

An investigation of cyber attack impact on consumers' intention to purchase online

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ABSTRACT

E-commerce technologies are increasingly adopted and used because they give companies a competitive edge and boost their profitability through access to international markets. Even though global e-commerce has grown over the past few years, many consumers lack confidence in e-commerce purchases. Several factors, including safety, trust, and use of technology, influence the users' intent to purchase. This study uses the Theory of Planned Behavior (TPB), trust in e-commerce sellers, trust in the internet medium, and cyber-fraud perception to determine what factors influence customers' intention to buy online. We surveyed 258 Thai customers of e-commerce websites via Google Forms. Cronbach's alpha and correlation are used to verify the analysis's reliability and validity analysis. Data analysis included simple linear and multiple linear regression. We show that attitude toward behaviour and perceived behavioural controls are ideal predictors of customers' e-commerce purchasing intentions. Customers' behaviour also depends on their trust in the internet medium and the vendor. We further demonstrate subjective norms, online vendor trust, cybercrime perception, and Internet trust do not affect users' intent to purchase, and cybercrime does not change behaviour either. It also does not moderate the association between trust in e-commerce companies and clients' disposition toward buying online.

1. Introduction

E-commerce refers to conducting business online using computing devices and communication platforms. It has proven to be a crucial facilitator for businesses by allowing them to efficiently and cheaply reach customers worldwide. Organisational procedures, human resources, and technology infrastructure must be updated as part of this massive digital evolution. Successful businesses do in-depth analyses of their markets to develop effective business strategies [1]. The e-commerce domain has expanded due to technological development and Internet growth [2]. A customer's level of trust is a significant component in deciding whether or not they will make an online purchase. E-commerce's hidden procedure makes it hard for customers to determine whom to trust [3]. E-commerce provides several features feedback systems, promotions, review forms, discount offers, etc.—designed to make customers feel more at ease and satisfied with their experience. While rich countries' e-commerce processes are already embedded with cutting-edge technology that makes their apps dynamic, evolving, and safe, developing countries are still looking into how to

get theirs to that point [4]. Customers rely on the online payment system to facilitate returns for broken or flawed merchandise. Poorly designed and poorly performing e-commerce apps can add technical complexity to the user experience [5]. When users find it quick and easy to accomplish their goals with the app, they are more likely to stick with it. High expectations can lead to disappointment if consumers do not receive adequate or accurate information about the products and services advertised online [6]. Online shoppers' intentions to buy are hard to predict since they vary widely based on previous purchases and other factors. Consumers trust e-commerce platforms because they provide convenient access to a wide selection of high-quality goods and services, expedited shipping times, service guarantees, money-saving discounts, and other special deals. Customers' faith in a company rather than its privacy or security measures was shown to be the most essential factor in determining whether or not they would make a transaction online [7,8].

Globally, there are approximately 4 billion internet users from more than 139 countries [9]. Especially in Thailand, the number of

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people who use the Internet has risen to 29.07 million, accounting for 42.70% of the 68.14 million people living in Thailand, which in turn has resulted in a considerable amount of money circulating in the national economy (National statistical office, 2018) [10]. In Thailand, the Internet is now considered an essential factor in the digital society and tends to change into a new world without borders. Since data distribution is fast in every direction, the changes this has given birth to help make human life more comfortable, interacting with significant economic systems. Moreover, when the economy entered the industrial age of 4.0, it was substantial in the consumption, product management, and investment profit management services, along with businesses, trade, entertainment, education, and various other fields [11]. Loss of face-to-face interaction in e-commerce [12] and the inability to touch or examine the item cause doubt and paranoia among consumers.

E-commerce has many advantages, but some security challenges can seriously affect the customer's intention of online purchasing. There are several practical and sociological benefits to using online services in today's world. The growing internet ecosystem puts users at risk from several threats, though [13]. Surveys show that consumers value the Internet as a marketing medium because of its accessibility, but they are wary of making financial transactions online due to security and privacy concerns. When conducting business online, it is essential to feel assured that sensitive information will not fall into the wrong hands [14]. It was shown that customers are more likely to trust several online services if they feel safe using them. The word "cybercrime" is used to describe any illegal behaviour that makes use of a computer or a network of computers. These are premeditated attacks with far-reaching consequences on society, including the emergence of emotional problems and the disruption of economic activity [15]. Phishing, social networking burglary, identity theft, social engineering, viruses, and cyber-stalking were all mentioned in the NW3C's study on cybercrime [16].

1.1. Study objectives

- To identify a statistically meaningful correlation between internet security and consumer buying propensity.
- To learn if there is a relationship between privacy policies and consumers' propensity to purchase on the web.
- To learn if there is an association between effective Technology Regulations and practices and the likelihood that a customer will purchase on a website.

1.2. Research questions

- Is there any correlation between safety features and the likelihood that a customer will purchase from the online store?
- Is there a relationship between privacy policies and the likelihood that a client will make a purchase when shopping online?
- Is there an association between strict Cyber rules and regulations and the likelihood of making a transaction on the Internet?

This research is rare in that it examines cybercrime's impact on e-commerce technologies from the viewpoint of a developing nation. This research aims to analyse how customers' fears of cybercrime affect their propensity to shop online. This study aims to shed light on how consumers' attitudes toward cybercrime and other trust factors influence their propensity to conduct business online. Since TPB has been effectively applied to studying user behaviour in e-commerce, we have adopted it.

2. Literature review

Users are increasingly challenged to discern between authentic content and promotional messages due to the prevalence of inaccurate

or misleading information on social media. The efficiency of digital marketing initiatives decreases, and the reputations of the businesses and organisations advertising those items or services are affected.

The authors of [17] pointed out that Thai users' acceptance of online stores is lower than in the United States. Early reasons were the slow speed of the Internet and the risk of installing malware applications [18]. However, the researchers believe that perceptions of cyber-fraud have a significant influence as fraud in e-commerce is on the ISE. Phishing, spam, investment fraud, and identity theft make consumers realise it might happen to them [19]. By 2023, fraud will increase from 22 billion US dollars this year to 48 billion US dollars [20]. In Thailand, cybercrime has risen from 27% two years ago to 40% [21]. As a result, the concern is that the perception of fraud may influence buyers' trust when making an online transaction. Many researchers investigate trust in online shopping in the context of Thailand. In [22], the authors identified trust, ease to use, and perceived benefits as significant factors in describing customer attitudes. A correlation is found between perceived buyer's trust and customer attitudes toward using online hotel reservations refer from the respondents of 446 Thai students. Several scholars have studied the theory of Planned Behavior (TPB) in e-commerce, including [23–26].

Numerous studies have concentrated on the security aspects of the technological infrastructure underlying e-commerce, such as secure payment mechanisms [27], securing communication [28,29], and fraud protection [30,31]. However, research into the safety and confidence of online shoppers has increased. According to [32], consumers' trust and social connections matter while purchasing via mobile devices. Security seals on company websites have been shown to enhance sales and traffic, as discussed by the authors of [33]. Data exchanges within and between companies and between companies and their customers pose security risks, as illustrated by the studies collected in [34]. The authors of [35] observed that a lack of confidence for clients in business is a constant hindrance to the acceptance and realisation of electronic commerce, despite the developments in e-commerce. In order to succeed in e-commerce, businesses must earn their customers' trust, as regaining that trust is a time-consuming and costly process. The authors of [36] drew attention to the fact that users' demographic characteristics and browsing habits influence the risks they face online, and they created a comprehensive perceived risk map to inform readers about these factors.

Customers are more likely to engage in online or traditional commercial transactions if they believe the merchant is trustworthy are more likely to engage in online or traditional commercial transactions if they believe the merchant is trustworthy, according to researchers [37]. Additionally, purchase intent is affected by security, privacy, and usability. Conducted experiments using mockups of e-commerce platforms to identify what makes buyers happy [38]. According to the authors of [38–40], users should be compensated for their time spent reading privacy policies on websites because doing so is an investment on their part that results in the disclosure of personal information. Data confidentiality refers to the safeguarding of confidential data, integrity for retaining the originality of the information, authentication for verification of the individuals or operations involved, and the non-repudiation for evidence of the legitimacy of actions are just some of the security control measures discussed by the authors of [40–42]. Online shoppers are more likely to purchase if they feel safe doing so, according to the study cited in [43].

In [44], researchers emphasised the importance of societal impact, perceived value, simplicity of application, and trust in influencing consumer's perceptions of the safety of online purchases using a credit card. The study by the authors of [45] indicated that men generally engage in safer online behaviour than women. However, according to researchers in [44], it has been stated that users' emotions and risk tolerance are more influential than their gender or age when it comes to their information security habits. According to their findings, the authors of [46] concluded that the government's presence on social

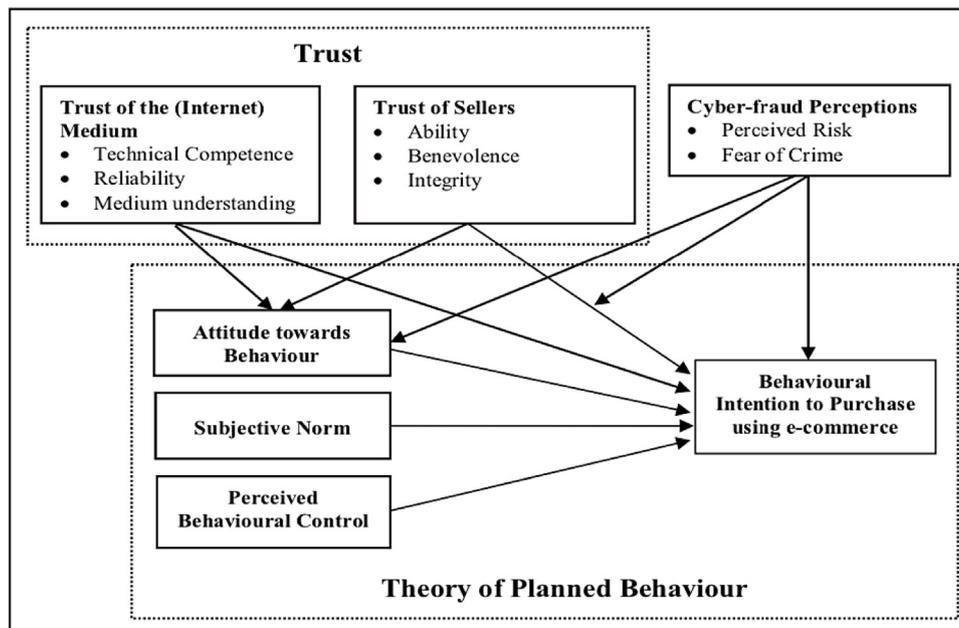


Fig. 1. Conceptual model.

media can influence users' information security behaviours. Since the authors of [5,47] recognised that security and privacy could hinder the development of electronic commerce, they reviewed the available literature to identify the most prevalent causes of these worries. Authors in [48–50] suggested that building quantitative and qualitative trust models is necessary for securing computer networks since trust is an integral part of security models.

Systematic literature study reveals that intent purchase using e-commerce, perception of cyber-fraud, and trust have not been studied before with a specific focus on Thailand. No single research has looked at the three concepts together. It has been reviewed in other settings like Indonesia by the authors of [51]. That is why it will be interesting to see results in the context of Thailand. Thus, the research aims to fill the gap by investigating intent purchase using e-commerce, perception of cyber-fraud, and trust. The study will utilise an existing conceptual model developed by [52], listed in Fig. 1. The model shows a relationship between the perception of cyber-fraud, trust in the seller and trust in the medium (Internet) to find out which factors can affect Customers' purchasing habits and intentions when using an e-commerce system.

Some of these studies recognise the multifaceted nature of trust, but the vast majority focus solely on customer confidence in vendors or Internet trust. As a result, a lack of research considers both types of trust. E-commerce operations have also been the primary subject of other studies, either from a vendor or an institutional point of view. Few studies have looked at how different countries' attitudes against cybercrime affect consumers' propensity to make online purchases.

Fig. 2 shows ten hypotheses developed by [16]. These hypotheses are:

- H1: The intention to buy through the e-commerce system will be positively influenced by the customer's faith in the sellers.
- H2: The customer's behavioural intention to purchase using the e-commerce system will be positively impacted by their faith in the (Internet) medium.
- H3: The customer's perception of cybercrime will harm their behavioural intention to use the e-commerce system to make a transaction.
- H4: The views about consumer behaviour will favour consumers' behavioural intentions to use the e-commerce system to make purchases.
- H5: The subjective norms of the customer will favourably impact their behavioural intention to buy when utilising the e-commerce system.

H6: The perceived behavioural controls of the client have a favourable impact on their behavioural intention to purchase the e-commerce system.

H7: The attitudes regarding customer behaviour are positively impacted by the consumer's faith in the seller.

H8: The views regarding customer behaviour are positively impacted by the consumer's trust in the (Internet) medium.

H9: The customer perceives Cyber fraud negatively, which negatively affects attitudes about customer behaviour.

H10: The link between trust in the sellers and the behavioural intention to purchase using the e-commerce system is negatively impacted by the customer's perception of cyber-fraud.

3. Research methodology

A quantitative survey was designed using Google Forms. A Thai version of the questionnaire was created. Using a random sample, it was sent through different social media platforms, including Facebook, Instagram, Twitter, and Line app.

3.1. Analysis and findings

3.1.1. Demography attributes

There were 169 females and 89 males among the 258 people who participated in this survey. The majority of participants were between 18 and 30 (67%). The second largest number of participants is in the age range between 31 and 40, around 22 per cent. It confirms a societal view that young people tend to shop more online. Most respondents have a high level of education (about 90%). Government officers rank second with nearly 16 per cent. Most respondents' income ranges from 20,001 to 30,000 Baht per month (31%) in GBP. These amounts range between £534 and £801.

3.1.2. Sample e-commerce experiences

Seventy-five per cent of all participants had used the Internet for over seven years. According to the statistics below, half of the people who participated in this study accessed the Internet for more than 20 h a week (52%). In addition, 31 per cent do it for 10 to 20 h a week. Over a quarter of the respondents, 32%, have purchased goods or services online 3 to 6 times, and 35% more than 12 times a year.

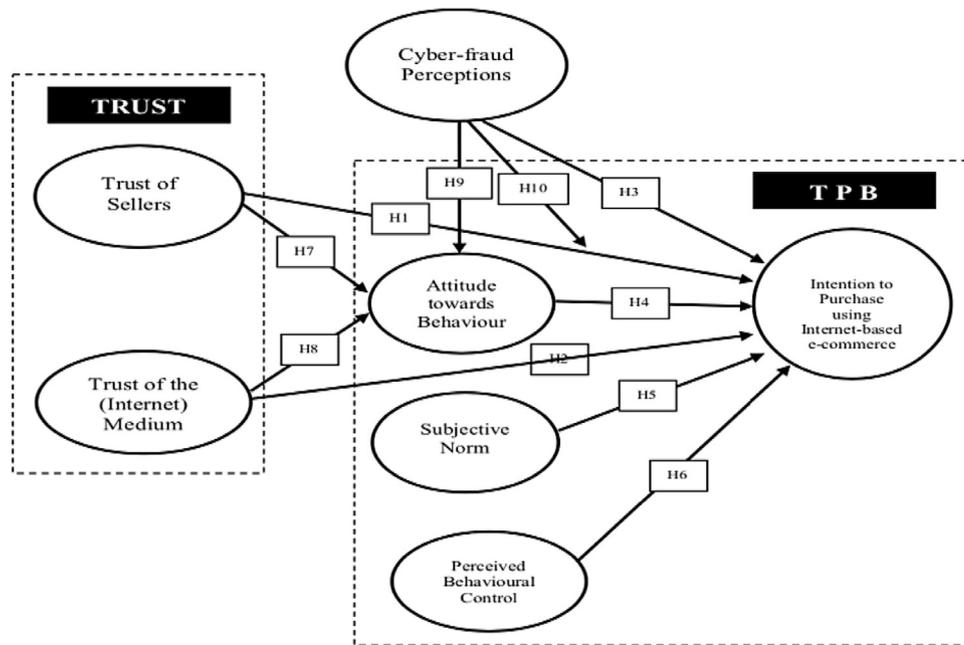


Fig. 2. The hypothesised model.

They are followed by respondents who have purchased online products one to two times a year. By contrast, only 1% have never experienced buying goods, products, and services online. Over the past 12 months, the majority of respondents had purchased a variety of products. The highest proportion of items respondents buy belongs to clothes, with approximately 41 per cent. This is followed by other things, including electronic products, games, cosmetics, gadgets, and medicine (29%). Sports equipment ranks third in this study (close to 12%), followed by books with 12%.

On the other hand, the proportions for software, music CDs and DVDs are the lowest (3%, 2% and 1% respectively). The survey found evidence that in Thailand, over the last 12 months, the participants used several payment methods for online shopping. The most popular way is Bank transfer, with nearly 44 per cent. The Credit card comes second, with around 33 per cent, while payment on delivery in Thailand is close to 16%. The primary vendor location in this survey is Thailand, with approximately 83 per cent, followed by China, with almost 10 per cent.

Conversely, the proportion of vendors from neighbouring countries and the USA are similar (around 1%). The groups of respondents who spend less than 1000 Baht and 1001 to 2000 Baht per year shopping online have similar percentages, nearly 27. This is followed by those who spend more than 4000 Bath per year, with 24%. Only 1% of the respondents never bought products on the Internet resulting in the high value of the study by collecting data from Thai people who have experience with online shopping.

3.1.3. Sample experience with cyber-crime

Respondents have to deal with experiences related to cybercrime to process Internet purchases. They tend to experience at least one incident involving various types of cybercrime. As a result, respondents to this study are given the option to indicate if they or a member of their family or relative has encountered more than one cyber fraud. Most respondents have experienced spam (close to 29%). This is followed by the Parcel Courier Email Scheme and phishing (around 18% and 17%, respectively), while 13% of the respondents have never experienced cybercrime. On the other hand, Counterfeit Cashier's Cheque has the most minor incidence (1%). The types of cybercrime Thai customers suffered from were similar to the ones in Indonesia (ROFIQ, 2012).

Table 1

Correlation coefficients between constructs.

Correlations	r value	p-value
TS ↔ IP	0.459	0.000
TM ↔ IP	0.453	0.000
CF ↔ IP	0.431	0.000
AB ↔ IP	0.594	0.000
SN ↔ IP	0.439	0.000
PC ↔ IP	0.626	0.000
TS ↔ AB	0.522	0.000
TM ↔ AB	0.561	0.000
CF ↔ AB	0.390	0.000
CF ↔ TS	0.334	0.000

4. Correlation results between dependent and independent variables

The Pearson product-moment correlation coefficient(r) results show the correlation coefficients between constructs such as trust in sellers (TS), perceptions of cyber fraud (CF), trust in the medium (the Internet) (TM), attitude toward behaviour (AB), subjective norm (SN), perceived behavioural control (PC), and intention to buy using e-commerce (IP). Considering all the correlations among constructs listed in Table 1, none have correlation coefficients higher than 0.75, so multicollinearity is impossible.

4.1. Multiple regression between the independent variables and e-commerce purchase intent

Fig. 3 shows that independent variables AB and PC positively influence IP with a regression coefficient (B) equal to 0.294 and 0.383, respectively, at p = 0.000. Regarding the result of the beta coefficient, PC has a higher value than AB, 0.356 and 0.272, respectively. Unfortunately, the result did not find any relationship among other independent variables.

Fig. 4 shows regression coefficients (B) of TS, TM, and CF are 0.332, 0.327, and 0.135, respectively, which indicates a 41.9 per cent variation (R²) in attitude toward behaviour.

A simple regression was carried out to determine the connection between the intention to use e-commerce for purchases and the level

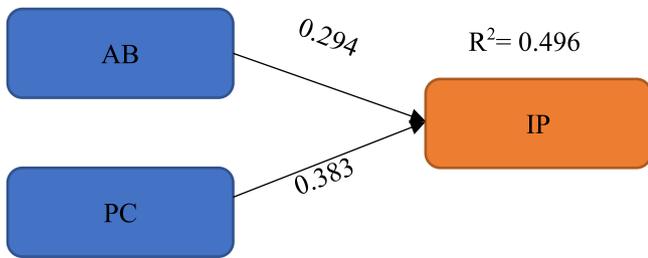


Fig. 3. The association between the independent variable and e-commerce purchasing intention.

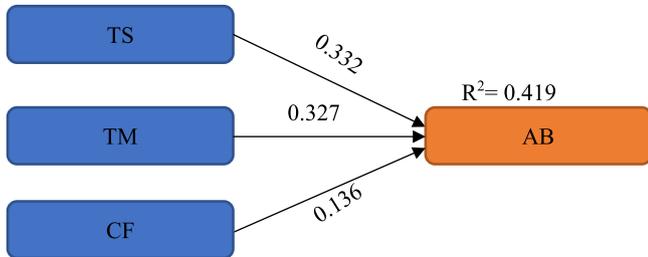


Fig. 4. Independent variable and the attitude's relationship toward behaviour.

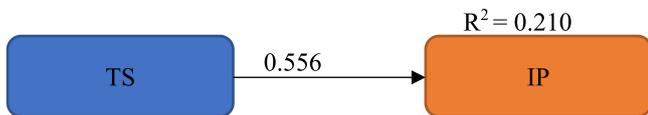


Fig. 5. A buyer's intention to use online shopping and their faith in the sellers.

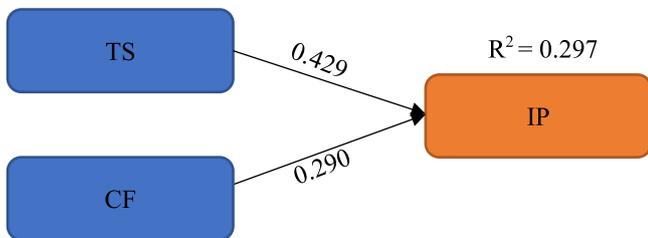


Fig. 6. The relation between the perception of cyber fraud, seller trust, and e-commerce purchase intent.

of seller confidence. The R square and adjusted R square values of 0.210 and 0.207, respectively, show a 21 per cent variation (R^2) in the intention to purchase using e-commerce at p -value = 0.000 ($F_{1,256} = 68.195$). In addition, the regression coefficient (B) value is equal to 0.556 (Fig. 5).

Multiple regression was run to define the relationships between overall independents variables, including the trust of sellers and cyber-fraud perceptions that have a positive impact on the dependent variable (TS) at $p = 0.000$ ($F_{3,254} = 53.927$), explaining 29.7 of the variance (R^2) with the intent to make an online transaction. When analysing the variables' details, TS and CF have significance levels at $p = 0.000$ with regression coefficients (B) equal to 0.429 and 0.290, respectively (Fig. 6).

4.2. Hypothesis testing

After conducting multiple inspections, Fig. 7 illustrates the best structural model obtained. In the valid model, the structure proposed

in this study creates the coefficient of the path. The hypothesis is examined using these coefficients.

4.3. The influence of the trust in the sellers on customers' purchase intentions

According to Hypothesis 1, "the intention to purchase by using the e-commerce system will be positively influenced by the customer's trust in the sellers". The path regression coefficient of the association between customer intent to purchase goods and services through the e-commerce system and customer trust in sellers is coefficient (B) = 0.103 at p -value = 0.132, according to the results of the valid structural model. This association is insignificant because it has a significance level greater than 0.05. As a result, Hypothesis 1 is disproved.

4.4. The influence of the trust in the medium (Internet) on customers' purchase intentions

According to Hypothesis 2, "the customer's faith in the (Internet) medium will have a beneficial influence on the behavioural intention to buy through the e-commerce system". The outcome of the valid structural model shows a correlation between customer intentions to purchase goods and services through the e-commerce system and their level of faith in the medium (the Internet), with a regression coefficient B = 0.005 at a p -value of less than 0.935. Although the result indicates that the coefficient's value is positive, the association is insignificant because the significance level is more than 0.05. As a result, theory 2 is likewise disproved.

4.5. The perception of cyber fraud on customer's purchase intentions

According to hypothesis number 3, "the customer's perception of cyber-fraud will have a detrimental impact on the behavioural intention to purchase through the e-commerce system". The outcome shows a correlation between customer intents to use the e-commerce system and their perception of cyber-fraud, with a regression coefficient (B) = 0.080 and a p -value of 0.106. There is no correlation between them because the p -value is higher than 0.05. As a result, Hypothesis 3 is disproved.

4.6. The influence of attitude toward behaviour on customer's purchase intentions

Hypothesis 4 declares that "the customer's attitudes towards the behaviour will positively influence the behavioural intentions to purchase using the e-commerce system". The valid model shows that the path regression coefficient of the relationship between the customers' attitudes toward behaviour and their intentions to buy products and services through the e-commerce system is B = 0.294 at p -value = 0.000. In addition, the result also shows that the value of the coefficient is positive. Because the significance of the coefficient is less than 0.05, it is evident that the customer's attitudes toward behaviour are significant. Moreover, there is a positive influence on the customer's intention to buy. This can prove that hypothesis 4 is supported.

4.7. The influence of subjective norms on customer's purchase intentions

According to hypothesis number 5, "the customer's subjective norms will have a favourable influence on the behavioural intention to purchase through the e-commerce system". The valid structural model results show a regression coefficient B = 0.071 at a p -value of 0.186 between subjective norms and customers' intentions to purchase goods and services through the online marketplace. Although the result indicates that the coefficient's value is positive, the association is insignificant because the significance level is more than 0.05. Therefore, theory number 5 is disproved.

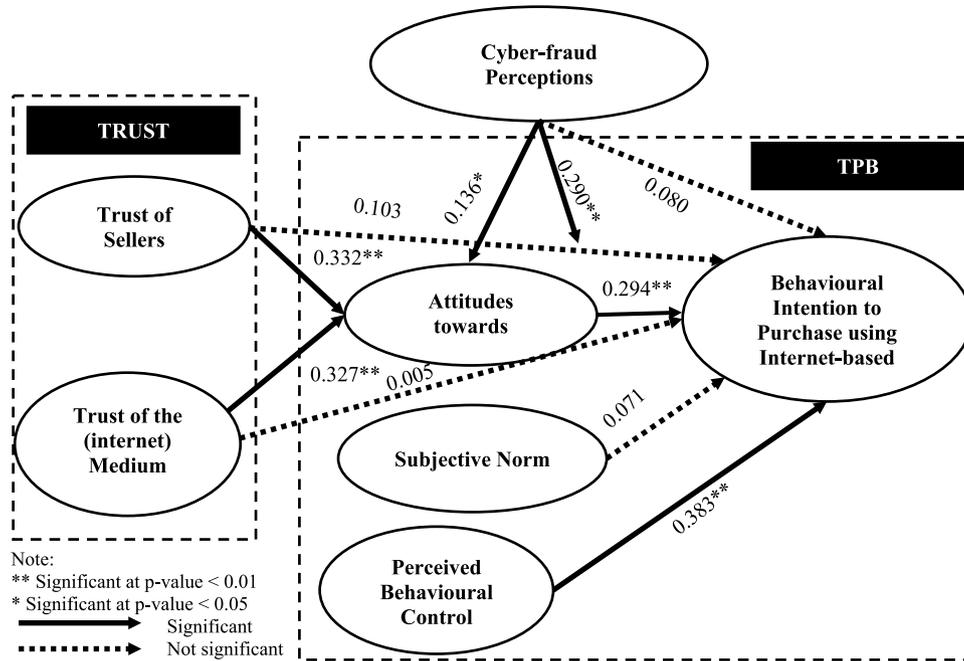


Fig. 7. The study's valid structural model.

4.8. The influence of perceived behavioural control on purchase intentions

According to Hypothesis 6, the customer's perceived behavioural controls "have a beneficial influence on the behavioural intention to purchase utilising the e-commerce system". The valid structural model shows the association between the customer's perceived behavioural controls and their intent to purchase goods and services through the e-commerce system, which has a regression coefficient of $B = 0.383$ at a significance level of 0.000. Because the significance level is smaller than 0.01, the regression coefficient value also shows that the link is significant and positive. Thus, hypothesis 6 is unquestionably supported.

4.9. The influence of the customer's trust in the sellers on customers' attitude toward behaviour

According to Hypothesis 7, "the customer's views regarding behaviour are positively influenced by the customer's faith in the vendors". The association between a customer's attitude toward behaviour and their level of trust in the sellers was estimated to have a regression coefficient $B = 0.332$ at a p-value of 0.000 using the valid structural model. As the significance level is less than 0.001, this relationship is enormously significant. Furthermore, the value of the regression coefficient can be evidence that trusts in the sellers has a positive relationship with the attitude toward behaviour. This means that hypothesis 7 is wholly supported.

4.10. The influence of trust in the (Internet) medium on attitude toward behaviour

Hypothesis 8 posits that "the customer's trust in the (Internet) medium positively influences the customer's attitudes toward behaviour". The result of the valid model illustrates that the path regression coefficient of the relationship between the trust in the medium and the customer's attitude toward behaviour has a $B = 0.327$ at p-value = 0.000. Likewise, the value of B also shows that trust in the medium will encourage increasing customers' attitudes toward their behaviour. Hypothesis 8 is supported.

4.11. The influence of the perception of cyber-fraud on attitude toward behaviour

According to Hypothesis 9, "the customer's attitudes about behaviour are negatively impacted by the customer's perception of cyber-fraud". The findings from assessing the valid structural model show a regression coefficient $B = 0.136$ at a p-value of 0.003 between the perception of cyber-fraud and the customer's attitude toward behaviour. Even though the significance level can be evidence that this relationship is significant, the value of the regression coefficient shows there is a relationship in a positive direction. Therefore, hypothesis 9 is rejected.

4.12. The influence of the perception of cyber-fraud toward the relationship between the trust in the sellers and the behavioural intention to purchase

The customer's perception of cyber-fraud, according to hypothesis number 10, "has a negative influence on the relationship between trust in the sellers and the behavioural intention to purchase through the e-commerce system". The outcome of the simple regressions demonstrates that the correlation between the desire to make an online purchase and the seller's trust has a coefficient $B = 0.556$ at a p-value of 0.000. After investigating, the moderator (the perception of cyber-fraud) found that the multiple regression coefficients (B) of the trust in the sellers decreased to 0.429. However, considering the moderator can increase the prediction ability on the intention to purchase using e-commerce from $R^2 = 0.210$ to $R^2 = 0.297$. Moreover, the path regression coefficient of cyber-fraud and intention behaviour (B) is 0.290 at p value = 0.000. The value of B demonstrates an impact in a positive direction between them. Consequently, hypothesis 10 is rejected.

Six hypotheses in total do not adhere to the standards. Regarding viable theories, hypothesis 6 has the most significant regression coefficient (B) value, 0.383. As shown in Table 2, there is no doubt that the association between customers' perceived behavioural controls and their behavioural intention to purchase an e-commerce system is the strongest among those that are acceptable.

Table 2
The summary of hypothesis testing.

Hypotheses	Coefficient (B)	p-values	Results
H1: The customer's trust in the sellers will positively influence the behavioural intention of purchasing using an e-commerce system.	0.103	0.131	Rejected
H2: The customer's trust in the (Internet) medium will positively influence the behavioural intention of purchasing using an e-commerce system.	0.005	0.935	Rejected
H3: The perception of customers toward cyber-fraud will negatively influence the behavioural intention of purchasing by using an e-commerce system.	0.080	0.106	Rejected
H4: The attitudes toward customer behaviour will positively influence the behavioural intentions to purchase by using an e-commerce system.	0.294	0.000	Supported
H5: The subjective norms of the customer will positively influence the behavioural intention of purchasing using an e-commerce system.	0.071	0.186	Rejected
H6: Customers' perceived behavioural controls positively influence the intention of purchasing by using an e-commerce system.	0.383	0.000	Supported
H7: The customer's trust toward the sellers positively influences the attitudes toward customer behaviour.	0.332	0.000	Supported
H8: The customer's trust toward the (Internet) medium positively influences the attitudes toward customer behaviour.	0.327	0.000	Supported
H9: Customers' perception of the cyber-fraud negatively influences their attitudes toward customer behaviour.	0.136	0.003	Rejected
H10: The perception of customers toward cyber-fraud negatively influences the association between the trust of sellers and the behavioural intention of purchasing by using an e-commerce system.	0.290	0.000	Rejected

5. Discussions

5.1. The influence of trust in the sellers on customer's purchase intentions

This study's results show no correlation between customer intention to buy things online and their trust in e-commerce providers. This implies that Thai customers do not consider trust in e-commerce vendors an essential factor when deciding whether to make an online transaction. However, most studies discovered a strong correlation between the two [9,20–23]. These results prove that Thai users perceive differently than users in other countries. The research strongly suggests that this finding is a big contract. Thus, qualitative analysis needs to perform to investigate this finding further.

5.2. The influence of trust in the medium (Internet) on customer's purchase intentions

The findings of this study show a connection between customer intention to make an online purchase and their level of trust in the Internet medium. Although the influence is positive, there is no significant relationship between them. That means Thai consumers do not think Trust in the Internet is important when making online transactions using the e-commerce system. Meanwhile, previous studies do not support this idea because they found that trust in the medium positively impacts and significantly correlates with customers' intentions [1,24]. They might understand that every vendor will provide a secure platform and offer an appropriate solution to make the process free from crime, resulting in them ignoring this point.

5.3. The perception of cyber-fraud on customer's purchase intentions

The results of the perception of cybercrime were controversial from those in previous studies [1,20,24]. They declare that the perception of cybercrime will negatively influence customers' intention to buy e-commerce items. At the same time, this finding shows no significant correlation in their relationship. It implies that even though Thai consumers know no one can guarantee that an online transaction will be safe, they still keep doing it.

5.4. The influence of attitude toward behaviour on customer's purchase intentions

The findings of this study demonstrate that behaviour-related attitudes have a favourable and significant impact on consumer's intention to buy. Additionally, it proves that Thai consumers' attitudes toward online buying impact their intention to purchase through e-commerce. It makes the idea that by employing e-commerce technologies, attitude toward behaviour can forecast the intention to make a purchase. This implies that sellers' attitudes toward conducting business have an impact. Given that actual purchasing behaviour is predicted [25,26], these findings are not unexpected.

5.5. The influence of subjective norms on customer's purchase intentions

Although the outcome of this research demonstrates that the impact of subjective norms on purchase intention is positive, unfortunately, it is not significant in this relationship. Thai users do not consider social influence an essential factor before buying an e-commerce product. Contrarily, past studies have discovered that subjective norms highlight social pressure from friends, family, and other respected persons to take or refrain from specific activities. Subjective standards also discuss how people's choices are affected by those they believe to be significant in their lives. The study's findings demonstrate that subjective norms significantly impact customer purchase behaviour in e-commerce. Our study supports earlier studies that found subjective norms markers of online shopping behaviour by showing a connection between subjective norms and e-commerce intentions. The results contradict earlier research [1,19,53,54].

5.6. The influence of perceived behavioural control on purchase intentions

The findings in this study postulate that perceived behavioural control positively affects customers' purchase intentions. It can be evidence that Thai users consider perceived behavioural control a significant issue when making decisions about online transactions through e-commerce. In addition, it demonstrates that the more customers think what they are going to do is under their control, the more they tend to do online transactions. This outcome is consistent with previous studies [16,26]. Furthermore, these results confirm that Thai consumers have similar views to people in other countries.

5.7. The influence of the customer's trust in the sellers on the customer's attitude toward behaviour

The results show that their trust in online businesses positively impacts customers' attitudes toward behaviour. According to the findings, e-commerce buyers' opinions in Thailand are significantly influenced by their faith in the seller. These findings are corroborated by earlier work by [27]. Thai e-commerce customers can choose from a wide range of merchants. This may help explain why online retailers consider customer trust in the sellers a key criterion.

5.8. The influence of trust in the (Internet) medium on the attitude toward behaviour

The research finds that customer trust in the Internet affects their behaviour and attitudes. This suggests that clients' confidence level to conduct business online is substantially influenced by their level of faith in the Internet. This is entirely consistent with earlier research by Rofiq and the faculty [1,16], and it means that e-commerce consumers in less developed countries cannot buy online as well as those in developed countries who think that Trust in the Internet is a crucial factor in online business transactions. Numerous cyber-related crimes are recorded daily due to the internet's and computer networks' weaknesses. Internet users are cautious about making purchases online since they are aware of these fraudulent operations carried out by cybercriminals. Despite the flaws, customers are ready to use e-commerce technology for commercial operations even if it puts the security of their online purchases at risk.

5.9. The influence of the perception of cyber-fraud on the attitude toward behaviour

The findings also imply that although this study identified a strong association between attitudes toward behaviour and perceptions of cybercrime, cybercrime does not negatively influence customer attitudes. This suggests that Thai users do not consider cybercrime an essential factor affecting their attitude toward behaviour. These outcomes are consistent with Rofiq's [16] earlier research (2012). Conversely, various previous studies dispute this opinion because they found that the perception of cybercrime is essential in predicting the customer's attitude toward their behaviour [1,54]. This result might prove that Thai internet users live in the age of technology usage.

5.10. The influence of the perception of cyber-fraud on the relationship between the trust in the sellers and the behavioural intention to purchase

The data show that, despite the perception of cybercrime having a substantial link with the relationship between customer purchase intention and trust in online vendors, cybercrime does not adversely affect either. Therefore, it cannot be a moderator to strengthen the link between behavioural intention to purchase goods or services through an online store and trust in the vendor.

6. Conclusions

The study applied the Theory of Planned Behavioural (TPB) to investigate customers' intention to purchase through the e-commerce system. It aimed to ascertain to what extent the dimensions of trust and cybercrime perception affect customers' intent to purchase. The model used for exploring came from [16], which integrates various constructs, including the trust in the online vendor, the trust in the internet medium, the perception of cyber fraud, and TPB. To verify the model, an online survey was developed via Google Forms to gather information from people in Thailand who have used the Internet. The data was also examined using the linear regression method. The outcome suggests that four out of the ten hypotheses proposed were supported. The valid

structural model asserts that the relationship between the independent variables indicates a 49.6% variation in purchase intention and a 41.9% variance in customers' attitudes toward behaviour.

The investigation into the relationship between constructs shows that the trust in online vendors, the Trust in Internet medium, the perception of cybercrime, and subjective norms do not significantly influence customers' buying intentions. Similarly, cybercrime did not directly impact the attitude toward behaviour. It needed to moderate the relationship between the trust in the e-commerce vendors and customers' intention to purchase. On the other hand, a customer's attitude toward behaviour and perceived behavioural controls are valuable indicators of what they intend to buy when they choose to use e-commerce technology. Furthermore, the trust in the internet medium and the trust in the vendor directly influence the customer's attitude toward behaviour. The findings in this study can fill the gap in the literature about customers' perceptions of cyber-fraud in Thailand. They show the implications for conducting business and the e-commerce stakeholder. In addition, it reminds people related to e-commerce businesses, such as developers and designers, to become aware of how trust impacts Thai users' acceptance. Finally, this study suggests that those involved in the e-commerce sector include crucial security measures in the following e-commerce technologies to reduce vulnerabilities and boost users' trust in the e-commerce system.

The online questionnaires were only distributed to Thai people in some areas of Thailand. Although there are 258 respondents, the distribution of the questionnaires does not cover the entire population. Therefore, we cannot conclude that the analysis of the whole population of Thailand causes the result of influence. In addition, this study does not focus on the type of respondents that relate to e-commerce. The research may have less predictive power without distinguishing between respondents who participated in the study in high, medium, or low numbers. According to this study's findings, the ability to predict a factor in a customer's purchase intention is only about 50% because only a few factors influence online shopping decisions, and the study can cover only some of the relevant ones. However, researchers who want to use this research model in their studies can incorporate it in many different ways, such as focusing on respondents' characteristics and cultural impact to study how distinct cultural characteristics affect customers' purchasing decisions. In addition, other factors might affect the attitude toward customers' behaviour. Covering the studies on such factors would make the research more complete and provide effective results.

CRediT authorship contribution statement

Fazal Wahab: Conceptualization, Methodology, Software. **Imran Khan:** Visualization, Review and editing. **Kamontip:** Supervision. **Tariq Hussain:** Resources, Validation, Investigation, Writing – original draft. **Abbas Amir:** Writing and editing.

Declaration of competing interest

The authors of this manuscript declare no conflicts of interest.

Data availability

No data was used for the research described in the article

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Ethics approval and consent to participate

We confirm that relevant guidelines and regulations are carried out in all methods.

Consent for publication

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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