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Technology acceptance affecting purchasing behavior among online apparel consumers

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Abstract

Electronic commerce, or e-commerce as it is commonly known, is an ultimate weapon against poverty in developing countries as it involves cheap and easy access to large markets for small and large sellers alike. The value of e-commerce in Thailand has been increasing rapidly in recent years, and has become the must-have business channel for both new e-entrepreneurs and traditional stores. This study looks at a particular market segment and explores how technology acceptance influences online apparel purchasing behavior. A Technology Acceptance Model (TAM) was developed in the apparel industry context by taking into account seven factors—usefulness, ease of use, security, time pressure, hedonic orientation, product involvement, and enjoyment. Online purchasing behavior covers three stages: pre-purchase, purchase, and post-purchase. Multistage random sampling was used to select 386 online consumers; and their responses to a range of questions were collected through a web-survey. Quantitative data were analyzed using descriptive statistic and structural equation modeling (SEM). The result revealed that the technology acceptance level has positively significant influences on consumers' online purchasing behavior, especially those who have apparel product experience and who enjoy shopping process. The government should develop policies (e.g. e-payment, e-shipment, data security) to increase the number of e-commerce users and to support expansion of the digital economy.

Keywords: technology acceptance, e-commerce, online apparel purchasing behavior

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1. Introduction

E-commerce has arisen from a combination of economic, social, and information technology development. It can significantly affect the economic growth of nations. If a nation's government issues effective regulations, develops online transaction security, and supports the internet infrastructure, information technology can play a vital role in the economy and can be a key success factor toward the nation achieving the sustainable economy. According to a recent report on e-commerce in Thailand, the total e-commerce market value in Thailand has been increasing rapidly in recent years, being worth around 4 billion baths in 2019 [1], because of multiple driving factors, such as significantly improved logistics, effective electronic transaction systems, improved trustability in online shopping services, and higher internet availability and smart phone usage. Approximately one-fifth of all e-commerce trade (17.27%) is fashion, which puts the sector just behind computers and cosmetics. [2] Nowadays e-commerce has become a must-have business channel, as many consumers prefer online shopping because of its convenience (anywhere, anytime), time savings, price flexibility, fast delivery, product variety, plentiful supply of information, and low transaction costs. [3] Consequently, well-known fashion brands now have to offer e-commerce options in parallel with traditional stores to meet customers' needs. In addition, there are now a lot of new e-entrepreneurs who only have an online store.

Apparel is a symbolic product that sells based on both function and aesthetics. It is a tangible product that creates an emotional experience. Above all, consumers use it as a form of self-expression to show their social status, tastes, and personality. [4] Apparel is an example of goods that depend on touch-and-feel evaluation, yet this is not possible to experience online before a purchase. Online apparel purchasing involves a form of indirect e-commerce, in which consumers make transactions over the Internet, and then get the ordered product delivery in the traditional way. [3] This can make consumers hesitant about buying apparel online, which means they may postpone buying clothes online. Previous online shopping studies have tended to focus on demographic variables, such as how gender, age, occupation, and education affect online purchasing behavior. For example, women are more likely to shop for apparel and fashion than men by considering the shop design and advertising. On

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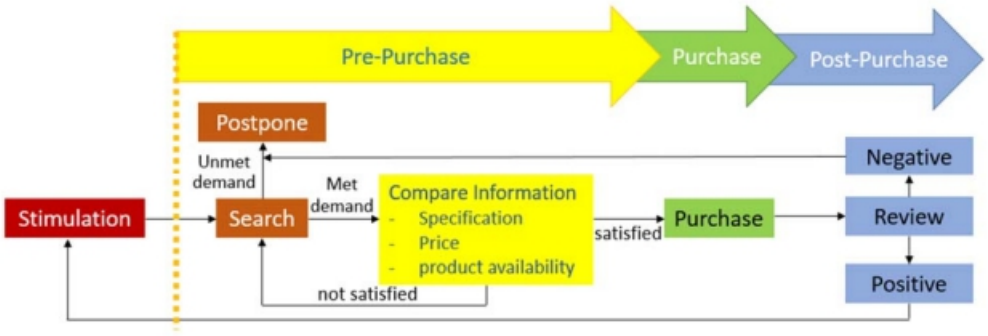

Figure 1: The online purchase process model.

the other hand, men consider more the up-to-date and completeness of product information. [5] Age also has an influence on the product types bought online and customer habits. Frasquet *et al*. [6] found that buyers aged 30 – 40 (Generation Y) are the main population of online shoppers. Income also has an effect on the intention to buy, especially for brand name products. [7] A number of external factors can also help explain online purchasing behaviors. For example, gaining acceptance on social media by demonstrating a high number of 'Likes' for a product and from good product experience comments left. [8] In the fashion context, the chosen apparels and accessories represent a customer's personality and trend-setting power. [9] The marketing mix (product, price, place, and promotion as the 4Ps) [10] and the role of branding [11, 12] are very popular tools used in purchasing behavior studies. This present research introduces a technology acceptance model (TAM) to explain online purchasing behavior as it is a well-known theory to describe technology phenomena. [13] However, there is still a need to determine suitable variables for the model according to the variety of users and contexts. [14] The results of this study will provide useful information to the government, entrepreneurs, and researchers for aiding the development of e-commerce business plans and strategic policies to increase the number of e-commerce users to support the expansion of the digital economy.

2. Research Objectives

1) To study the technology acceptance level and purchasing behavior of online apparel consumers;

2) To study the effects of the technology acceptance level on the purchasing behavior of online apparel consumers.

3. Conceptual Background and Model

Recent research has focused on the factors that affect the purchasing behavior of consumers in traditional commerce, such as basic consumer information [7], channels [6], shop design [5], subjective norms [15, 16], branding [11, 12], and marketing mixes [17] etc. For online apparel, the purchasing process is a form of indirect e-commerce, which an order is made online and must be paid before the goods are delivered in the traditional way, by mail or courier delivery, a few days later. That is why the confidence in e-commerce is an important factor that significantly influences the acceptance of the online purchase. [3]

3.1 Online purchase process

The patterns of traditional purchasing behavior are considered to be linear, which is not appropriate for an online consumer's decision-making process, because the online shopping process model involves a complex and backward decision-making behavior pattern. [18] This transformation in the decision-making moment can be explained by ZMOT (Zero Moment of Truth). In the case of online shoppers, before the purchase process begins, they will explore as much as possible the available choices by surfing the Internet before making a final decision, which is called the "Zero Moment". In addition, the after purchase process is changed as well because the new generation of online consumers love to express their opinions regarding product satisfaction or dissatisfaction. [19] This means that for online shoppers, the online purchasing behavior can be divided into three main stages: pre-purchase, purchase, and post-purchase.

Figure 1 shows that the pre-purchase stage starts when consumers encounter an online or offline stimulus about a product information or its user experience, such as when watching television commercials, talking to family members, viewing pictures or messages from social media, or targeted advertising from search engine optimization. Consumers may then search for product information from various sources. They will compare the product details based on a set of criteria, such as the price and availability of any promotions. If the information is not enough on a particular site or they do not find a product that meets their needs, they will go back and find more information elsewhere. Experienced consumers often primarily go

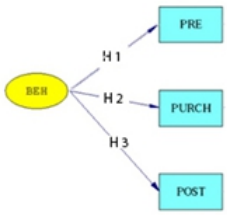

Figure 2: The observable indicators of purchase behavior.

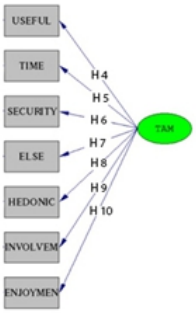

Figure 3: The observable indicators of Technology Acceptance.

back to their latest deals seller and will then search for a few sources of the same product group to confirm their decision. On the other hand, newcomers tend to search for product information from plenty of websites or use a search engine, but may ultimately end up postponing the purchasing. [20] The purchase stage starts when a consumer is satisfied with the product information they have found; and they are ready to place an order via the website, email, or even chat program on a mobile phone. Some of them may inquire about the product availability and the availability of any discount offers. The post-purchase stage occurs after consumers have received the product and have some experience of using it. They may want to share their product opinion on the Internet. This information can be either positive or negative, depending on their expectations before making the purchase. If their satisfaction is higher than their expectations, their feedback will likely be positive, but if it is lower than their expectations, this may lead to them leaving a negative comment and warning to other consumers. A good word of mouth recommendation is the most desired outcome for sellers because it affects the decision-making of other consumers at the pre-purchase stage.

H1 Pre-Purchase is associated with purchase behavior

H2 Purchase is associated with purchase behavior

H3 Post-Purchase is associated with purchase behavior

3.2 Technology acceptance model (TAM)

TAM is recognized as an effective framework for predicting the technology usage of individuals or organizations. [13] It is widely used to study online shopping intentions in the context of both developing and underdeveloped countries. [14] The original model, which improved upon the theory of reasoned action (TRA), was proposed by Fred D. Davis in 1986. [21] The main concept is based on actual system use, which itself comes from behavioral intention to use, which is influenced by two factors: perceived usefulness (PU) and perceived ease of use (PEU). In 2000, Venkatesh and Davis developed TAM2, which added some external variables affecting PU and PEU. [22] Three years later, Vankatesh, Moris, Davis, and Davis formed the unified theory of the acceptance and use of technology (UTAUT) model from previous models. [23] This model enhanced the understanding in the actual use of technology showing that it is effected from a facilitating condition and behavioral intention. In addition, these are moderated by performance expectancy, effort expectancy, and social influence. The theory was later extended as UTAUT2 by adding new variables, including hedonic motivation, price value, and habit. [24]

Many current studies also employ TRA (the origin of TAM) alongside UTAUT. [16, 25] Furthermore, current TAM research trends are directed toward finding a moderator variable between PU and PEU [26, 27], with popular variables being attitude, which means hedonic motivation and enjoyment [28], and security, as measured by the trust levels in e-commerce [29, 30] and cybercrime information perception. [31] Frasquet *et al.* [6] applied TAM in the context of online purchasing apparel and electrical appliances, and stated that the TAM components for apparel purchasing could be classified as extrinsic motivations and intrinsic motivations, including usefulness, ease of use, security, time pressure, hedonic orientation, product involvement, and enjoyment, shown in Figure 3.

H4 Usefulness is associated with Technology Acceptance

H5 Time pressure is associated with Technology Acceptance

H6 Security is associated with Technology Acceptance

H7 Ease of use is associated with Technology Acceptance

H8 Hedonic orientation is associated with Technology Acceptance

H9 Product involvement is associated with Technology Acceptance

H10 Enjoyment is associated with Technology Acceptance

Previous research has focused on the traditional commerce factors which are not suitable for online purchasing behavior. The technology acceptance model (TAM), a well-known theory to describe technology phenomena, could give a further explanation

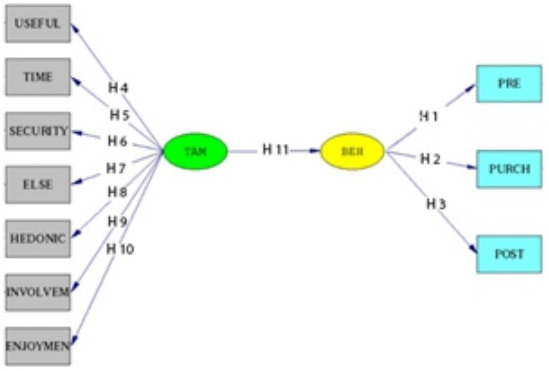

Figure 4: Conceptual model.

of online purchasing behavior, especially in apparel industry context. However, it still needs to determine a suitable variables for the model.

H11 Technology Acceptance has positive effect on purchase behavior

4. Research Method

In the present study, data were collected and analyzed from 386 online apparel consumers through the Internet. A multistage random sampling technique was employed by choosing online consumers who had more than one-year experience in online purchasing. In the next stage, half of the sample was formed by accidental sampling consumers, that is, voluntary online consumers who were motivated to participate by agreeing to donate 10 baht per questionnaire to charity. The other half was divided into four groups by age, ranging from 18 – 25, 26 – 35, 36 – 45, and more than 45 years old. The research instrument was a questionnaire based on TAM and a relevant prior study. The questionnaire comprised 3 parts seeking customer information on their demographics, online purchasing behavior, and technology acceptance. The content validity of the questionnaire was developed by three experts. The Cronbach's alpha coefficient for the questionnaire was 0.86, which is considered a high reliability. After checking the completeness of the 392 returned questionnaires, seven of them were excluded from the data analysis because of poor completeness, leaving 385 for analysis. The non-response bias test showed negligible differences in response time, but indicated that those completing the voluntary samples were younger than the quota groups. The data analysis used a descriptive statistics method and structural equation modeling (SEM) for hypotheses testing. A major benefit of using SEM is that its confirmatory factor analysis (CFA) helps in confirming the membership of the measured variable and shows the direction and size of the relationship between the latent variables in a single analysis.

5. Research Result

5.1 Demographic and purchase behavior of online apparel consumers

The results showed that most of the participants were female (81.3%), 31.25 years old on average, and had an income of less than 15,000 baht (51.3%). In addition, the biggest influencer was social media (64.5%), the most frequently purchased item was clothes (65.8%), and the average spend was 500 – 1,000 baht for each purchase (40.4%). Facebook (36.3%) and Instagram (28.2%) were the most popular search channels. Also, two-thirds used shop websites as their main information sources (65.8 %), and they searched for apparel information every month (38.6%), as shown in Table 1. The sample had a high technology acceptance level, with ease of use as the highest requirement ($\bar{x}$ = 4.02, SD = 0.65), followed by usefulness ($\bar{x}$ = 3.87, SD = 0.73), product involvement ($\bar{x}$ = 3.86, SD = 0.61), time ($\bar{x}$ = 3.69, SD = 0.67), enjoyment ($\bar{x}$ = 3.54, SD = 0.83) and security ($\bar{x}$ = 3.40, SD = 0.69), respectively as shown in Table 2

5.2 Path analysis of technology acceptance level affecting online apparel consumers behavior.

Pearson's product-moment correlation was used to test the suitability for the confirmatory factor analysis (CFA). We found that from a total of 45 pairs of variables, 33 were significant ($p < 0.05$). The correlation coefficients ranged from 0.01 – 0.56, as shown in Table 2.

The SEM method was performed to analyze the relationship between the variables. The factor covariance error relax assumption technique was selected to modify the proposed model. Table 2 and Figure 2 show non-statistical significance of the goodness of fit indices, these indicate a very good fit between the modified model and empirical data. Because of chi square to df ratio is less than two. Goodness of fit index and adjusted goodness of fit index close to one, while root mean square residual and root mean square error of approximation close to zero. Finally, the Largest Standardized Residual is less than two and Q - plot slope greater than the diagonal.

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Table 1. Demographic and purchase behavior of online apparel consumers (n = 386).

Items		Frequency	Valid percent
Gender	Male	72	18.7
	Female	314	81.3
Age $\bar{x}$ = 31.27, S.D. = 11.36			
Income (Baht/month)	Less than 10000	127	32.9
	10000-less 15000	78	20.2
	15000-less 25000	82	21.2
	25000-less 35000	21	5.4
	35000 and over	78	20.2
Occupation	Housewife	28	7.3
	Private Employee	108	28.0
	Civil Servant	45	11.7
	Student	140	36.3
	Private Business/Freelance	65	16.8
Education Level	High School	60	15.5
	Bachelor Degree	289	74.9
	Master Degree	23	6.0
	Doctoral Degree	14	3.6
Purchasing Channel	Shop Website	16	4.1
	Search Engine	49	12.7
	Instagram	109	28.2
	Facebook	140	36.3
	Communication Application	71	18.4
Information Website	1 website	17	4.4
	2 – 3 websites	254	65.3
	4-5	87	22.7
	6 and over	25	6.5
Apparel Type	Clothing	254	65.8
	Bag	71	18.4
	Shoes	43	11.1
	Accessories	18	4.7
Frequency of searching	Occasionally/A few time per years	59	15.2
	Monthly	149	38.6
	Weekly	123	31.9
	Daily	55	14.2
Frequency of online shopping	Occasionally/A few time per years	309	80.0
	Monthly	71	18.4
	Weekly	6	1.6
	Daily	0	0
Volume on each purchase	1 item	264	68.4
	2 – 3 items	112	29.0
	4 and over	10	2.6
Money spent per each purchase	Less than 500	145	37.6
	500 – less 1000	156	40.4
	1000 – less 2000	55	14.2
	2000 and over	30	7.8
Experience Sharing	Never	198	51.3
	A few time	161	41.7
	Monthly	42	10.9
	Weekly	19	2.1

fit index were close to one, and the root mean square residual (RMR = 0.012) and root mean square error of approximation (RMSEA = 0.029) were close to zero. Finally, the largest standardized residual (1.88) was less than two and the Q - plot slope was greater than the diagonal.

The validity of the observed variables revealed that the INVOLVEM variable had the maximum validity, followed by USEFUL, ENJOYMEN, SECURITY, HEDONIC, ELSE, and TIME, as the variable with the minimum validity. All seven variables showed positive values. This indicates that if consideration of the variables is taken into account, the technology acceptance will be high. When considering the factor score coefficients, it was found that all seven components had significant weights between 0.54 and 0.77, with

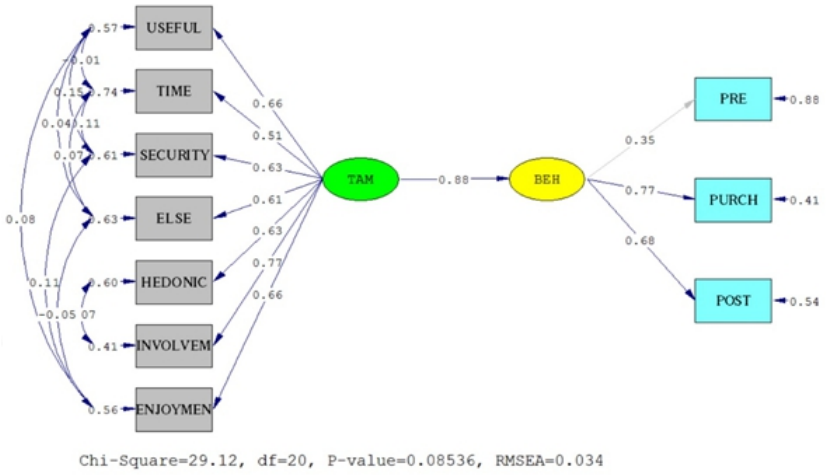

Figure 5: Path diagram.

Table 2. Correlation metric.

	PRE	PURCH	POST	USEFUL	TIME	SECURITY	ELSE	HEDONIC	INVOLVEM	ENJOYMEN
PRE	1									
PURCH	0.38	1								
POST	0.47	.108	1							
USEFUL	0.18	-0.05	-0.01	1						
TIME	0.06	0.21	0.08	0.31	1					
SECURITY	0.11	-0.11	-0.02	0.56	0.19	1				
ELSE	0.11	-0.11	0.05	0.44	0.40	0.37	1			
HEDONIC	0.21	-0.08	0.12	0.39	0.32	0.37	0.39	1		
INVOLVEM	0.23	-0.03	0.07	0.51	0.41	0.21	0.48	0.56	1	
ENJOYMEN	0.28	-0.10	0.06	0.52	0.25	0.31	0.33	0.43	0.54	1
$\bar{x}$	1.76	2.71	2.02	3.73	3.69	3.40	4.02	3.87	3.86	3.54
SD	0.97	0.45	0.48	0.48	0.67	0.69	0.65	0.73	0.61	0.83

Note: Bartlett's test of sphericity = 985.134, p = .001, Kaiser-Mayer-Okin measure of sampling adequacy = 0.845

statistical significance at 0.001 for every value. This suggests that the model was developed in accordance with the empirical data and the model results supported the research hypotheses, confirming that technology acceptance has a direct effect on purchasing behavior. The predictive coefficient (R-square) was 0.79, indicating that technology acceptance could explain 79% of the purchasing behavior, indicating that consumers with a high technology acceptance level tend to have a high involvement with e-commerce.

6. Conclusion and Discussion

E-commerce is an inevitable business model nowadays because most of today consumers are Generation Y (Gen Y), who were born during 1977 – 1994 and who have therefore grown up as digital natives and are used to having information readily available online. Consequently, they expect and need to consume plenty of information before making a decision. [32] Gen Y has different behaviors than the previous generation. Because they prefer products to serve both functional and emotional needs, they are inclined to search for information particularly on items that have received a lot of 'Likes' or that are brand names. Also, they are more addicted to convenience and tend to prefer in-house shopping than other generations. [33] That is why, they tend to be an influencer of other groups. Consumers in the present study were heavily influenced by social media, with Facebook the number one source of inspiration, following by Instagram. This concords with the findings of Napompech [8], who stated that social media is the most popular e-commerce channel in Thailand.

Analysis of the causal relationship model of technology acceptance on online apparel purchasing behavior reflects that e-commerce in the textile and apparel sector will be enhanced if the technology acceptance of the online consumers is high in term of seven dimensions: product involvement (INVOLVEM) has maximum validity, followed by usefulness (USEFUL), enjoyment (ENJOYMEN), security (SECURITY), hedonic (HEDONIC), ease of use (ELSE) and time pressure (TIME). In line with previous research, Frasquet *et al.* [6] found that perceived enjoyment influences the buying process at all stages. However, only in the case of apparel products, likely related to the nature of them being in the fashion industry, the influencer and word of mouth recommendations are as important as the functional requirements. [34] Consumers enjoy visiting online front stores and choosing the right products to develop their preferences. [35] Millan and Reynolds [4] stated that the hedonic aspect will have a positive effect on a consumer's shop

Table 3. Path coefficients and fit indices.

Variable	Raw	Standard	SE	t	R^2
Measurement model					
Matrix LX					
USEFUL	0.32	0.66	0.02	12.85***	0.43
ELSE	0.39	0.61	0.03	11.83***	0.30
TIME	0.36	0.54	0.04	9.88***	0.39
SECURITY	0.43	0.62	0.04	12.07***	0.37
HEDONIC	0.46	0.62	0.04	12.32***	0.39
INVOLVEM	0.48	0.77	0.03	16.10***	0.60
ENJOYMEN	0.56	0.68	0.043	13.35***	0.46
Matrix LY					
PRE	0.21	0.35	<–>	<–>	0.13
PURCH	0.67	0.77	0.11	6.21***	0.57
POST	0.76	0.68	0.13	6.06***	0.48
Casual Model					
TAM –> BEH	0.89	0.88	0.14	6.21***	0.79
x^2 = 29.12, df = 20, p = 0.08, GF = 0.99, AGFI = 0.96 ,RMR 0.012,RMSEA = 0.034					

Variable	PRE.BEH	PURCH.BEH	POST.BEH	Useful.TAM	Ease.TAM
Validity	0.12	0.59	0.46	0.43	0.26

Variable	Time.TAM	Security.TAM	Hedomic.TAM	Involment.TAM	Enjoymen.TAM
Validity	0.26	0.39	0.40	0.59	0.44

visit behavior and apparel preferences. In addition, time pressure variables affect the purchase phase. Entrepreneurs thus have to balance and manage the style of buying costumes online from the hassle of spending a lot of time shopping by transforming it into a leisurely and enjoyable experience. The advantage of online commerce is that they can use a variety of images and media to create an enjoyable experience. [36]

7. Study Limitations and Suggestions for Future Work

1. This study provides some insights for better understanding the casual relationship between consumers' technology acceptance and online purchase behavior. However, the effects of mediators and moderator variables were not investigated. Therefore, future research could examine the effects of these factors on consumers' online purchasing behavior.

2. Future researchers could use TAM for studying some other types of products or technology; and could also perform comparative studies on different industries. In addition, different types of cultures and countries would provide further information about the generalizability of the issues and findings.

3. The majority of online customers are Gen Y who were born and grew up as digital natives. They have a high technology acceptance level and their experience and expectations increase over time. That is why they are the perfect targets for online products. E-entrepreneurs can use this group's information and behavior patterns to plan their product development and marketing strategies.

4. The government should support the information technology infrastructure to increase the number of e-commerce users and to support expansion of the digital economy. Currently, the number of internet users in Bangkok is higher than urban areas. [10] In addition, the government should support policies to promote e-payment and e-shipment activities, and increase data security, especially for online transactions.

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