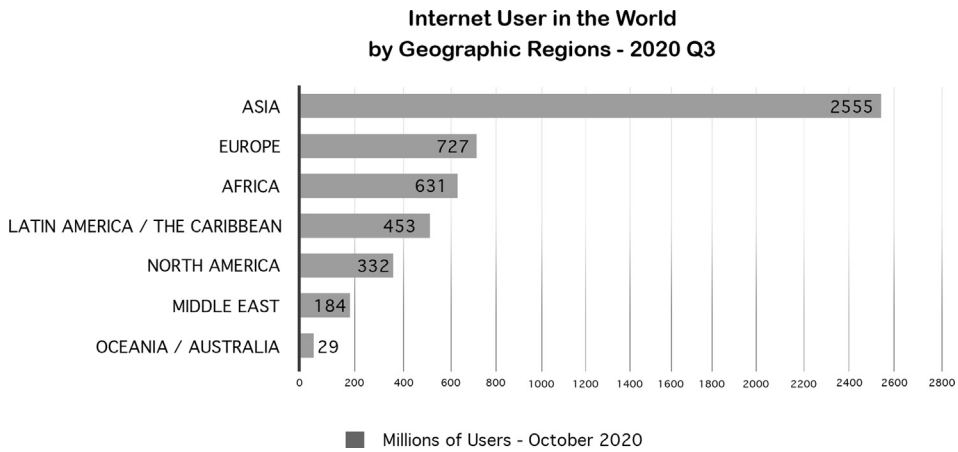

Figure 1. Internet users in the world by geographic regions - 2020 Q3 (Marketing Group., 2020).

especially in commercial aspects (Marketing Group., 2020). The growing number of Internet users has shown a tendency to shift people's behavior towards more Online lifestyles, especially in trade. This has led to a rapid increase in online purchases of goods and services. It also may affect consumer behavior towards convenience and easy decision-making when buying products or services online.

With the recent and ongoing pandemic e.g. coronavirus disease 2019 (COVID-19), the online business opportunity has been greatly widened as a result of enforcing social distancing, stay-at-home order, shop closures, and other measures in response to suppressing the pandemic. Demand for internet data services and logistics has increased to accommodate the shift to online activities, especially in commercial aspects. This has led to a spike in online purchases of products and digital services; and, this may affect consumers' behavior towards online shopping from experiencing the convenience of it. With the change of trends to online business, although the sale rate has been noticeably higher for sellers as shown by the aforementioned statistics, bargaining power has been shifted to the buyer since they can obtain more details of products and compare prices more comfortably before buying. This leads to be more competitive to satisfy the buyers in an online market and to be less concerned about the brand loyalty (Ratchatanon et al., 2019). The intensive competition of online business thus causes a higher expectation for buyers. From such information, it can be seen that perceived factors of buyers and other environmental factors could be affected to online consumers' satisfaction as customer satisfaction leads to a successful business (Pham and Ahammad, 2017). Online customer satisfaction may relate to many factors such as quality of the product (Kotler and Armstrong, 2012) or service, price, details of product and promotion, ease of use, and security of payment process (Liang and Turban, 2011; Kim and Park, 2013).

According to the previous literature, the research can be divided into 2 categories. The first group is related to the perceived factors involving e.g. technology acceptance model (TAM) (Law et al., 2016; Gibreel et al., 2018; Driediger and Bhatiasevi, 2019; Pena-Garcia et al., 2020), unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003; Kim et al., 2010; Gao et al., 2015; Dakduk et al., 2020) concerning online shopping decisions, etc. Such perceived factors of feelings have directly affected the decision or intention to purchase a product or service. Most of this research group has only talked about the factors that influence the purchase of goods. However, it still did not explain the important trading processes including evaluation and re-purchase which will make the consumer behavior with clearly more details. The second group is involved in decision-making process (DMP) for shopping the online platform to study behavioral users affecting an online business achievement e.g. the online purchase DMP originated from the "EKB Model" (Engel et al., 1978, 1986), and developments of the online purchasing DMP (Darley et al., 2010; Huang and Benyoucef, 2017; Karimi et al., 2018; Faulds et al., 2018). However, such DMP did still not consider the perceived factors and a function of selecting the products into a shopping cart to exploit the filter and help of decisions before buying products through online platforms. In addition, Zhao et al. (2020), Lobel Trong Thuy (2020), Meilatinova (2021), and Tuncer (2021) have proposed the two separated factors which are quality and trust defined as two processes of need recognition and information search, respectively. These research papers have indicated that the quality will influence the trust using eWOM of influencers who have persuaded intention to purchase or post-purchase. However, no research papers have been reported in both quality and trust together as antecedent factors on the DMP to assess and convince completely re-purchased behaviors of consumers by the platforms. Therefore, the research questions are as follows:

How do the E-Business platforms influence online users' behavior and repeat purchases?
How can TAM, DMP, trust and quality be used to assess consumer behavior and repeat purchases?

In this research, TAM and the online purchasing process, additional factors (Trust and Quality) are proposed for a new conceptual model. This is because both factors are important in building confidence among the users of the platform (Hajiheydari and Ashkani, 2018; Cui et al., 2020; Tuncer, 2021). However, it has not been reported to assess the online platform's user behavior using integration between the technology acceptance model and the online decision-making process. Especially, the shopping cart process has not been mentioned in the literature, while the recommendations will help promote the online platform of users repurchase. Whilst these two research groups together will provide a more comprehensive understanding of the behavior of buying goods or services online to achieve the highest consumer satisfaction. Therefore, this research can be applied for a retentive consumer behavior assessment model of the online purchase decision-making process through the use of services and products in the electronic business (e-business) platforms,i.e., E-Commerce, M-Commerce, and Social-Commerce (see Appendix). More and more people are turning to use the Internet, creating new habits in communicating through social platforms. This is why a trade or business must use E-business platforms, and the reason to study these services is that humans now use them as tools or a channel for online purchases of goods or services to support the purposes of this study. The results will be generated and collected online (Online questionnaire). The target group is those over 18 years old who have previous experience in purchasing products or services online. In addition, the data analysis process is analyzed and explained in descriptive statistic form such as Mean, S.D. and Inferential Statistic Analysis for

Measurement Model and Structural Model using SmartPLS V3.3.0 program. The rest of this paper can be structured in the following Sections: 2. Literature Review and Theoretical Framework, 3. Proposed Research Model and Hypotheses, 4. Research Methodology, 5. Findings, 6. Discussion and Interpretation, and 7. Conclusions, Limitations, and Future Work.

2. Literature Review and Theoretical Framework

This section will explain more details about two categories which are depicted and introduced from Section 1. Firstly, many E-business platforms have been reported in the use of technology acceptance theories. What are the differences between TAM and UTAUT? Secondly, the online DMP is summarized by comparisons between each stage and behavior types. Such the process is also another basic theory to apply our proposed model; thus, a summary of its concepts and relevant information are given.

2.1. Online shopping based on technology acceptance

In general, most of the research is related to the online trading of products and services. There have many theories to explain user behavior including, e.g., DOI (Rogers and Shoemaker, 1971), TAM (Davis et al., 1989), TPB (Ajzen, 1991), UTAUT (Venkatesh et al., 2003), and UTAUT2 (Venkatesh et al., 2012), etc. However, many research papers have used TAM and/or UTAUT that are mostly applied for shopping online purchases to describe the factors of the behavior of intention to users. Figure 2 shows comparisons of TAM (Davis et al., 1989) and UTAUT (Venkatesh et al., 2003). It can be seen from Figure 2 that two inputted factors of Perceived Usefulness (PU) and Perceived Ease of Use (PEU) for TAM are similar to Performance Expectancy (PE) and Effort Expectancy (EE), respectively, for UTAUT; whilst TAM does not have Social Influence (SI) and Facilitating Conditions (FC) but they will be the inputted factors of UTAUT. Moreover, two factors of process and output (both TAM and UTAUT) are Intention to Use (ITU) and Actual Use (AU), respectively, which are the same. However, TAM has an Attitude (ATT) whilst UTAUT does not have it; as a reason, the ATT factor is necessary to know how to use the user behavior by the E-business platforms. Therefore, this part will explain more the theory of TAM and summarize the comparisons of TAM and its extension with other theories in online purchases.

Technology Acceptance Model (TAM) is the well-known and widely accepted model in how users come to accept and use a technology (Davis et al., 1989). TAM is an extended form of Ajzen and Fishbein's Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) by replacing TRA's attitude measures with the measures specified for technology acceptance, including 'Perceived Usefulness' (PU) and 'Perceived Ease-of-Use' (PEU). PU is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" while PEU refers to "the degree to which a person believes that using a particular system would be free from effort" (Davis et al., 1989). According to the theory, the perception may change depending on users' attributes such as age, gender, culture and social status. TAM can be used to study how and when users will use new technology by finding factors that influence a user's decision. In detail, the Behavioral Intention (BI) is influenced by Attitude (AT) which is the general impression of the technology, as shown in Figure 2. Many papers have used the theory of TAM and its extension to study user's perception factors on online business and behavioral intention; therefore, Table 1 has summarized related studies on online purchase and intention to use through the use of technology acceptance theories and its extension according to three electronic businesses, i.e., E-commerce, M-commerce, and S-commerce. In Table1, there are many studies used in M-commerce (Kim et al., 2010; Zhang et al., 2012; Chong, 2013; Tan et al., 2014; Gao et al., 2015; Agrebi & Jallais, 2015; Liébana-Cabanillas et al., 2017; Mehrad and Mohammadi, 2017; Natarajan et al., 2017; Chou et al., 2018; Chi, 2018; Hajiheydari & Ashkani, 2018; Cui et al., 2020; Singh et al., 2020; Hsiao et al., 2016; Dakduk et al., 2020) based on TAM because they can be used for mobile-friendly, convenient, flexible, and accessible to consumers; whilst S-commerce (Gibreel et al., 2018) with TAM is focused on technology adoption along with purchasing influencing factors such as WOM.

It can be seen from Table 1 that most of the studies have the initial inputs of PU and PEU affecting the purchase intention through the use of

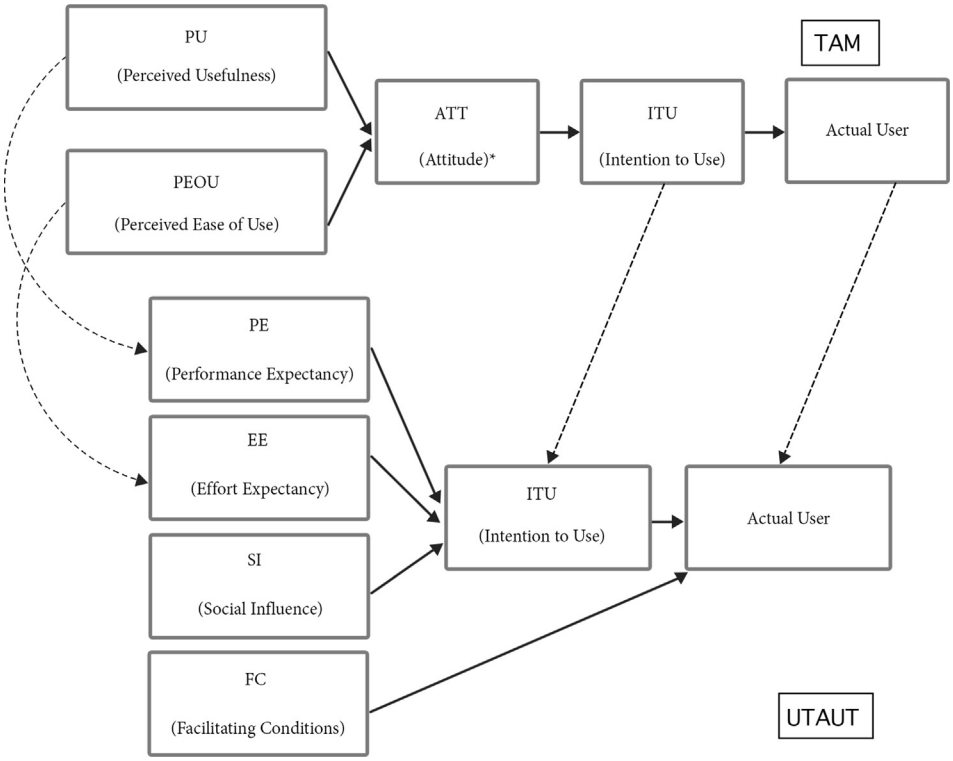

Figure 2. Comparisons of technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT).

Table 1. Summary of related studies on online purchase and intention to use through the use of technology acceptance theories and its extension.

Group	Year	Authors	Context	Based Model	Antecedents	Constructs	Outcome Variable (s)
E Commerce	2009	Lee	The adoption of internet banking	Trust, TAM	PU, PEU,PT	AT	Intention
	2016	Law et al.	Online purchase intention for middle-aged users	TAM	PU, PEU	AT	Purchase intention
	2019	Driediger and Bhatiasevi	Online grocery shopping	TAM	SN, PR, VIS, perceived enjoyment	-	Intention to use, Usage Behavior
	2020	Pena-Garcia et al.	Online purchase A cross-cultural	TAM,	PU,PEU	AT	Purchase intention
M-Commerce	2010	Kim et al.	Intention to use m-payment	TAM, UTAUT	Individual differences, MPS characteristics	PU, PEU	Intention to Use M-Payment
	2012	Zhang et al.	The factors that influence mobile commerce adoption	TAM	PU, PEU	AT,	Attitude, Behavioral intention, Actual use
	2013	Chong	Mobile commerce usage activities	TAM	PU,PEU,PT	-	Intention to adoption
	2014	Tan et al.	Intention to use mobile learning	TAM	PEU, PU, PIIT, SII	-	Intention
	2015	Gao et al.	Continuance intention towards mobile purchase	TAM, UTAUT, Information system success	System Quality, Information quality, Service quality, Privacy and security	PT, Flow, PS	Intention mobile purchase
	2015	Agrebi and Jallais	Intention to use smartphones for m-shopping	Extended TAM	PE	PU, PEU	Satisfaction, Intention to use
	2017	Liébana-Cabanillas et al.	Predicting antecedents of m-commerce acceptance	TAM	PU, PEU,PT	-	Behavioral intention
	2017	Mehrad et al.	Word of Mouth impact on the adoption of mobile banking	TAM	WOM,PT,SN	PU,PEU	Intention
	2017	Natarajan et al.	shopping applications and its influence on price sensitivity	TAM, DOI	PR,PU,PEU,PEJM, PI	Satisfaction, Intention to Use	Price Sensitivity
	2018	Chou et al.	Factors influencing the adoption of m-commerce	TAM, TPB	PU, PEO	Online Purchase Intention	Online purchase behavior
	2018	Chi	Consumer adoption of apparel mobile commerce	TAM	Brand Loyalty, Brand Association, Perceived Quality, Brand Image, Information Quality, System Quality, Service Quality	PU, PEU	Attitude, Intention to use
	2018	Hajiheydari and Ashkani	Mobile application user behavior in the developing countries	TAM	self-efficacy, Response efficacy, SQ, IQ,SQ,SN, Attitude,PT, PS, Flow	Mobile App Adoption, PBC PU,PEU	Intention to recommend
	2020	Cui et al.	Cross-border m-commerce (CBMC)	Adoption	Psychological Distance, Commitment-Trust Theory	Trust in This CBMC, Relationship Commitment	Intention to use
	2020	Singh et al.	The adoption and recommendation of mobile wallet services	TAM	PEU, PU, PR, Attitude	Intention to use, Perceived satisfaction	Recommendation to use
	2016	Hsiao et al.	Continuance usage of mobile social Apps	TAM	PU, PEU, Social Ties	PS, Habit	Continuance Intention
	2020	Dakduk et al.	Acceptance of mobile commerce in low-income consumers	UTAUT2	Performance Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Habit, Perceived Security and Perceived Trust	PT	Behavioral Intention
SCommerce	2018	Gibreel et al.	S-commerce development in emerging markets	TAM,	Familiarity, WOM, Technological Utility, Governing form factors	PT, PU	Intention to search, Intention to Buy

Abbreviation Legend: Compatibility (COM), Perceived Cost (PC), Perceived Ease of Use (PEU), Perceived Enjoyment (PEJ), Perceived Privacy (PP), Perceived Quality (PQ), Perceived Risk (PR), Perceived Security (PS), Perceived Trust (PT), Perceived Usefulness (PU), Personal Innovativeness (PI), Attitude (AT), Word of Mouth(WOM), Perceived satisfaction (PS), Performance Expectancy (PE), Social Influence (SI), Facilitating Conditions (FC), Hedonic Motivation (HM), Habit (H), Perceived Security (PS), Perceived Trust (PT).

the platform (Lee, 2009; Law et al., 2016; Pena-Garcia et al., 2020; Zhang et al., 2012; Chong, 2013; Tan et al., 2014; Liébana-Cabanillas et al., 2017; Natarajan et al., 2017; Chou et al., 2018; Hajiheydari and Ashkani, 2018; Singh et al., 2020; Hsiao et al., 2016). For example, there was a study of the differences in two countries between Spain and Colombia through the use of e-commerce to prove the user behavior using TAM e.g. PU, PEU, and Attitude affecting purchase intention (Pena-Garcia et al., 2020). Another example was to study intention to use by m-commerce of low-income consumers in Ecuador to prove the user behavior using UTAUT or UTAUT2 as the inputted factors i.e. PE, PT, and PS affecting the intention to use by m-commerce (Dakduk et al., 2020). However, such two studies are not yet aimed at repeat purchases. Therefore, most of the research papers using TAM in Table 1 are regarding online shopping and are directed towards Intention to purchase or Intention to use, but they do not consider the evaluation and post-purchase processes (Singh et al., 2020; Hajiheydari and Ashkani, 2018; Agrebi and Jallais, 2015).

2.2. Decision-making process

Trading traditional goods or services is an exchange of money. There is a salesperson providing information, presenting product information to customers, and putting information on the product packaging; then the customer makes a purchase decision. With the advancement in information technology and Internet access to all areas, consumer behavior has been changed in trading products, thus the adaptation of technology will help to reach more customers. Therefore, online trading systems have been occurred for purchasing products or services. They come in an era that requires online trading instead of traditional salespeople. The study of system design is widely undertaken to support customers' purchasing decisions. For example, in 2017, Pham has conducted studies on customer satisfaction resulted from an overview of the online process. Moreover, the design of all processes at each stage is critical to the success or impact of the customer's purchasing decisions for products or services (Pham and Ahammad, 2017). Later, Ozkara has studied the enjoyment factor and perception of information affecting the path and experience of the customer to shop online (Ozkara et al., 2017).

2.2.1. Online purchase decision-making process

Online purchase DMP is the process that the user of online trading products or services goes through before the final process is to decide to buy. The study will focus on the importance of DMP to design the platform or online tools to comply with the convenience of purchasing decisions. This will result in easier and more informed purchasing decisions. DMP is significant as it is a process that users who buy online products or services must go through before reaching the final process of making a purchase. In 2017, Huang and Benyoucef have conducted a study on customers' purchasing decisions. It has been found that the design to understand a customer's decision has been difficult. They have tested 5 processes about online DMP influencing customers' purchasing decisions (Huang and Benyoucef, 2017). In 2018, Karimi has presented a study on the differences in consumer behavior in purchasing decisions and consumer characteristics. When purchasing products, some information about the product has affected customers' purchasing decisions (Karimi et al., 2018). To decide on doing something, human has a thinking process to conclude it (Faulds et al., 2018). In 1959, Simon has published the framing process in step-wise decision-making as intelligence (gathering information), design (exploring alternatives) and choice (deciding) (Simon, 1995). In 2002, Liang and Lai has defined completely 5 processes for making decision regarding buying products and services as follows (see Figure 3):

(1) Need recognition: A process is to realize one's own wants or needs to buy.
(2) Searching for information: A process is to look for and gain related about information of products/services. This can result in many buyable candidates.
(3) Evaluation of alternatives: A process is to estimate and compare buyable candidates.
(4) Purchasing: A process is to make a payment to obtain a product/service.
(5) Post-purchasing: A process is to make after purchases e.g. reviewing, suggesting, complaining, and refunding, etc.

However, such 5 processes are not completely considered in the use of the practical platform, i.e., it still lacks a process of intention recognition locating between the evaluation process and the purchase process. This is a process function of the shopping cart that will help the user decisions for purchasing products and services. It also can be encouraged to re-purchased users in the future.

Table 2 shows the research related to the online DMP summarized and grouped according to three electronic businesses i.e., E-commerce, M-commerce, and S-commerce. It can be seen from Table 2 that Darley et al. (2010), Huang and Benyoucef, (2017), Karimi et al. (2018), and Faulds et al. (2018) have presented the online purchasing DMP as five processes in the platforms, i.e., E-commerce and M-commerce, but they did not study the factors influencing the DMP. There also have been four studies (Zhao et al., 2020; Lobel Trong Thuy, 2020; Meilatinova, 2021; Tuncer, 2021) in S-commerce (eWOM of influencers) using two separated factors i.e. Quality and Trust defined as need recognition and information search, respectively, of the DMP directing to intention to purchase or post-purchase. However, there has not been proposed a process of intention recognition occurred in the e-shopping cart function, as shown in Table 2. Therefore, the re-purchase process is still the primary goal of the online purchased platforms which should be supported by the process of shopping cart function.

2.2.2. Trust and quality in online purchase

As shown in Tables 1 and 2, human behavior should also be considered as two important factors influencing the use of online trading systems for products or services, especially the factors of Trust and Quality. It can be seen from Table 1 (TAM and its extension) that previous studies have focused on both Trust and/or Quality factors for online merchandise and services businesses (Lee, 2009; Chong, 2013; Gao et al., 2015; Liébana-Cabanillas et al., 2017; Mehrad and Mohammadi, 2017; T. Chi, 2018; Hajiheydari and Ashkani, 2018; Cui et al., 2020; Dakduk et al., 2020; Gibreel et al., 2018). In the case of Trust, it has given importance to confidence in the online platform placed in a product or brand, then trust and belief will be built with the advice of close people (Mehrad and Mohammadi, 2017; Hajiheydari and Ashkani, 2018; Chi, 2018). This has included confidence in quality data (Lee, 2009; Chong, 2013; Liébana-Cabanillas et al., 2017; Hajiheydari and Ashkani, 2018; Cui et al., 2020). The case of Quality has given importance to the quality of information, quality of service, product quality, and the quality of the system. This has been largely used as a precursor to technology adoption (Gao et al., 2015; Chi, 2018) and the online DMP.

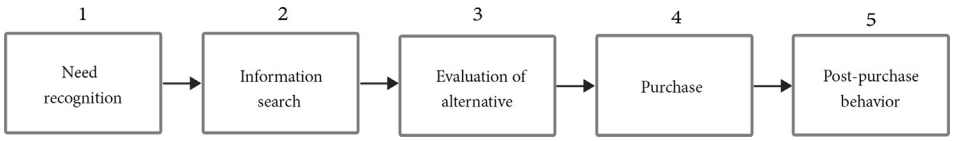

Figure 3. Stages of online purchase decision-making process (Liang and Lai, 2002).

Table 2. Decision-making process used in related studies of purchasing product/service.

Stages				Online decision-making process				
				1	2	3	4	5
				Need/want recognition	Searching for information	The evaluation of alternatives	Purchase	Post-purchase
Behaviors Types				Feeling	Attitude	Attitude	User Acceptance	User Acceptance
Group	Year	Authors	Context					
E Commerce	2010	Darley et al.,	Online Consumer Behavior and Decision Making Process	✓	✓	✓	✓	✓
	2018	Karimi et al.	Online purchase decision-making processes and outcomes.	✓	✓	✓	✓	✓
M Commerce	2018	Faulds et al.	The consumer decision process.	✓	✓	✓	✓	✓
S Commerce	2017	Huang and Benyoucef	The touch points in the marketing process.	✓	✓	✓	✓	✓
	2020	Zhao et al.	eWOM and consumer purchase intentions.	✓ Quality	✓ Trust	-	✓ Intention	-
	2020	Tran	Online reviews and purchase intention	✓ Information Quality	✓ Trust	-	✓ Intention	-
	2021	Meilatinova	Factors affecting customer repurchase and word-of-mouth intentions	✓ Positive, Service quality	✓ Satisfaction, Trust	-	-	✓ Repurchase Intention, WOM Intention
	2021	Tuncer	The relationship between IT affordance	✓ Visibility, Metavoicing, Guidance shopping	✓ Trust in seller, Trust in social media platform	-	✓ Social commerce intention	-

It can be seen form Table 2 that the online purchase can be classified into 5 processes as need recognition, information search, evaluation, purchase, and post-purchase. Directions of such 5 processes (Darley et al., 2010; Huang and Benyoucef, 2017; Karimi et al., 2018; Faulds et al., 2018) will be influenced on the following order: need recognition → information search → evaluation → purchase → post-purchase. Zhao et al. (2020), Lobel Trong Thuy (2020), Meilatinova (2021), and Tuncer (2021) have applied S-commerce (eWOM of influencers) selecting two separated factors i.e. Quality and Trust defined as need recognition and information search, respectively, leading to purchase or post-purchase. Gibreel et al. (2018) have indicated that Quality will be necessary to know the customer's need for receiving the information by eWOM of influencers who will influence the process of information search to build Trust later until the customers will decide the purchase or post-purchase bypassing the evaluation process. However, there have not been researched papers describing the use of both Trust and Quality factors together to start and input the online DMP which will have a benefit of the use of the platform to assess and convince completely re-purchased behaviors of the users.

3. Proposed Research Model and Hypotheses

As mentioned earlier in Sections 1 and 2, the specific problems have occurred in the online purchase using online platforms as follows. 1) The technological acceptance factors are not sufficient to explain the process of user behaviors. 2) The DMP does not have a process of intention recognition (shopping cart function) to exploit the filter and help of decisions before buying products. 3) No research papers do not use Trust and Quality together as antecedent factors on the DMP to assess and convince completely re-purchased behaviors of consumers. Therefore, this section will explain how to derive a new conceptual model through the use of formulating and comparing a proposed research model and previous works to find the gap of factors and processes in terms of Input, Process, and Output workflow. This section will be described by 2 main topics. The first is a summary of formulation to propose a new research model using comparisons between the proposed research model and previous works. The second is a construction of hypotheses based on our research model.

3.1. Formulation and comparisons of the proposed research model and previous works

Table 3 shows formulation and comparisons of the proposed research model and previous works in terms of Input, Process and Output. It can be summarized in the following groups.

1. Input-Output:

1.1) Input is defined as Need Recognition of the DMP including three perceived factors as Usefulness (U), Ease of Use (EU) and Trust (T) e.g. TAM (U, EU, T) (Kim et al., 2010; Chong, 2013; Tan et al., 2014; Driediger and Bhatiasevi, 2019; Law et al., 2016; Cui et al., 2020), UTAUT (U, EU, T) (Abrahão et al., 2016) UTAUT2(U, EU, T) (Dakduk et al., 2020; Verkijika, 2018; Yahia et al., 2018), TRA (U, EU, T) (Kim et al., 2008), TAM+TPB(U, EU, T) (Lee, 2009), TAM+UTAUT(U, EU, T) (Liébana-Cabanillas et al., 2017), TAM+DOI(U, EU, T) (Chong, 2013)

1.2) Output is determined as Purchase Behavior of the DMP including one factor as Purchase (P) e.g. TAM(P) (Kim et al., 2010; Chong, 2013; Tan et al., 2014; Driediger and Bhatiasevi, 2019; Law et al., 2016; Cui et al., 2020), UTAUT(P) (Abrahão et al., 2016), UTAUT2(P) (Dakduk et al., 2020; Verkijika, 2018; Yahia et al., 2018), TRA(P) (Kim et al., 2008), TAM+TPB(P) (Lee, 2009; Hajiheydari and Ashkani, 2018), TAM+UTAUT(P) (Liébana-Cabanillas et al., 2017), TAM+DOI (P) (Chong, 2013), purchase intention in online shopping (P) (Lee et al., 2017; Kremez et al., 2019; Zhao et al., 2020; Lobel Trong Thuy, 2020; Meilatinova, 2021; Tuncer, 2021)

2. Input – Process (Attitude) – Output

2.1) Input also is defined as Need Recognition of the DMP including two perceived factors as Trust (T), and Quality (Q) e.g. TAM+TPB+TRA (T, Q) (Hajiheydari and Ashkani, 2018)
2.2) Process (Attitude) is assigned as Information Search and Evaluation of Alternatives including one factor as Attitude (A) e.g. TAM(A) (Agrebi and Jallais, 2015; Natarajan et al., 2017; Chi, 2018; Gibreel, 2018; Pena-Garcia et al., 2020; Darley et al., 2010)
2.3) Output is determined as Purchase Behavior and Post Purchase of the DMP including three factors as Purchase (P), Re-Purchase (RP) and Recommend (R) e.g. TAM (P) (Agrebi and Jallais, 2015; Natarajan et al., 2017; Chi, 2018; Gibreel et al., 2018; Pena-Garcia et al., 2020; Darley et al., 2010) (Singh et al., 2020; Zhang et al., 2012), UTAUT2(P,R) (Sheikh et al., 2017; Alalwan et al., 2017), TPB(P,R) (Yang, 2012; Wang et al., 2020), TAM+UTAUT(P,R) (Gao et al., 2015; Hsiao, 2016), TPB+TAM(P,R) (Chou et al., 2018), consumer decision making in social commerce (P,RP) (Chen and Shen., 2015; Huang and Benyoucef, 2017; Faulds et al., 2018; Sullivan and Kim, 2018)

3. Process (Attitude) – Output

3.1) Process is the same as No. 2.2) e.g. factors influencing intention to use mobile payments (A) (Karimi et al., 2015; Kim et al., 2010; Karimi et al., 2018; Amoroso and Lim, 2017).
3.2) Output also is assigned as Purchase Behavior and Post Purchase of the DMP including three factors as P, R and RP e.g. decision-making process and consumer shopping behavior (P, R) (Karimi et al., 2015; Kim et al., 2010), Mobile applications in a continuous effect on the intention. (P) (Amoroso and Lim, 2017)

4. Input – Process (Attitude/Feeling) – Output (Proposed Research Model)

After comparisons of previous works have been demonstrated in No. 1), 2), 3) and Table 3, then a new research model will be proposed by such formulation and comparisons. It can be seen from Table 3 that previous researches have not been reported in the integration between TAM and Online DMP two input factors: Trust and Quality. In addition, they also have not been present in an additional process as Intention Recognition (shopping cart function). Therefore, this paper proposes an assessment model of retentive consumer behaviors with the integration of TAM, DMP, Trust, and Quality. This proposed concept can be applicable for E-businesses: E-Commerce, M-Commerce, and S-Commerce, It can be described as follows.

4.1) Input: Need Recognition is to use four factors as U, EU, T, and Q.
4.2) Process (Attitude/Feeling): Information Search and Evaluation of Alternatives are to use one factor as Attitude.
4.3) Process (Feeling): Intention Recognition is to use one factor as Feeling. It can be summarized in the following. As mentioned earlier in Sections 1, 2.2, and Table 2, there is a problem with the lack of shopping cart process compared to traditional online trading platforms (5 processes or 5 stages), as shown in Figure 3. Therefore, this is another important process for Intention Recognition as a process of satisfaction (Feeling) which will be an important DMP before purchasing or abandoning (not buying), but it has also not been reported yet. When conducting a study with currently an online trading platform, there has one important process that should not be overlooked, namely the *4 Purchase Intention or Intention Recognition process (shopping cart process) located between the original processes of 3 (Evaluation) and 5 (Purchase), as shown in Figure 4. Moreover, Purchase Intention (Intention Recognition) is also one of the Feeling processes corresponding to the input factors as the major concern in this study. Thus, a proposed online shopping DMP consists of 6 processes or 6 stages, as shown in Figure 4 and Table 3.
4.4) Output: Purchase Behavior and Post Purchase are to use three factors as P, RP and R.

Table 3. Formulation and comparisons of the proposed research model and previous works in terms of Input, Process and Output workflow.

Grouping Processes	Reference no. – Literature review	INPUT				PURCHASE PPROCESS (ATTITUDE/FEELING)			OUTPUT			Remarks + [Online Commerce Type]
		(1) Need Recognition (Perceived)				(2) Information search	(3) Evaluation of alternatives	(4*) Intention recognition (Satisfaction)	(5) Intention Behavior	(6) Post-Purchase		
		Usefulness	Ease of use	Trust	Quality	(Attitude)	(Attitude)	(Feeling)	Purchase	Re-Purchase	Recommend	
1. Input – Output	UTAUT : (Abrahão at al.,2016) UTAUT2 : (Dakduk et al.,2020; Verkijika and Formunyuy,2018; Yahia et al.,2018) TAM+TPB: (Lee, 2009; TAM+UTAUT : (Liébana-Cabanillas et. Al,2017) TAM : (Kim et al,2010; Chong,2013; Tan et al.,2010; Chong,2013; Tan et al.,2014; Driedriger and Bhatiasevi,2019 ; Law et al,2016; Cui et al,2020) TRA : (Kim et al., 2008)	✓	✓	✓	-	-	-	-	✓	-	-	**-** A future mobile payment service (UTAUT) **[M-Commerce]** **-** Behavioral Intention to Recommend (UTAUT2). **[M-Commerce]** **-** The drivers for social commerce.**[S-Commerce]** **-** An integration of TAM and TPB with perceived risk and perceived benefit of internet banking **[E-Commerce]** **-** Intention to use mobile payment **[M-Commerce]** **-** M-commerce usage activities. **[M-Commerce]** **-** Online grocery shopping **[E-Commerce]** **-** Intention to use application.**[E-Commerce]** **-** Habitual online usage and online purchase intention.**[E-Commerce]** **-** A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents**[E-Commerce]**
	TAM+DOI: (Chong,2013)	✓	✓	✓	-	-	-	-	✓	-	-	**-** m-commerce adoption **[M-Commerce]**
	(Lee et al.,2017; Kremez et al.,2019;Zhao et al.,2020; Tran,2020; Melfatinova,2021; Tuncer,2021)	-	-	✓	-	-	-	-	✓	-	-	**-**purchase intention in online shopping **[E-Commerce]** **[S-Commerce]**
2. Input – Feeling – Output	TAM : (Agrebi and Jallais, 2015; Natarajan et al., 2017; Mehrad and Mohammadi,2017; Chi,2018 ; Gibreel,2018 ; Pena-Garcia et al.,2020;	✓	✓	✓	-	✓	✓	-	✓	-	-	**-** Explaining the intention to use smartphones for mobile shopping.**[M-Commerce]** **-** Understanding Chinese consumer adoption of apparel mobile commerce: An extended TAM approach. **[M-Commerce]** **-** Social commerce development in emerging markets.**[S-Commerce]** **-** Purchase intention and purchase behavior online: A cross-cultural approach.**[E-Commerce]**
	TAM+UTAUT: (Singh et al., 2020; Zhang et al., 2012) UTAUT2 : (Sheikh et al.,2017; Alalwan et al., 2017) TAM+UTAUT: (Gao et al., 2015; Hsiao,2016) TPB+TAM : (Chou et al. ,2018) TPB: (Yang, 2012; Wang et al., 2020)	✓	✓	✓	-	-	-	-	✓	-	✓	**-**Chinese consumers' trust in food certification and the effect of perceived quality on purchase intention.**[E-Commerce]** **-** Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use, and social influence.**[M-Commerce]** **-** Exploring the factors that influence the continued use of social mobile apps: Perspectives on customer satisfaction, habits and value from social mobile Apps such as WhatsApp, WeChat and LINE.**[S-Commerce]**
	TAM+TPB+TRA (Hajiheydari and Ashkani, 2018)	-	-	✓	✓	-	-	-	✓	-	-	**-** Mobile Application Adoption: Survey of Mobile Application User Behavior in Developing Countries: Iran. **[M-Commerce]**
	(Chen et al., 2015; Huang et al., 2017; Faulds et al., 2018; Sullivan and Kim.,2018)	✓	-	✓	-	-	-	-	✓	✓	-	**-** Consumer decision making in social commerce. **[S-Commerce]**
3. Process – Output	(Karimi et al., 2015; Kim et al., 2010)	-	-	-	-	-	✓	-	✓	✓	-	**-**The model of decision making in the online purchase decision-making process and consumer shopping behavior. **[E-Commerce]** **-**Factors that Influence intention to Use Mobile Payments. **[M-Commerce]**
	(Karimi et al., 2018)	-	-	-	-	✓	✓	-	-	-	-	**-** Consumer behavior towards the online purchasing decision process. **[E-Commerce]**
	(Amoroso and Lim, 2017)	-	-	-	-	-	✓	-	✓	-	-	**-**Mobile applications affect emotions, attitude, satisfaction, continuance intention, resulting in a continuous effect on the intention. **[M-Commerce]**
4.* Input-Process – (Attitude/ Feeling) - Output	Proposed Research Model: TAM+Online Decision Making Process	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**- E-businesses: E-Commerce, M-Commerce and S-Commerce**

- TAM (Technology Acceptance Model) **-** PU(Perceived Usefulness),PEOU(Perceived Ease of Use)
- DOI (Diffusion of Innovations) **-** (CP)Compatibility, (EOU)Ease of Use, (PN)Perceived Need
- UTAUT (Extended Unified Theory of Acceptance and Use of Technology) **-** PE(Performance Expectancy), EE (Effort Expectancy), SI (Social Influence), FC (Facilitating Conditions)
- TRA (Theory of Reasoned Action) **-** Behavioral Intention, Behavior
- TPB (Theory of Planned Behavior) **-** Attitude, Subjective Norm, Perceived Behavioral Control
- UTAUT2(Unified Theory of Acceptance and Use of Technology) **-** PE(Performance Expectancy), EE (Effort Expectancy), SI (Social Influence), FC (Facilitating Conditions), HM (Hedonic Motivation), PV (Price Value), H (Habit)

3.2. Hypotheses

The model in this study is divided into three main parts as input, process, and output. The input part is about the feeling perceptions of online platform users. There are four perceptions in the model which are Perceived Usefulness (PU), Perceived Ease of Use (PEU), Perceived Trust (PT) and Perceived Quality (PQ). The four perceptions are the feeling towards using the online platform, not towards the products, sellers or product brands. These perceptions are designed to reflect consumers' awareness in deciding on available online platforms. The four feelings are

related to the decision-making processes which are Information Search (IS), Evaluation of Alternatives (EA) and Intention Recognition (IR). Lastly, the intention leads to deciding to use the online platform to purchase a product and post-purchase process, including re-using and recommending others to use the online platform as an output. By relating the concepts, hypotheses are assigned to explain how they are related. Each concept and its related hypotheses are explained in detail below. As an overview, the model with hypotheses of relations among them is illustrated in Figure 5.

3.2.1. Perceived Usefulness

Perceived Usefulness (PU) is one of the factors mentioned in TAM (Chi, 2018). It originally refers to the concept of "the degree to which a person believes that using a particular system would enhance his or her job performance". Several studies have applied this perception to their work (Natarajan et al., 2017; Driediger and Bhatiasevi, 2019; Martin et al., 2015; Zhang et al., 2012; Chi, 2018; Chen et al., 2018). Their results indicate that Perceived usefulness effectively relates to acceptance of online technology and has a positive effect on customers' points of view towards online marketing. In this work, PU is defined as "the degree to which a consumer believes that using an online platform for purchasing would ease his or her task". We expect that PU should relatively have an effect on the DMP and deciding to use an online market platform. Thus, we have the following hypotheses:

PU: H1a, H1b, and H1c have positive effects on information search of online decision making process, evaluation of alternatives of the DMP, and intention recognition processes, respectively.

3.2.2. Perceived Ease of Use

Perceived Ease of Use (PEU) is a consumer's perception of an online marketing platform. This factor has been mentioned in many studies related to mobile shopping (Natarajan et al., 2017; Chong et al., 2012; Liebana-cabanillas et al., 2017; Zhang et al., 2012) and social commerce (shopping via social network) (Chen et al., 2018; Hajli, 2015; Lu et al., 2016; Gibreel et al., 2018; Yahia et al., 2018; Li and Ku, 2018; Huang and Benyoucef, 2017). It has been found that the ease of use factor is one of the important factors making consumers shifted from offline shopping to online shopping. In this work, PEU refers to "the degree to which a consumer believes that an online market platform for purchasing easily and conveniently operates". We expect PEU to be an important factor affecting on the DMP towards online shopping. Therefore, the following hypotheses are proposed:

PEU: H2a, H2b, and H2c have positive effects on information search of online decision making process, evaluation of alternatives of the DMP, and intention recognition processes, respectively.

3.2.3. Perceived Trust

Perceived Trust (PT) refers to the perception of consumers toward the reliability and trustworthiness of the online platform regarding payment procedures. Trust is an important factor for customers since it is the foundation of any relationship. It is crucial for customers to feel secure and confident when deciding on purchasing. PT has been mentioned in many research papers extended to TAM for studying acceptance of online shopping including E-Commerce (Kim et al., 2008; Pascual-Miguel et al., 2015; Driediger and Bhatiasevi, 2019; Casado-Aranda et al., 2019; Martin et al., 2015), mobile commerce (Malik et al., 2017; Hajiheydari and Ashkani, 2018; Oliveira et al., 2016; Verkijika, 2018), and social commerce (Hajli et al., 2017; Hajli, 2015). The study results also have signified that PT greatly affects online purchasing during the payment transactions. We, thus, have the following hypotheses:

PT: H3a, H3b, and H3c have positive effects on information search of online decision making process, evaluation of alternatives of the DMP, and intention recognition processes, respectively.

3.2.4. Perceived quality

Perceived Quality (PQ) is another perception of customers towards online shopping. In this work, we focus on the quality of three aspects which are quality of a system, quality of provided product information, and quality of service. The quality of a system refers to a state of a system where it can perform its intended functions without being degraded or impaired by changes or disruptions (DeLone and McLean, 2003). The quality of provided information refers to accurate and up-to-date information of products selling on the online system (Parasuraman et al., 1985). The quality of the service is defined as the capability of a service to respond to users' needs. PT has been mentioned in extended TAM for studying acceptance of e-commerce technology (Ha and Stoel, 2009) and to measure service quality of applications of mobile-phone (Deng et al., 2010). In this study, we expect that PT may affect the DMP to conduct a purchase on an online shopping platform; hence, we set the following hypotheses:

PQ: H4a, H4b, and H4c have positive effects on information search of online decision making process, evaluation of alternatives of the DMP, and intention recognition processes, respectively.

3.2.5. Information search

Information Search (IS) is one of the processes in online purchase decision-making (Karimi et al., 2015, 2018; Liang and Lai, 2002; Darley et al., 2010) referring to the activity to gather necessary information regarding purchasing items. The gathering information can be from either internal (self-experience) or external sources. In this study, information refers to experiences or words from others regarding using online shopping platforms. It should be related to other processes in deciding to use an online shopping platform. Hence, hypotheses are stated as follows:

IS: H5a and H5b have positive effects on evaluation of alternatives process of the DMP and intention recognition of the DMP, respectively.

3.2.6. Evaluation of alternatives

Evaluation of Alternatives (EA) is the third process in online purchase DMP (Karimi et al., 2015, 2018; Liang and Lai, 2002). This process is started at customers who have gathered relevant information and built up a list of alternatives for assessment. In making a choice, the selection criteria mostly have involved suitability and need of an individual customer (Darley et al., 2010). This process has been studied and showed that it directly relates to purchasing intention in social commerce (Huang and Benyoucef, 2017). Thus, this study adopts the idea of the relation between evaluating alternatives and recognizing purchase intention process. Hereby, the following hypothesis is stated:

EA: H6 has a positive effect on intention recognition of the DMP.

3.2.7. Intention recognition

Intention Recognition (IR) is defined as a process for a customer to realize the final decision of purchasing via an online shopping platform. An intention is a form of mental commitment to carry out a decided action (Doha et al., 2017). This factor will play a connection role between perceptions as input and the act of conducting a purchase as output. According to Venkatesh et al. (2003), the intention has a direct effect on the behavior and action of humans (Venkatesh et al., 2003). So, the following hypotheses are presented:

IR: H7 has a positive effect on purchasing process of the DMP.

3.2.8. Purchase behavior

Purchase Behavior (PB) is the main output in online shopping and it is the result of previous processes (Darley et al., 2010). Purchase via an online shopping platform is a representation of accepting online shopping technology in the DMP. Despite being the focused output of this study, purchasing can lead to a further process called the post-purchasing process (Deng et al., 2010). The post-purchasing process involves several activities as re-purchasing from the same platform and other platforms,

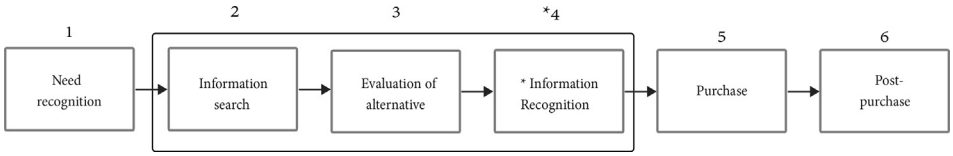

Figure 4. Proposed online shopping DMP by an additional Intention Recognition.

providing reviews and recommendations for the platform, and stopping the use of the online shopping platform, etc. In this study, we include post-purchasing as another feature but limit it to recommend the use of the online shopping platform and re-purchasing from the same platform (Chen et al., 2017). We, therefore, propose the following hypotheses:

PB: H8a and H8b have positive effects on recommending the use of the online shopping platform and re-purchasing from the same platform, respectively.

4. Research methodology

Figure 6 shows research methodology consisting of 7 processes as follow.

4.1. Analysis and synthesis

Problem analysis, research questions, objectives, and literature review were mentioned earlier in Sections 1 and 2. As the prototype synthesis mentioned in Section 3, a new conceptual model (Technology Acceptance Model (TAM), DMP, Trust and Quality) is proposed by formulation and comparisons of the related research papers to find the gap between factors and processes. The conceptual model can be divided into 3 parts: Antecedent Variables, Methods, and Outcome Variables affecting the acceptance of its use of an online trading platform for products or services.

4.2. The scope of survey

The target audience is the people who use the online trading system by purchasing products online. A sample group was calculated from a statistical formula. In this research, the exact number of population group is not known. Therefore, the formula to calculate the sample without the limitation of the sized population is the use of Cochran (1953) as the equation below. The number of samples can be represented by the Cochran formula with a 95% confidence, z = 1.96, and the error value in an acceptable sample e = .05.

$$n = \frac{P(1-P)Z^2}{e^2} = \frac{(0.5)(1-0.5)(1.96)^2}{(0.05)^2} = \frac{0.5\,x\,0.5\,x\,3.84}{0.0025} = \frac{0.96}{0.0025} = 384$$

There are several methods for selecting a sample group. In this research, Convenience Random Sampling Method was selected. Data collection was done using the Online Questionnaire created by Google Form, which was collected through social media such as Facebook and Line, etc. The sample group was selected from the voluntary respondents and the users consuming the online trading system for goods or services. The target group is those over 18 years old because the 18-year-old group was the largest demographic group with higher numbers than the baby boomers in 2015. The population in the age range from 18 - 34 years has more money to spend on toys, clothing and products than those of other generations. As this group gets older, they have developed the habit of using an online commodity trading system until middle age (Miraflor, 2020). Therefore, the selection of the study group for 18 years or more is consistent with the objective of this research. Miraflor said, "It's about the opportunity to convert those 18- to 34-year-olds into brands and products and services they'll use for the rest of their lives." (Miraflor, 2020). As this research has studied the behaviors that seek the opportunity to switch to online trading products or services, this group of the specific targets will make it possible to reflect the feeling of using an online trading system for products or services more clearly and easily than other groups.

4.3. Questionnaire design

In this study, questionnaires were used to test the model and the research hypothesis. To prove the hypotheses of the proposed research model, a quantitative approach is employed. The components of the

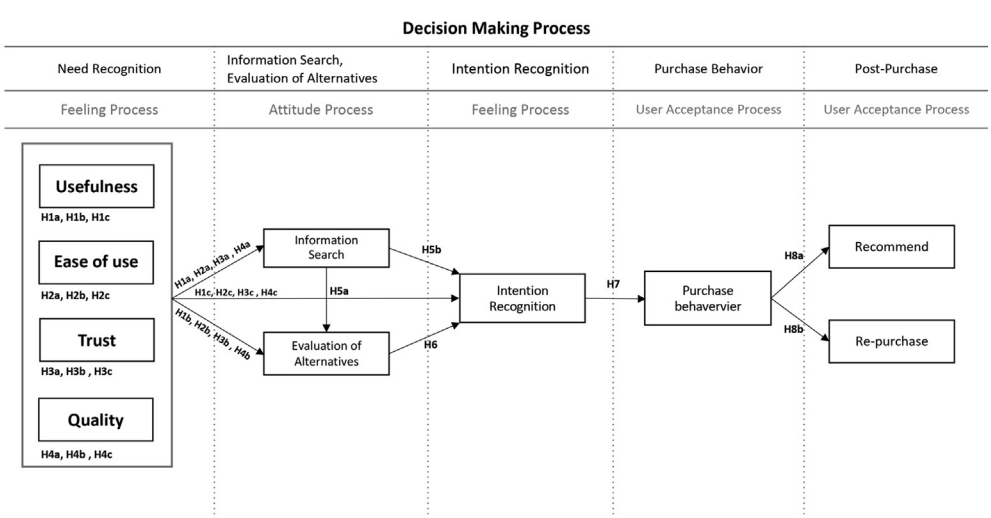

Figure 5. Proposed research model.

Table 4. The demographic data of main testing respondents.

Demographics		Total (N = 384)	
		Frequency	Percent (%)
Gender	Male	129	33.59
	Female	255	66.41
Nationality	Thai	384	100
Age (years)	18–20	22	5.73
	21–30	99	25.78
	31–40	104	27.08
	41–50	112	29.17
	51–60	30	7.81
	Greater than 60	17	4.43

questions are as follows: (1) basic information consisting of Gender, Nationality, Age (years), and Behaviors (see details in Tables 4 and 5), (2) opinions and experiences of online shopping realized on an online platform, and (3) the questions in the second part are in a five-level Likert scale with 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree (see details in Table 6).

4.4. Institutional review board: IRB

Data collection is done through questionnaires filled out by online trading technology users for online purchases. The research is not specific to vulnerable groups, e.g., children, patients, people with disabilities and prisoners, since the survey method was used to select a random sampling by using Convenience Random Sampling Method. It is possible that some volunteers can be vulnerable. Therefore, research protocols and research tools must be included in the consideration of the Ethics Review Committee of Mahidol University. The questionnaire was approved by the Institutional Review Board of Mahidol University and received the approval number of MU-CIRB 2020/044.1302.

4.5. Pilot testing

There are two phases of the experiment. The first phase is pilot testing while the second phase is the main testing. Pilot testing aims to verify the tools and approaches used in the experiment. For the pilot testing, 100 participants were selected based on the criteria for selection: Adult Thai internet users, who personally had used and bought the products from the online market platform for at least 3 months regardless of gender and occupation. The pilot testing was conducted within a span of 10 days.

4.6. Main testing

After the pilot testing and improving the questionnaire to ensure accuracy, the questionnaires were answered by 384 users of technology, online trading systems, products, or services by using a Google Form. The researcher has sent 500 invitations and received 384 total responses, accounting for 76.8% of the total. All online questionnaires have an invitation letter to provide information for IRB-approved research. The participants of the survey were received as a thank you gift. All respondents have to fill in their first-last name, phone number, and address at the end of this questionnaire. The research teams will receive news about activities to promote and support online business entrepreneurs continuously and up to date. The main testing was set up after verifying and adjusting the pilot testing result. The period for the main testing was 21 days. The questionnaire results of the main testing were statistically analyzed to test the assigned hypotheses using SmartPLS version 3.3.0 (Ringle et al., 2015). Participants of the main testing were Volunteers who applied via social network applications. Two campaigns were used to gather the volunteers. The first campaign was to donate 20 Baht for buying food for those affected by the Covid-19 pandemic in Thailand. The second campaign was to gift participants with a hygienic face mask. Therefore, there were 384 respondents in the main testing. According to the statistics, the respondents were reported in the demographic data given in Table 4, and the data of online shopping behaviors were represented in Table 5.

4.7. Statistical data analysis

After importing the survey results from Google Form and cleaning the data, SmartPLS version 3.3.0 program will be used for analyzing such completed data consisting of the measurement model, structural model, and model Fit, as described in Section 5. The final step of the study is to compile, process, and analyze questionnaire results from descriptive statistical analysis and inferential statistical analysis furthered in discussion and interpretation to be clear and easy to understand a summary in Section 6.

5. Findings

We have applied SmartPLS version 3.3.0 to the measurement of the research model and questionnaire regarding their reliability and validity. SmartPLS version 3.3.0 is used for analyzing some of the least squares of data. This method was used in this study because it is an element-based statistical technique for creating causal modeling (Joreskog et al., 1993). As a technique of structural equation modeling, the PLS analyzes measurement models and structural models simultaneously in a single operation. We choose PLS since it has a size of the less stringent sample and indicator distribution requirement compared to the covariance-based SEM methods such as LISREL (Chin, 1998). According to a two-step data analysis procedure (Anderson et al., 1998), the measurement model is examined first to assess the reliability and validity of the measurement. Then, the structural model is tested for approximation of a hypothetical relationship.

5.1. The measurement model

Table 6 shows the reliability and validity of the results from question items consisting of median, mean, S.D., loading, and Variance Inflation Factor (VIF). There are 40 questions in the questionnaire. The questions are split into two parts as questions for the general information of respondents and questions related to the proposed model. The former consists of 10 questions while the latter is the remaining 30 questions. The answers to the questions are processed via PASW statistic version 18.0.0 to evaluate for internal consistency of data. And, the acceptable threshold of the score refers to Cronbach's Alpha value as over 0.7 (Hair et al., 2016). The result of Cronbach's Alpha value is 0.957; thus, we conclude that the answers have internal consistency. In terms of reliability and validity of the questionnaire, we have obtained results as follows. The mean scores are between 3.71 and 4.60, and the SD scores are 0.538–1.044. For factor loading, the data obtained in scores of 0.701–0.957 are over the acceptable threshold of 0.70 (Hair et al., 2016). The Median score is also close to the Mean and most of the raw scores are numbers 4 and 5. The outer VIF scores by items that should be under 5.00 (Ringle et al., 2015) for acceptable threshold being 2.000–4.000 (Kock and Lynn, 2012; Jattamart and Leelasantitham, 2019, 2020; Phaosathianphan & Leelasantitham, 2019). As shown in Table 6, their VIF scores by items are not more than 5, so there should not be any effect of multicollinearity. In addition, it can be seen further in Table 9 that the inner VIF scores by the relationship between the constructs are less than 5 (Ringle et al., 2015); thus, multicollinearity should not be used to assess common method bias.

In the evaluation of the proposed research model, we have obtained Cronbach's Alpha scores between 0.709 – 0.914 which are higher than the acceptable threshold of 0.7 (Hair et al., 2016). The testing results of internal consistency in the model have been considered for Composite Reliability (CR), which have yielded the score of 0.805–0.946 being

Figure 6. Processes of research methodology.

Table 5. Online shopping behavior of main testing respondents.

Behaviors		Total (N = 384)	
		Frequency	Percent (%)
Online shopping (multi-options)	Facebook	352	91.67
	Shopee	335	87.24
	Lazada	312	81.25
	Grab	288	75.00
	Food panda	274	71.35
	Line man	249	64.84
Experience of using online shopping	less than 1 month	0	0
	1–3 months	26	6.77
	3–6 months	17	4.43
	6–12 months	43	11.20
	1–3 years	116	30.21
	3–5 years	147	38.28
	over 5 years	35	9.11
Frequency of using online shopping	daily	61	15.88
	weekly	103	26.82
	biweekly	181	47.14
	monthly	39	10.16

acceptable since they have surpassed the criterion of 0.70 (Hair et al., 2016). The convergent validity of Average Variance Extracted (AVE) should be over 0.50 score, and the model results have returned the AVE results between 0.553–0.853. The details are given in Table 7.

Furthermore, we assessed the Discriminant Validity of the model using the criterion of Fornell and Larcker (1981). Each diagonal value will be higher than those of the column values in each construct with a criterion being not less than 0.70 (Fornell and Larcker, 1981). For example, in the Perceived Quality (PQ), the square root of AVE equals 0.794 which is higher than the correlation of other constructs, ranged between 0.339 – 0.598. Thus, the research model is eligible model (Fornell and Larcker, 1981). The Fornell-Larcker criterion results are shown in Table 8.

5.2. Structural model

With the acceptable results from the previous assessment, we then performed hypothesis testing and Goodness of Fit (GoF) using SmartPLS 3.3.0. In this section, the hypotheses of the proposed research model mentioned in Section 3.2 are tested. A Bootstrapping algorithm (Hair et al., 2016) is used for resampling of 5,000 samples with significance level at 0.05 for Path coefficient (β), t-value and p-value. The criteria for accepting Path coefficient (β), t-value and p-value are >0.10, >1.96 and <0.05 (<0.01), respectively. Thus, the results show that H1b, H1c, H2b and H4b are rejected, and H1a, H2a, H2c, H3a, H3b, H3c, H4a, H4c, H5a, H5b, H6, H7, H8a and H8b are supported. The detailed results are given in Table 9. The results of the model with indication of hypothesis testing from SmartPLS program are illustrated in Figure 7. Regarding the model fit assessment, we obtained the Goodness of Fits (GOF) result of 0.357.

As shown in Table 9 and Section 3.2, the summarized results can be explained in the context of the case study as follows.

(1) Perceived Usefulness (PU): H1a has influenced Information Search (IS) (β = 0.158, t-value = 1.991, p-value = 0.045, Inner VIF = 2.196) whilst H1b and H1c have not influenced Evaluation of Alternative (EA) (β = -0.009, t-value = 0.091, p-value = 0.927, Inner VIF = 2.205) and Intention Recognition (IR) (β = -0.128, t-value = 1.791, p-value = 0.225, Inner VIF = 0.000), respectively.
(2) Perceived Ease of Use (PEU): H2a and H2c have influenced IS (β = 0.338, t-value = 3.173, p-value = 0.002, Inner VIF = 1.628) and IR (β = 0.114, t-value = 2.318, p-value = 0.048, Inner VIF = 3.786), respectively, but H2b has not influenced EA (β = -0.215, t-value = 1.589, p-value = 0.388, Inner VIF = 1.826).
(3) Perceived Trust (PT): H3a, H3b and H3c have influenced IS (β = 0.268, t-value = 2.621, p-value = 0.010, Inner VIF = 1.122), EA (β = 0.175, t-value = 1.995, p-value = 0.045, Inner VIF = 1.621) and IR (β = 0.143, t-value = 2.211, p-value = 0.028, Inner VIF = 1.652), respectively.
(4) Perceived Quality (PQ): H4a and H4c have influenced IS (β = 0.247, t-value = 2.053, p-value = 0.041, Inner VIF = 3.001) and IR (β = 0.087, t-value = 2.100, p-value = 0.045, Inner VIF = 3.324), respectively; but H4b has not influenced EA (β = 0.121, t-value = 1.229, p-value = 0.220, Inner VIF = 3.846).
(5) Information Search (IS): H5a and H5b have influenced EA (β = 0.488, t-value = 4.590, p-value = 0.000, Inner VIF = 3.029) and IR (β = 0.375, t-value = 2.801, p-value = 0.005, Inner VIF = 4.175), respectively.
(6) Evaluation of Alternatives (EA): H6 has influenced IR (β = 0.390, t-value = 2.903, p-value = 0.004, Inner VIF = 3.202).
(7) Intention Recognition (IR): H7 has influenced Purchase Behavior (PB) (β = 0.743, t-value = 13.924, p-value = 0.000, Inner VIF = 1.000).
(8) Purchase Behavior (PB) leading to Post-Purchase (PP): H8a and H8b have influenced Recommend (RC) (β = 0.707, t-value = 12.060, p-value = 0.000, Inner VIF = 1.000) and Re-Purchase (RP) (β = 0.801, t-value = 14.549, p-value = 0.000, Inner VIF = 1.000), respectively.

It can be seen from Table 9 that the sequential influences of the proposed model have occurred four input factors (PU, PEU, PT, and PQ) and six process factors (IS, EA, IR, PB, RC, and RP). All ten factors can be classified into processes of the proposed online DMP in the following. PU, PEU, PT, and PQ are defined as a process of Need Recognition. IS and EA are assigned as processes of Information Search and Evaluation of Alternative, respectively. IR and PB are defined as processes of Intention Recognition and Purchase Behavior. Finally, RC and RP are assigned as a process of Post-Purchase. Therefore, the results of the analysis have supported all 14 hypotheses to positively influence the DMP in each process, as shown in Figure 7, i.e. PU, PEU, PT, and PQ are positive correlations with firstly information search directing to evaluation, intention recognition (shopping cart before buying decision), purchase, and then post-purchase.

5.3. Model fit

The results of each construct in the proposed model have been described in Section 5.2. In this section, Model Fit has analyzed the results of the structural model using SmartPLS based on the data in all constructs of the proposed model, as shown in Figure 7. The Model Fit of a research model consists of three parts as follows. Firstly, the determination coefficient (R^2) is unacceptable at below 0.19, low 0.19–0.33, moderate 0.33–0.67 and good at 0.67 (Chin, 1998). All factors have a moderate influence. The R^2 results of RC, IR, PB, EA, RC and IS are approximately at 0.642, 0.636, 0.552, 0.537, 0.500 and 0.420 respectively, as shown in Figure 7. Secondly, Standardized Root refers to Square Residual (SRMR) and it should not be higher than 0.080 (Hair et al.,

Table 6. The reliability and validity of the results.

Index	Question items	Median	Mean	S.D.	Loading (>0.70)	Outer VIF (<5.00)	Source
PU1	The online shopping platform can help you shop more conveniently	5	4.60	0.538	0.890	1.512	Adapted from (Anol et al., 2012)
PU2	The online shopping platform helps you search for and buy a product faster than offline shopping	4	4.44	0.585	0.889	1.512	Adapted from (Lee, 2009)
PU3	The online shopping platform helps you buy a product cheaper than offline shopping	4	4.21	0.765	0.854	1.632	Adapted from (Kim et al., 2008)
PEU1	You can use the online shopping platform by yourself	4	4.17	0.719	0.778	1.079	Adapted from (Lee, 2009)
PEU2	The online shopping platform is easy to use for buying a product	4	4.02	0.762	0.896	2.407	Adapted from (Kim et al., 2008)
PEU3	The online shopping platform has obvious functions and easy to understand	4	3.82	0.829	0.877	2.367	Adapted from (Kim et al., 2008)
PT1	The online shopping platform has accurate and clear processed information such as product detail and price	4	3.91	0.725	0.943	1.169	Adapted from (Chen et al., 2015)
PT2	The online shopping platform is trustworthy for buying products	4	3.83	0.795	0.957	2.264	Adapted from (Pascual-Miguel et al., 2015)
PT3	You are assured to get the purchased products from the online shopping platform	4	3.84	0.761	0.912	2.041	Adapted from (Pascual-Miguel et al., 2015)
PQ1	The online shopping platform has an acceptable quality (regarding usability, accuracy and speed) that fits your needs	4	3.98	0.731	0.701	1.754	Adapted from (Wang et al., 2020)
PQ2	Products on the online shopping platform fit your need	4	4.00	0.591	0.739	1.523	Adapted from (Wang et al., 2020)
PQ3	All processes of the online shopping platform have acceptable quality	4	4.00	0.665	0.768	1.254	Adapted from (Wang et al., 2020)
IS1	Searching function in the online shopping platform helps you decide on buying the product	4	3.90	0.890	0.747	1.358	Adapted from (Lobel Trong Thuy, 2020)
IS2	Searching function in the online shopping platform helps you compare the quality and price of the similar products and ease your decision-making to buy	3	3.71	1.044	0.879	1.713	Adapted from (Tran, 2020)
IS3	Searching function in the online shopping platform is necessary and benefits a buyer	4	3.89	0.669	0.827	1.665	Adapted from (Tran, 2020)
EA1	Intending to buy products before going to the shopping cart function in the online shopping platform helps you on comparing the products	4	4.13	0.818	0.905	2.856	Adapted from (Tran, 2020)
EA2	Intending to buy products before going to the shopping cart function in the online shopping platform is necessary and benefits a buyer	4	4.03	0.869	0.921	3.164	Adapted from (Tran, 2020)
EA3	Intending to buy products before going to the shopping cart function in the online shopping platform makes you buy in good value	4	4.02	0.807	0.944	3.896	Adapted from (Tran, 2020)
IR1	You often get in the online shopping cart platform to check on product details	4	3.93	0.832	0.763	1.516	Adapted from (Tan et al., 2014)
IR2	You will use the online shopping cart platform to buy products	4	4.08	0.766	0.882	1.728	Adapted from (Pascual-Miguel et al., 2015)
IR3	You are interested in promotion notifying from the online shopping cart platform and likely to buy from it	4	4.06	0.894	0.764	1.319	Adapted from (Tan et al., 2014)
PB1	You will buy the products from the online shopping platform if the product satisfies you	4	4.32	0.619	0.859	2.015	Adapted from (Lee, 2009)
PB2	You are happy with the online shopping platform and will continue using it	4	4.30	0.667	0.886	2.164	Adapted from (Wang et al., 2020)
PB3	The online shopping platform is necessary for you	4	3.95	0.761	0.878	1.974	Adapted from (Wang et al., 2020)
RP1	You may repurchase from the online shopping platform	4	4.20	0.713	0.897	2.326	Adapted from (Chen et al., 2015)
RP2	Repurchase can be done easier with the online shopping platform	4	4.15	0.656	0.887	2.103	Adapted from (Chen et al., 2015)
RP3	You have repurchased the same product from the online shopping platform	4	4.18	0.708	0.868	2.154	Adapted from (Chen et al., 2015)
RC1	You recommend others to use the online shopping platform that you use	4	3.92	0.750	0.923	2.973	Adapted from (Oliveira et al., 2016)
RC2	You will recommend friend and family to buy from the online shopping platform instead of offline shopping	4	3.94	0.768	0.900	2.632	Adapted from (Oliveira et al., 2016)
RC3	You will recommend an unfamiliar person to buy from the online shopping platform instead of offline shopping	4	3.94	0.705	0.926	3.445	Adapted from (Oliveira et al., 2016)

2016; Henseler et al., 2016; Hu and Bentler, 1999). Therefore, the calculation result is an acceptable value of 0.065. Thirdly, Goodness of Fit (GoF) is the square root of multiplication between the mean of the determination coefficient (R^2) and AVE, as shown in (1), less than 0.10, small, 0.10–0.25, intermediate, 0.25–0.36, and high (Tenenhaus et al., 2005; Wetzels et al., 2009). Thus, the GoF is at a high level at 0.599

Table 7. Construct reliability and validity.

Constructs	Item code	Cronbach's alpha (>0.70)	Composite Reliability (CR) (>0.70)	Average Variance Extracted (AVE) (>0.50)
Evaluation of Alternatives	EA	0.914	0.946	0.853
Information Search	IS	0.756	0.859	0.672
Perceived Ease of Use	PEU	0.804	0.880	0.715
Perceived Quality	PQ	0.709	0.805	0.553
Perceived Trust	PT	0.822	0.918	0.849
Perceived Usefulness	PU	0.736	0.883	0.791
Purchase Behavior	PB	0.847	0.907	0.765
Purchase Intention	PI	0.728	0.846	0.647
Re-purchase	RP	0.861	0.915	0.782
Recommend	RC	0.905	0.940	0.840

(Phaosathianphan and Leelasantitham, 2019, 2020, 2021). The result of GoF can be calculated from Eq. (1) below.

$$GoF = \sqrt{\overline{R^2} \times \overline{AVE}} = \sqrt{0.548 \times 0.655} = \sqrt{0.3590} = 0.599 \quad (1)$$

6. Discussion and interpretation

This section will describe more details below to discuss comparisons between a proposed research model and previous works corresponding to Section 3.1, and implications to theories and practice. The objective of this study is to assess the behavior of users and repeated purchases of online trading with E-business platforms. How do the perceived factors and the DMP influence consumer behaviors using online shopping? No research papers have been reported to integrate the perceived factors (TAM, trust, and quality) and the DMP. However, most of the previous studies generally have focused on only behavioral factors (Law et al., 2016; Gibreel et al., 2018; Chou et al., 2018; Driediger and Bhatiasevi, 2019; Pena-Garcia et al., 2020; Cui et al., 2020; Dakduk et al., 2020) intending to purchase the products and services. Moreover, as shown in Table 2, four papers have studied the use of all 5 processes (Darley et al., 2010; Karimi et al., 2018; Huang and Benyoucef, 2017; Faulds et al., 2018), whilst four papers have not been completed with full five processes (Zhao et al., 2020; Tran, 2020; N.Meilatinova, 2021; Tuncer, 2021); but all of them have also not considered a process of intention recognition. In addition, both Trust and Quality are necessary to assess consumer re-purchased behaviors using E-Business platforms. Not only the perceived factors need to study the user behaviors, but also the processes should be interested in the online purchasing platforms in the future. Therefore, it should consider adding all processes including the factors until the results can be seen and can be used to develop the platforms.

6.1. Comparisons between a proposed research model and previous works

As mentioned earlier in Sections 5.2 and 5.3, the results of the analysis have supported all 14 hypotheses to positively influence the DMP in each process, as shown in Figure 7. PU, PEU, PT, and PQ are fundamental factors having positive correlations with information search directing to evaluation, intention recognition (shopping cart before buying decision), purchase, and then post-purchase. These results can be exploited in electronic business applications of E, M, and S-commerce platforms because they will be reflected in the processes in the functions of E-business platforms, as will be further described in Section 6.2. Therefore, the user will need to check and consider overall usefulness and ease of use through the platforms before influencing decision making. The comparisons of other related works can be summarized in two research groups as follows.

On the one hand, most of the papers based on TAM have also used four perceived factors (PU, PEU, PT, and/or PQ) directly to the attitude of user behaviors by intention to purchase e.g. E-commerce: the adoption of internet banking (PU, PEU, and PT) (Lee, 2009), online purchase intention for middle-aged users (PU and PEU) (Law et al., 2016), online grocery shopping (PU and PEU) (Lee, 2009) and online purchasing, A cross-cultural (PU and PEU) (Pena-Garcia et al., 2020); M-commerce: intention to use m-payment (PU and PEU) (Kim et al., 2010), the adoption and recommendation of mobile wallet services (PU and PEU) (Singh et al.); S-commerce: Instagram for emerging markets (PT and PU) (Gibreel et al., 2018), etc. In addition, Gibreel et al. (2018) have proposed impulsive buying using eWOM to persuade customers for making direct purchases i.e. only a factor of PT is to positively influence directly with intention to buy, but PU and PEU did not influence intention to purchase because of no purchasing function in the Instagram platform. Whilst all three factors (PEU, PQ, and PT) of this paper have positively influenced a process as intention recognition (similarly S-commerce using e-WOM) leading to purchase. However, such TAM papers have not reported the use of all four factors (PU, PEU, PT, and PQ) together to propose the antecedent factors for assessing the user behaviors of online purchases, and they did not focus on the processes of evaluation and post-purchase. Moreover, there have some factors of this paper not influencing the processes i.e. PU does not influence both evaluation and intention recognition, whilst PEU and PQ do not influence evaluation, because consumers are always like to start the use of platforms firstly by the information search, as discussed further in Section 6.2.

On the other hand, there have been researched papers using five processes of online purchasing DMP. Darley et al. (2010), Karimi et al. (2018), Huang and Benyoucef, (2017), and Faulds et al. (2018) have proposed the DMP framework but they have not focused on the perceived factors influencing such processes, and they have not considered a process of intention recognition (a function of the shopping cart) to exploit the filter and help of decisions before buying products through online

Table 8. Fornell-Larcker criterion.

Constructs	EA	IS	PEU	PQ	PT	PU	PB	IR	RP	RC
Evaluation of Alternatives (EA)	0.924									
Information Search (IS)	0.689	0.820								
Perceived Ease of Use (PEU)	0.512	0.521	0.845							
Perceived Quality (PQ)	0.455	0.487	0.582	0.745						
Perceived Trust (PT)	0.324	0.394	0.332	0.339	0.921					
Perceived Usefulness (PU)	0.379	0.451	0.471	0.508	0.430	0.889				
Purchase Behavior (PB)	0.656	0.709	0.547	0.598	0.446	0.544	0.875			
Intention Recognition (IR)	0.702	0.700	0.569	0.524	0.413	0.390	0.743	0.804		
Re-purchase (RP)	0.621	0.655	0.537	0.595	0.402	0.491	0.801	0.683	0.884	
Recommend (RC)	0.540	0.633	0.641	0.553	0.482	0.450	0.707	0.582	0.769	0.917

Table 9. A Summary of hypothesis testing results.

Hypothesis	Path	Path coefficient (β) (>0.10)	t-value (>1.96)	p-value (<0.05, <0.01)	Inner VIF (<5)	Supported
H1a	PU→IS	0.158	1.991	0.045	2.196	Yes
H1b	PU→EA	-0.009	0.091	0.927	2.205	**No**
H1c	PU→IR	-0.128	1.791	0.225	0.000	**No**
H2a	PEU→IS	0.338	3.173	0.002	1.628	Yes
H2b	PEU→EA	-0.215	1.589	0.388	1.826	**No**
H2c	PEU→ IR	0.114	2.318	0.048	3.786	Yes
H3a	PT→IS	0.268	2.621	0.010	1.122	Yes
H3b	PT→EA	0.175	1.995	0.045	1.621	Yes
H3c	PT→IR	0.143	2.211	0.028	1.652	Yes
H4a	PQ→S	0.247	2.053	0.041	3.001	Yes
H4b	PQ→EA	0.121	1.229	0.220	3.846	**No**
H4c	PQ→IR	0.087	2.100	0.045	3.324	Yes
H5a	IS→EA	0.488	4.590	0.000	3.029	Yes
H5b	IS→IR	0.375	2.801	0.005	4.175	Yes
H6	EA→IR	0.390	2.903	0.004	3.202	Yes
H7	IR→PB	0.743	13.924	0.000	1.000	Yes
H8a	PB→RC	0.707	12.060	0.000	1.000	Yes
H8b	PB→RP	0.801	14.549	0.000	1.000	Yes

Note that: If the significance (P- value) of Path Coefficient is less than 0.05, then it will be supported or correlated (Yes). However, if the P- value is more than 0.05, then it will not be supported or correlated (No).

platforms. Moreover, there have been four research papers using S-commerce (Zhao et al., 2020; Tran, 2020; Lee, 2009; Tuncer, 2021) that can be assigned or grouped in the processes as the following with two separated factors i.e. PQ and PT defined in need recognition and information search, respectively, delivering results to the process of intention to purchase or post-purchase. For example, PQ (need recognition) has a positive influence directly on PT (information search) e.g. the study of eWOM and consumer purchase intentions (Zhao et al., 2020), online reviews and purchase intention (Tran, 2020), factors affecting customer repurchase, and word-of-mouth intentions (Meilatinova, 2021), and the relationship between IT affordance (Tuncer, 2021). After that, PT (information search) has a positive influence directly on intention to purchase (Zhao et al., 2020; Tran, 2020; Tuncer, 2021) or post-purchase (Meilatinova, 2021). This indicates (Gibreel et al., 2018) that PQ is necessary to know the customer's need before receiving the information by eWOM of influencers affecting the process of information search to build PT later until the customers have decided the purchase or post-purchase bypassing the evaluation process. However, all research papers on the process have been not mentioned in the shopping cart before the purchase decision to make sure that the user will buy the service or products. PT and PQ also have not been added together in the antecedent factors in the DMP. These two factors will help to assess the retentive consumer's behavior by using the platforms. In addition, PT (need recognition) of this paper positively influences each process, i.e. information search, evaluation, and intention recognition, leading to intention to purchase and post-purchase. PQ has a positive influence on information search and intention recognition but PQ does not influence the evaluation, as discussed further in Section 6.2.

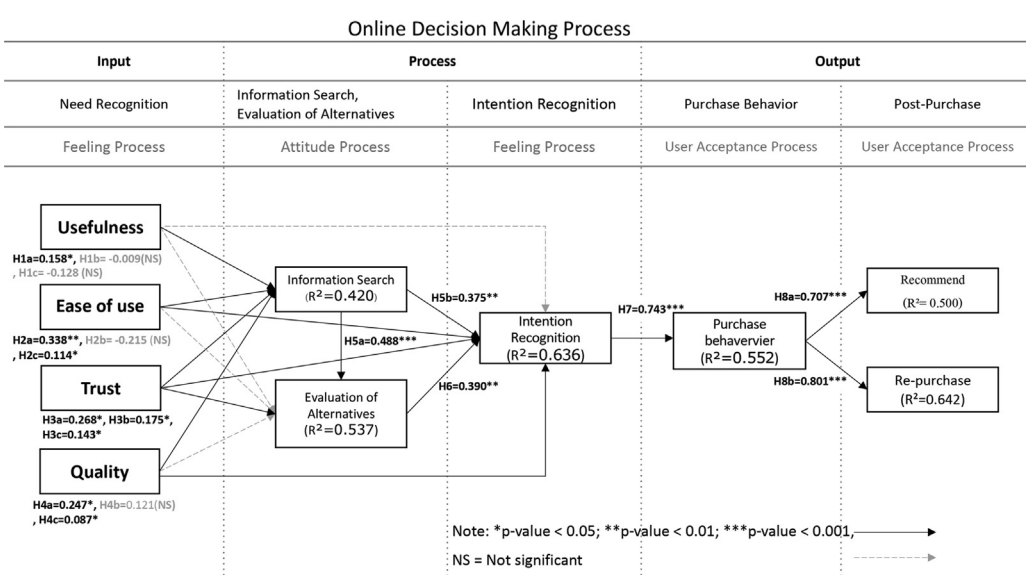

Figure 7. SmartPLS results of the structural model.

6.2. Implication to theories and practice

This implication can describe and explain more detail corresponding to the research questions and objectives in this study. Theories of the proposed model have utilized the perceived factors of TAM, Trust, and Quality in conjunction with the DMP that have a positive correlation with purchasing as well as repeat purchases or referrals. It can be applied to assess purchasing behaviors and repeat purchases from consumers through 3 types of E-businesses: E-commerce, M-commerce, and S-commerce. For example, the practice can also be described in the context of the case study in Thailand. It can be seen from Table 5 that the survey results show the amount of frequency using online platforms ordered from Facebook, Shopee, Lazada, Grab, Food panda, and Line man. It can be noted that why Thailand is most popular with the Facebook platform (Millions, 2021) as there are many functions such as Facebook messenger, Facebook Fan page, etc. including pictures, videos, news, and viral of celebrities which are the favorite of Thai behavior. However, there also are other platforms e.g. Shopee, Lazada, Grab, Food panda and Line man, etc., which are alternative platforms for Thai people besides a popular from Facebook.

For the sake of completeness, Table 10 summarizes the practical online purchase DMP with an additional Intention Recognition in various E-business platforms in Thailand corresponding to Table 5 (online shopping platforms). It can be seen from Table 10 that the first group is Facebook (S-commerce). The proposed model can be applied to explain every process using 4 precursor factors i.e. PEU, PU, PQ, and PT, which affect the use of the Facebook platform for Thai people. The outstanding features are VDO, pictures, and viral, etc. This can lead the users to want the use of the platforms for (2) information search (Facebook search) and (3) decision (evaluation), (4) product selection (intention recognition), (5) purchase intention (Facebook messenger), and opportunities to cause (6) re-purchase or recommend. Besides that, it can also describe impulsive purchasing patterns i.e., PEU, PT, and PQ directly influencing IR and intention to purchase later. Therefore, the use of Facebook's platform is S-commerce, but there has been a researched paper using eWOM and PT with influencers using Instagram (Tuncer, 2021). The second group is Shopee and Lazada (E, M-Commerce) which platforms have both a website trading system and a mobile application with 6 processes based on the new DMP and 4 precursors (the same as Facebook). The difference is that it is a platform combining a variety of stores and products for customers who want to buy products. It uses complete functions to find products, select products, and make decisions (intention recognition) in the shopping cart function. Usefulness, ease of use, quality, and reliability of the platforms make easier re-purchased opportunities with using the re-purchase function. The third group is transportation service platforms i.e. Grab/Food panda/Line man (M-commerce). The platforms are based on mobile applications. These platforms have functions according to 6 processes corresponding to the new DMP as follows: (1) demanding to buy products of customers considering from pictures and promotion in the platforms, (2) finding the information with the search function, (3) deciding on a product at the select menu function, (4) selecting a product and enter shopping cart waiting for the decision, (5) purchasing payment, and (6) using the Favorite function, and giving opportunities for re-purchase later.

Furthermore, the contribution or benefit of this study can be exploited from assessing these results to develop better the platforms of business sectors. As mentioned earlier in Sections 6 and 6.2, the PU, PEU, and PQ have not influenced the processes e.g. EA and IR; however, the business sector can conduct these results to develop and improve the E-business platforms further. Therefore, this paper has proposed and discussed a guideline for developing platforms through the use of the resulted assessment of the proposed model as follows.

1) PU, PEU, and PQ have not influenced EA. It can take these results to further develop the platform and to increase the chances of intentional online shopping. For example, artificial intelligence (AI) has been used as a complement to collect traffic data, products, websites, and E-business platforms, then the data has been analyzed to shoot advertisements directly to the customer's account so that customers can access the product selection directly to the process of EA. A technique of Customer Listening (Liu et al., 2012) can be applied to solve such problems in the future. It will help the users to bypass the process without having to go through the process of information search. Therefore, the consumers will make the feeling of PU, PEU, and PQ influencing directly to the process of EA through the use of E-business platforms.
2) PU has not influenced IR. This result can be solved and performed by the analysis technique of market basket (Santarcangelo et al., 2018) using such data to develop a shopping cart i.e. analyzing customers who like to buy what and leading to design a product package for sale as a set. Moreover, customers want to take advantage of online shopping and can make decisions in the process of IR because the shopping cart is originally a function of making purchase decisions by choosing products for customers. For example, Facebook using messenger function has used only an item at a time, whilst Shopee, Lazada, Grab, Food panda, and Line man have many functions to support multiple purchases but they still cannot make it easier for the customers to buy products automatically. Therefore, if the E-business platforms can be developed by the business sector corresponding to the customer's need, then the feeling of PU also will influence directly to the process of IR.

7. Conclusions, limitations, and Future Work

7.1. Conclusions

This paper has presented the combination of factors from the technology acceptance model and processes in the decision-making process to study online shopping platforms. The perceptions including Perceived Usefulness, Perceived Ease of use, Perceived Trust, and Perceived Quality are considered to be a part of a process to recognize the need for using the platforms. The process of need recognition is connected to the Attitude process and the newly proposed process of Intention recognition. These processes are pre-purchase processes leading to the purchasing process. Lastly, the purchasing process is connected to the post-purchase process, including recommendation and re-purchasing. From 384 respondents, it has been found that almost 70% of the respondents have experienced using online shopping platforms for more than 1 year. Perceptions in this study include Perceived Usefulness, Perceived Ease of use, Perceived Trust and Perceived Quality. These four perceptions are found to have a positive effect on the Information Search process which is one of the two sub-processes in the Attitude process whilst only Perceived Trust has a positive effect on the other sub-processes as Evaluation of Alternatives. Five factors i.e. including Perceived Ease of use, Perceived Trust, Perceived Quality, Information Search, and Evaluation of Alternatives, have influenced Intention Recognition (shopping cart function). This indicates that Usefulness of online shopping platforms does not influence Evaluation of Alternatives and Intention Recognition, but other factors such as Ease of Use and Trust are more important to the buyers for getting Intention Recognition using online shopping platforms. After they have been recognized by the process of Intention Recognition, then they will be led to influence purchase and re-purchase processes. Therefore, this proposed model can be applied for assessing the user behaviors of online purchases using E-business platforms: E-commerce, M-commerce and S-commerce.

According to the results, Trust and Ease of Use are the most important perceptions; thus, the online shopping platforms keep Trust by increasing system security and improving user experience to make them easier to use. Moreover, Quality of the online platform, i.e. the accuracy of product details and coverage of product variations, is also important because of intending and choosing the online shopping platform directly. The purpose of this research is to study the DMP with TAM (Davis et al., 1989).

Table 10. The practical online purchase DMP with an additional Intention Recognition in various E-business platforms in Thailand.

Platforms (E-business Types)	Practical online purchase DMP					
	(1) Need/want recognition	(2) Information Search	(3) Evaluation of alternatives	(4*) Intention Recognition	(5) Purchase	(6) Post-purchase
Facebook (S-Commerce)	✓ Pictures, Videos, News, and Viral of celebrities	✓ Facebook search	✓ Facebook messenger	✓ Facebook messenger	✓ Facebook messenger	✓ Review on Facebook Fanpage
Shopee/Lazada (E,M-Commerce)	✓ Pictures, Videos, Game and Promotion	✓ Search	✓ Menu	✓ Shopping cart	✓ Purchase	✓ Re-purchase function
Grab/Food panda/Line man (M-Commerce)	✓ Pictures and Promotion	✓ Search	✓ Menu	✓ Shopping cart	✓ Purchase	Re-purchase function, Favorite

To understand the behavior of online users is to when buy products or services as well as before deciding to purchase a product or service, thus sensory factors are used to explain the process of searching for products or services (Hsu et al., 2015). It will allow us to use the results of this research to develop a system to let users purchase products or services during the use of the system in the future. It also resulted in the discovery of a pre-purchase process called "Intention Recognition" in addition to feeling (Perceived) among the four factors studied in this research affecting various processes in the process of deciding buy a product or service.

7.2. Limitations and Future Work

The present study has some limitations which are pointed out as follows: 1) Due to the small sample size in this study, the results may not be generalized to other contexts. In the future, it may more examine and specify how the use of details for different online trading platforms affecting online shopping decisions because the size of the large and diverse sample can produce different results. Furthermore, one can examine how the performance of different online platforms and online users from diverse backgrounds affecting online shopping decisions. 2) This study collects data directly from users of the online trading system. Therefore, it obtains information that shows the results used to only the current situation. A lack of analysis or consideration together with behavior before opening or building a system or a platform to sell products or services online can be described in more detail. Future research could study the behavior before setting the system. It is a long-term study allowing the business sector to consider the factors influencing the decision to buy products or services online in more details. 3) This research has proposed only four perceived factors studied: usefulness, ease of use, trust and quality. Other interesting perceived factors can be used to study the behaviors affecting the decision to buy products or services online. A more detailed study of the perceived factors such as the study of prejudice in the current situation can be conducted. In addition, the DMP can be applied to study consumer behavior in purchasing goods or services through the use of other technologies which may help to assess purchasing decisions. This includes the continuation of perceptions from the first process that is a factor of both positive and negative emotions, as well as through the DMP. The continuity of the customer's mood leading to the post-sales process is another potential area for future research. Moreover, the practical platforms in the future should be developed to study and plan the separation of E-business platforms i.e. E-commerce, M-commerce, and S-commerce.

Declarations

Author contribution statement

Thanatchaphan Petcharat and Adisorn Leelasantitham: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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