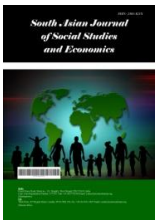

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The Determinants of Online Stock Investment in Malaysia: A Case in Early Phase of COVID-19 Pandemic

Tan Yong-Da[1], Teoh Teng-Tenk, Melissa[1*] and Lee Teck-Heang[1]

[1]Faculty of Business, Economics and Accounting, HELP University, Malaysia.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The purpose of this research is to determine the factors that affect the behavioral intention of Malaysians individuals to adopt online stock trading. The primary data is collected with the help of structured questionnaire from 285 participants in the study who are current or potential investors in the Malaysian stock market. The online surveys were distributed from the last quarter of 2019 to the first quarter of 2020. This study uses the structured and self-administered online questionnaire survey tool to collect the primary data from samples. Non-probability convenient sampling method was employed and Partial Least Squares Structural Equation Model (PLS-SEM) is adopted. The results indicate that all constructs, namely performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC) have a direct significant positive relationship toward behavioral intention. In addition, the study shows that PE is the most important factor in determining individuals' behavioral intention in adopting online stock trading. In conclusion, online stock trading system developer should focus on designing the additional useful features and ensuring the quality of the information to satisfy the demands and desires of the general public and to build features such as prompting traders to avoid the possibility of over trading or with feature enabling users to backtrack and test their trading strategies and to customize different types of analysis to help users making informed investment decisions.

**Corresponding author: Email: melissateoh@help.edu.my;*

Keywords: Online stock trading; behavioral intention, performance expectancy; effort expectancy; social influence; facilitating condition.

1. INTRODUCTION

As internet technology continues to bring breakthrough innovations, this has prompted to rapid changes in the way business is conducted [1]. Such technological innovations penetrate products, services or processes, which not only bring significant business benefits to enterprises, but also make great contributions to the human's daily life [2-3]. This has transformed the entire business market, which is often seen in activities involving capital flows [4], such as online payment systems [5,6,7,8], mobile learning [9,10,11,12], online shopping systems [4,13,14].

Likewise in the financial sector, the emergence of Internet innovation has fundamentally changed the way banks and financial companies provide financial services [2]. For instance, Internet banking or online payment systems is one of the current trends. In investment one of the greater contributions of Internet innovation to financial services was the introduction of online stock trading, an alternative to traditional approach, a new way of investing and trading in the money market and capital market [15,16,1]. Online stock trading is also considered to be a high-margin financial services sector and one of the best fields for e-commerce adoption [17,18]. Therefore, it can be seen today that securities services providers, stockbroking firms, banks and other financial institutions are increasingly cooperating to offer stock trading services over the Internet, making them more accessible to brokers and investors [15,19].

Online stock trading is a self-service technology. The traditional way of stocks trading practices involved a very high labour force participation. The main function of stockbrokers is to provide stock investors a mean or mechanism for buying and selling stocks on the stock market [20]. Therefore, from the perspective of financial institutions, the introduction of online stock trading system is able to reduce that labour participation and cut down substantial operating costs [15,21,22], which allows investors to trade through online trading platforms, without the need for face-to-face or to use telecommunication network to communicate with brokers or service personnel, and most importantly, without the need for investors to enter the trading floor and avoid frustration of unable to reach out the broker on time [23]. Hence, investors rely less on stockbrokers to execute trades or obtain investment information [20].

The participation rate of online stock trading is increasing year by year, and this trend is intensified during the technology era, which proves that people do think that online stock trading can provide them convenience while practising contactless during lockdown. According to a past survey conducted in 2005, there is around 2% of the total stocks dealing transactions were carried out via online trading platform [24]. The participation rate of online trading in the Bursa Malaysia had risen to 25% of the total market transactions in 2016 [25]. This substantial increase of online trading shows that online stock trading has played an important role in Malaysia stock exchange, and this will be a trend for future stock market investors, especially in the post COVID-19 era.

Nonetheless, many studies show that online stock trading adoption rates in Malaysia remain low when compared to other countries. Ramayah, Rouibah, Gopi, & Rangel [26] and Ramayah et al. [24] showed that the adoption rate of this technology system in Malaysia was lower than for other countries in Asia, for example Singapore, Japan, etc. Lee's [27] found a large gap between Malaysia's (25%) and Hong Kong's (47%) online stock trading participation rates in 2016. According to Hong Kong Exchanges and Clearing Limited [28], Malaysia had only 25% online stock trading participation rate in 2016, while Taiwan and India had achieved 27% and 30% online stock trading participation rate respectively as early as 2012. This shows that Malaysian stock investors still have not fully embraced online stock trading. This research therefore feels strongly for the need to identify the key drivers that determine people in adopting online stock trading.

This study provides empirical evidence that helps researchers investigate the most important drivers that affecting the intention of people in using online stock trading. It will be of great practical value for relevant institutions to better understand the intention of investors to adopt online stock trading and thus helps these insiders take steps to improve and focus on the most important features to develop a more successful online stock trading system and platform and

provides these individuals with appropriate advice to adapt their key strategies to further drive adoption of online stock trading.

2. LITERATURE REVIEW

Since online stock trading is burdened with uncertain risks, it may be in the interest of both investors and financial firms to understand how these factors affect investors' behavior. Unlike previous studies, which focused solely on certain aspects, the purpose of this research is to explore a less focused technology in Malaysia, i.e. online stock trading.

2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) theoretical model for understanding technology adoption proposed by Venkatesh, Morris, Davis, & Davis [29] is used. It is based on eight competing models and theories in the field of information technology acceptance and integrates all their constructs. The constructs of this model are shown in Fig. 1.

2.2 Performance Expectancy (PE)

Performance expectancy (PE) refers to the extent to which one feels that the use a specific technology contributes to his or her work performance [29].

The application of PE in online stock trading context suggests that people will find online stock trading very useful and productive because it enables them to complete their stock trading practices more quickly and flexibly, and even helps them trade more efficiently. Numerous research in this context have suggested that relative advantages and perceived usefulness are main drivers that significantly influence the BI in adopting online stock trading [22,30,1,31,24]. It is well known that these two factors constitute the determinant of PE. Tai & Ku [32] even found that PE was one of the significant variables affects people intention to adopt mobile or online stock trading. Thus, the first hypothesis predicts the following:

H_1: There is a positive relationship between the performance expectancy and behavioral intention of Malaysian individuals to adopt online stock trading.

2.3 Effort Expectancy (EE)

Effort expectancy (EE) is described as the degree to which people perceive that they need no substantial effort to learn to use a particular information technology [29], In a nutshell, EE describes how easy or convenient it is for people to adopt a technology in their work.

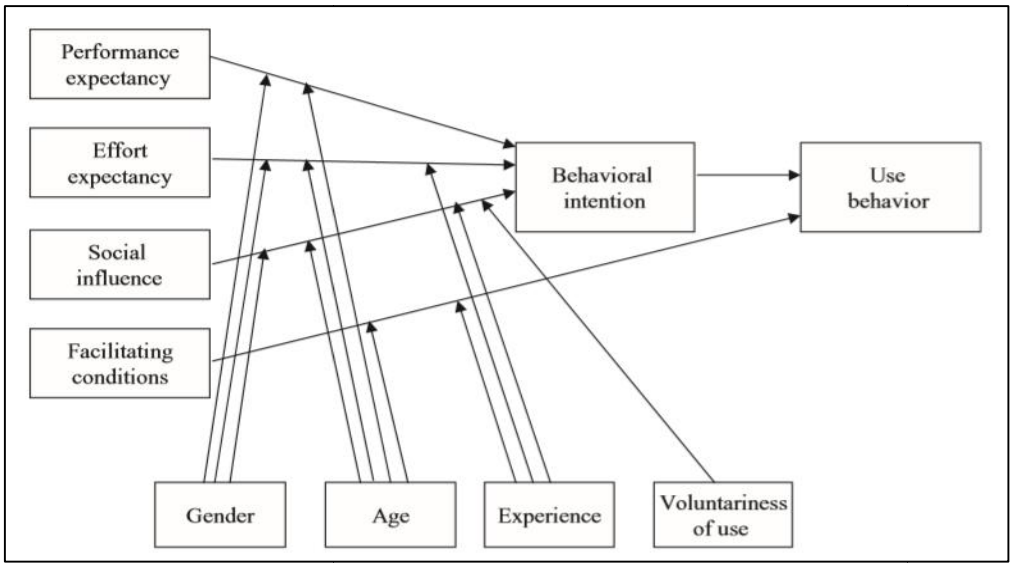

Fig. 1. Unified Theory of Acceptance and Use of Technology (UTAUT)
Source: Venkatesh et al (2003)

It is an assessment of the effort needed by individuals to understand and know how to operate the online stock trading system. More specifically, EE refers to the ease of use and difficulty associated with online stock trading. Notably, many previous empirical studies have supported factors such as ease of use, perceived ease of use and complexity as an important factor in determining the behavioral intention of stock investors in adopting online stock trading [33,34,22,31,30,1]. The key explanation is that stock investors feel that it is not difficult at all to learn and use internet stock trading, thereby growing their intention to use online stock trading. Hence, the second hypothesis is postulated:

H_2: There is a positive relationship between the effort expectancy and behavioral intention of Malaysian individuals to adopt online stock trading.

2.4 Social Influence (SI)

Social influence (SI) explains to what extent the opinions of others (family, friends, etc.) affect the intention of a person in adopting a particular technology [29]. SI is measured based on the degree of perception that stock investors believe that important people around them expect them to adopt online stock trading. Based on previous research, the fundamental elements of SI such as subjective norm or social factors have proven to be the main variables affecting the behavioral intention [34,35,27,24,30,1]. Additionally, research also found positive correlation between SI and behavioral intention [36,32]. For that reason, the third hypothesis is formulated:

H_3: There is a positive relationship between the social influence and behavioral intention of Malaysian individuals to adopt online stock trading.

2.5 Facilitating Conditions (FC)

FC is defined as the degree to which one believes that there are organizations or technical infrastructures available to support the use of a particular technology when needed [29]. Joshua & Koshy [37] pointed out that when people are more accessible to technologies, they will become more proficient in using them, which leads to the comprehensive application of that technology. Therefore, this study believes that the higher the availability of FC would lead to the higher behavioral intention to adopt online stock trading. Several past studies also confirmed a positive correlation between FC and behavioral intention [9,38,7,39,40,41,11,18,14,42]. Other relevant studies stated that the components of FC, such as perceived behavioral control and compatibility, are significant factors influencing the acceptance of online stock trading [31,30,35,33,27,24,1]. Consequently, the fourth hypothesis is stated as follows:

H_4: There is a positive relationship between the facilitating conditions and behavioral intention of Malaysian individuals to adopt online stock trading.

2.6 Behavioral Intention (BI)

The construct of behavioral intention (BI) is characterised as the willingness of an individual to perform a particular action or behavior [43]. Most studies have demonstrated that behavioral intention is a near precedent and also a variable that are highly correlated with the usage behavioral [44,45,43,46,47]. Fishbein & Ajzen [47] have even verified that behavioral intention is the strongest and well-established predictor of a person's behavior toward technology and can in fact predict actual behavior. Substantial empirical evidence found to validate the cause-and-effect relationship between behavioral intention and use behavior [48,29]. Venkatesh et al. [29] pointed that the UTAUT model explained approximately three quarter of variances in behavioral intention was significantly better than other models. Therefore, in this study, BI is used as a dependent variable to describe people's willingness in using online stock trading in future.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study uses the structured and self-administered online questionnaire survey tool to collect the primary data. Within quantitative research, the questionnaire is an ideal way to collect data for measuring the variables, as it is easier to collect data quickly and cheaply from a large number of participants [49,50]. In addition, online survey allowed researchers to gather data without geographical restrictions to achieve an acceptable sample size. The online surveys were distributed from the final quarter of 2019 to the first quarter of 2020. The study focuses on Malaysians over the age of 18, who are eligible to trade directly in the Malaysian stock market and might or might not have stock trading

experience. Non-probability convenient sampling method was employed in this study as it can overcome the problem of the study being unable to reach a large population and obtaining enough respondents [51]. Due to time, budget and resource constraints, this is a suitable sampling method for this study.

According to the rule by Hinkin [52], the preferred sample size should be the ratio of item-to-response of at least 1:4 to maximum of 1:10. Since the questionnaire consisted of 25 items (Appendix A) and the mean ratio of item-to-response was 1:7, the acceptable sample size for the study was set at 175 respondents. A total of 285 valid responses was obtained after deleting the non-Malaysian respondents.

3.2 Research Instrument

A 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) is employed [53]. Each construct (PE, EE, SI, FC and BI) composed of 5 questions related to the corresponding variables. A total of 25 questions (Appendix A) related to the latent variables proposed in the research model.

3.3 Methods

This study adopted Partial Least Squares Structural Equation Model (PLS-SEM) which has sufficient ability to estimate the correlation between the constructs and evaluate the impact of the model; while it performs better in non-probability sampling method and has low requirement on the sample size, which is consistent with the current research [54,55].

4. DATA ANALYSIS

4.1 Descriptive Statistics

Table 1 illustrates the demographic profile of the respondents with the total sample of 285. Among these respondents, 137 (48.1%) are females and 148 (51.9%) are males. This proportion is similar to the Malaysia's current gender population, which consists of 49.3% females and 50.7% males (Countrymeters.info, 2020). Most of our respondents age between 20 to 29, amounted to 101 (35.4%) respondents. There are 85 (29.8%) respondents aged between 30 to 39; 38 (13.3%) in the 40 to 49 age group; 34 (11.9%) respondents aged 18 and 19; and the least number of respondents are above 50 year old, amounting to 27 (9.5%) respondents.

Out of the total 285 respondents collected for this study, 172 (60.4%) are single and the remaining 113 (39.6%) are married. Majority of respondents have a bachelor's degree, representing 178 (62.5%) of the total respondents. There are 52 (18.2%) respondents with a diploma or foundation, 22 (7.7%) respondents hold a postgraduate degree, and 33 (11.6%) with high school or below education level. Moreover, 111 (38.9%) of the respondents are business undergraduates, 89 (31.2%) are non-business majors, and 85 (29.8%) are accounting and finance majors.

The respondents of the occupation survey include 90 (31.6%) students, 10 (3.5%) government jobs, 113 (39.6%) in private sector, 30 (10.5%) respondents each for freelancers and self-employed businessmen, and 12 (4.2%) laid-off, unemployed, or retired respondents. The monthly income level of the respondents is divided into five groups: there are 76 (26.7%) respondents with monthly income of less than RM 1,000; 65 (22.8%) respondents with monthly income of between RM 1,000 and RM 3,000; and 87 (30.5%) respondents with monthly income range from RM 3,000 to RM 5,000, which accounted for the largest proportion. The income levels of the other two groups are: monthly income ranging from RM 5,000 to RM 10,000 which occupied by 46 (16.1%) respondents; monthly income over RM 10,000 which occupied by 11 (3.9%) respondents.

The proportion of respondents with experience in stock trading and those without experience are split evenly: 150 (52.6 %) respondents with stock trading experience, while 135 (47.4 %) respondents with no stock trading experience. However, of the 150 stock traders, 114 (76%) are users of online trading, while 36 (24%) are not.

4.2 Measurement Model Analysis

Researchers can determine whether the questionnaire response measured the corresponding latent variables by evaluating the measurement model. Indicator reliability, internal consistency reliability, convergence validity and discriminant validity were established to ensure the validity and reliability of each survey item and construct [56,57].

Table 1. The profile of respondents

Category		Number of Respondents	Percentage (%)
Gender	Female	137	48.1
	Male	148	51.9
	Total	**285**	**100.0**
Age	18 – 19 years old	34	11.9
	20 – 29 years old	101	35.4
	30 – 39 years old	85	29.8
	40 – 49 years old	38	13.3
	50 years old and above	27	9.5
	Total	**285**	**100.0**
Marital Status	Single	172	60.4
	Married	113	39.6
	Total	**285**	**100.0**
Education Level	High School or less	33	11.6
	Diploma or Foundation	52	18.2
	Bachelor's Degree	178	62.5
	Postgraduate Degree	22	7.7
	Total	**285**	**100.0**
Academic Field	Non-Business (Psychology, Public Relationship, Law, etc.)	89	31.2
	Business (Business Administration, Marketing, Management, etc.)	111	38.9
	Major in Accounting and/or Finance	85	29.8
	Total	**285**	**100.0**
Occupation	Student	90	31.6
	Government Job	10	3.5
	Private Sector Job	113	39.6
	Freelancer	30	10.5
	Self-employed Businessman	30	10.5
	Laid-off/Unemployed/Retired	12	4.2
	Total	**285**	**100.0**
Monthly Income	Below RM 1,000	76	26.7
	RM 1,001 – RM 3,000	65	22.8
	RM 3,001 – RM 5,000	87	30.5
	RM 5,001 – RM 10,000	46	16.1
	Above RM 10,000	11	3.9
	Total	**285**	**100.0**
Have you ever trading stock in Malaysia?	Yes	150	52.6
	No	135	47.4
	Total	**285**	**100.0**

4.2.1 Indicator reliability

Indicator reliability assesses the accuracy and precision of a measurement procedure. To perform this assessment, the loadings of each item of the respective constructs must be at least 0.5, then it is deemed to be satisfied [56]. Table 7 shows the loading range for these items is from the lower limit of 0.629 (FC5) to the upper limit of 0.991 (EE3). Since the loadings of all items in the measurement model exceeds 0.50, it means that more than half of the variance can be explained by these items, hence showing sufficient indicator reliability.

4.2.2 Convergent validity

Convergent validity is to assess the level of correlation between several items, hence, to evaluate a certain construct [58]. The convergent validity of the model is considered adequate when a particular construct has an AVE value of minimum 0.5 or above [59]. Table 7 shows that values of AVE of all constructs range from 0.571 (FC) to 0.970 (EE). Therefore, the items truly represent each construct, and the convergent validity has been established.

4.2.3 Internal consistency reliability

The reliability of each construct's internal consistency was measured by composite reliability (CR) and Cronbach's alpha. Constructs with high composite reliability and Cronbach's alpha indicates that items in the construct do have equal meaning and scope, a value of 0.70 or higher is considered within the acceptable levels [60]. The composite reliability (ranging from FC's 0.868 to EE's 0.994) and Cronbach's alpha (ranging from FC's 0.810 to EE's 0.992) of constructs displayed in Table 2 are all greater than the threshold of 0.70, it is thus demonstrated that items used to denote the constructs have sufficient reliability of internal consistency.

4.2.4 Discriminant validity

Discriminant validity is used to distinguish the measure of one construct from the measure of another construct to test whether these items unintentionally measure something else.

First, in the cross-loading, the researcher can determine the model's discriminant validity if indicators' loading on their assigned construct is higher against all the other constructs [61]. As reported in Table 3, the loadings on the items are the highest with respect to their constructs compared to other latent variables. Therefore, the cross-loading output endorsed that the first assessment of the measurement model's discriminant validity is satisfied.

Second, the result of discriminant validity test based upon the Fornell and Larcker's criterion (Table 4). The Fornell-Larcker's criterion stipulates that the latent variable's variance with its assigned construct must be greater than that of other latent variables. This can be found by examining the discriminant validity when the AVE square root between two constructs is larger than the correlation with the other constructs within the research framework [59,56]. Notably, the diagonal elements (values in bold) are square root of AVE, while the off-diagonal elements reflect the relationship between two constructs. Thus, the discriminant validity of this research is established.

Table 2. Results of measurement model

Constructs	Items	Loadings[a]	AVE[b]	CR[c]	Cronbach's Alpha[d]
Performance Expectancy	PE1	0.970	0.939	0.987	0.984
	PE2	0.961			
	PE3	0.973			
	PE4	0.970			
	PE5	0.971			
Effort Expectancy	EE1	0.988	0.970	0.994	0.992
	EE2	0.984			
	EE3	0.991			
	EE4	0.990			
	EE5	0.971			
Social Influence	SI1	0.667	0.654	0.903	0.867
	SI2	0.851			
	SI3	0.836			
	SI4	0.779			
	SI5	0.892			
Facilitating Conditions	FC1	0.711	0.571	0.868	0.810
	FC2	0.818			
	FC3	0.767			
	FC4	0.833			
	FC5	0.629			
Behavioral Intention	BI1	0.959	0.853	0.966	0.956
	BI2	0.966			
	BI3	0.966			
	BI4	0.774			
	BI5	0.938			

a. All item Loadings > 0.5 indicates Indicator Reliability [56]; b. All Average Variance Extracted (AVE) > 0.5 as indicates Convergent Reliability [59]; c. All Composite reliability (CR) > 0.7 indicates Internal Consistency [77] d. All Cronbach's alpha > 0.7 indicates Indicator Reliability [60]

Table 3. Indicator item cross-loading

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social Influence	Facilitating Conditions
BI1	**0.959**	0.636	0.438	0.282	0.562
BI2	**0.966**	0.624	0.425	0.291	0.553
BI3	**0.966**	0.612	0.424	0.257	0.534
BI4	**0.774**	0.451	0.228	0.232	0.298
BI5	**0.938**	0.561	0.413	0.26	0.494
PE1	0.605	**0.97**	0.438	0.256	0.561
PE2	0.589	**0.961**	0.434	0.215	0.54
PE3	0.617	**0.973**	0.439	0.264	0.569
PE4	0.62	**0.97**	0.42	0.237	0.548
PE5	0.62	**0.971**	0.457	0.241	0.567
EE1	0.416	0.432	**0.988**	0.027	0.465
EE2	0.42	0.456	**0.984**	0.064	0.486
EE3	0.42	0.433	**0.991**	0.034	0.475
EE4	0.426	0.451	**0.99**	0.052	0.501
EE5	0.417	0.453	**0.971**	0.032	0.491
SI1	0.14	0.112	-0.098	**0.667**	0.107
SI2	0.22	0.206	0.067	**0.851**	0.397
SI3	0.28	0.25	0.043	**0.836**	0.349
SI4	0.201	0.136	-0.041	**0.779**	0.207
SI5	0.276	0.26	0.123	**0.892**	0.418
FC1	0.467	0.548	0.518	0.13	**0.711**
FC2	0.374	0.398	0.269	0.378	**0.818**
FC3	0.46	0.527	0.426	0.323	**0.767**
FC4	0.367	0.334	0.296	0.369	**0.833**
FC5	0.325	0.287	0.277	0.301	**0.629**

Table 4. Discriminant Validity (Fornell & Larcker's Criterion)

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social Influence	Facilitating Conditions
Behavioral Intention	**0.924**				
Performance Expectancy	0.630	**0.969**			
Effort Expectancy	0.426	0.452	**0.985**		
Social Influence	0.287	0.251	0.042	**0.808**	
Facilitating Conditions	0.539	0.575	0.491	0.389	**0.756**

**Diagonals (bolded elements) are the square root of the AVE; while the off-diagonals are the correlations*
**The diagonals are the square root of the AVE of the latent variables and indicates the highest in any column or row*

Table 5. Discriminant Validity (HTMT Criterion)

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social Influence	Facilitating Conditions
Behavioral Intention					
Performance Expectancy	0.645				
Effort Expectancy	0.430	0.457			
Social Influence	0.305	0.258	0.100		
Facilitating Conditions	0.591	0.622	0.528	0.460	

Third, the Heterotrait-Monotrait criterion (HTMT) is used to measure the average correlation between each construct to evaluate the discriminant validity [62]. The lower the HTMT value, the higher the discriminant validity between the two constructs. More specifically, any HTMT values less than 0.9 is acceptable [62]. As shown in Table 5, all HTMT ratio of correlation values in this study are far lower than the conservative value of 0.90, and none of them

is very close to 1. Hence, the result infers that all latent variables are discriminant or distinguishable from each other, and the measurement model has ample discriminating validity.

In general, the measurement model assessments have fulfilled all the fundamental requirements in terms of reliability and validity. In this way, the structural model can be effectively evaluated accordingly.

4.3 Structural Model Analysis

The algorithm and bootstrapping technique in SmartPLS 3 are used for developing the structural model assessment. Fig. 2 displays the path coefficient of original sample and the predictive strength of the model (R^2), while Table 6 reports the standardized beta of sample mean (β), effect size (f^2), predictive relevance (Q^2 and q^2), significance levels (t-statistic & p-value) and the hypotheses testing results of the current study.

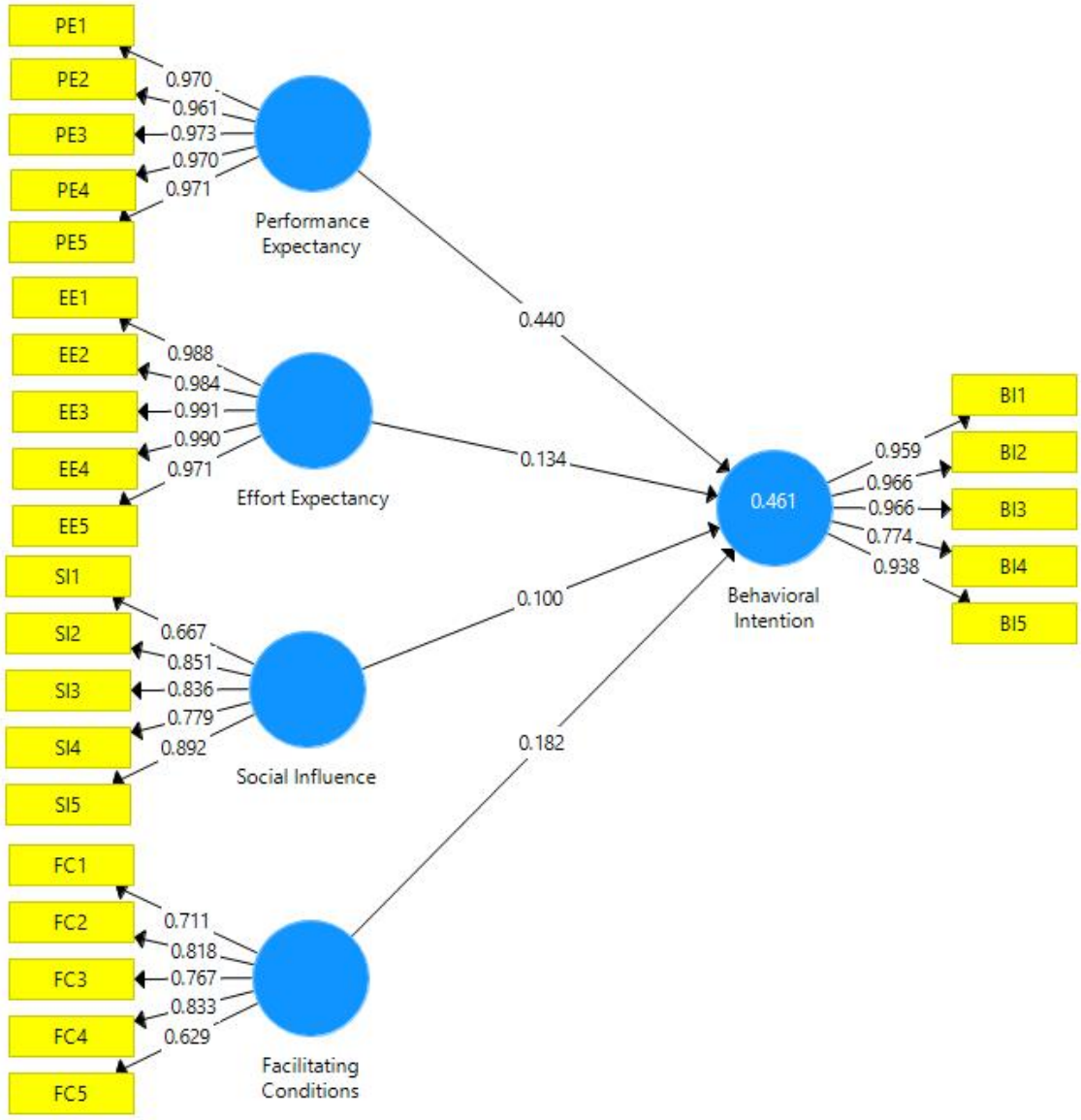

Fig. 2. Results of Structural Model (n=285, bootstrapping subsample=500)

Table 6. Direct Relationships for Hypothesis Testing

Relationship (Hypothesis)	Std Beta	Std Error	t-statistic	Decision	f^2	q^2	p-value	95% CI LL	95% CI UL
Performance Expectancy -> Behavioral Intention (H1)	0.436	0.062	7.130***	Supported	0.219	0.167	0.000	0.331	0.535
Effort Expectancy -> Behavioral Intention (H2)	0.132	0.052	2.576***	Supported	0.022	0.015	0.010	0.331	0.219
Social Influence -> Behavioral Intention (H3)	0.106	0.051	1.977**	Supported	0.015	0.010	0.049	0.022	0.189
Facilitating Conditions -> Behavioral Intention (H4)	0.186	0.065	2.798***	Supported	0.033	0.021	0.005	0.075	0.293

**** significant at 1%, ** significant at 5%*

Note:

1. *R^2 (Behavioral Intention to adopt Online Stock Trading) = 0.461*
2. *Effect Size impact indicator are according to Cohen (1988), f^2 values: 0.35 (large), 0.15 (medium) and 0.02 (small)*
3. *Q^2 (Behavioral Intention to adopt Online Stock Trading) = 0.385*
4. *Predictive Relevance (q^2) of Predictor Exogenous Latent Variables as according to Hair et al. (2017), q^2 values: 0.35 (large), 0.15 (medium) and 0.02 (small)*

R^2 value of the dependent variable reflects the prediction strength of the model. Fig. 2 shows that the four constructs (exogenous latent variables) proposed in this study are collectively explained 46.1% of the variance in dependent variable. Chin [61] considered that the R^2 value of 0.67 was sufficient, the R^2 value of 0.333 was an average, and the R^2 value below 0.19 was weak predictive strength. Therefore, 46.1% of R^2 value is considered to have moderately acceptable predictive strength (R^2 > 0.333). When an exogenous factor is omitted from the model, the change in the R^2 value is known as effect size (f^2). As shown in Table 6, it is interesting to note that PE had the highest (medium) effect size in the model, with f^2 value of 0.219. Followed by FC and EE with f^2 value of 0.033 and 0.022 respectively, indicating a small effect on BI. While SI had no influence on BI (f^2 = 0.015) in accordance with Cohen's [63] suggestion. The result of the predictive relevance or accuracy (Q^2) of the model in this study showed that the path predictive relevance is largely acceptable with a Q^2 value of 0.385 (footnotes in Table 6). Since all the predictive relevance of the exogenous variables (q^2) are greater than 0, PE (q^2 = 0.167), EE (q^2 = 0.015), SI (q^2 = 0.010) and FC (q^2 = 0.021) are considered to have predictive relevance and must be able to provide predictions to BI [64].

This study uses the bootstrapping function with 500 samples generated from the 285 cases to evaluate the path coefficient between independent and dependent variables. T-statistic and p-value are used to determine the significant of the path coefficient [65]. A two-tailed test with a significance level of 5% was used, this in turn indicates that the observed t-statistic must be at least 1.96 or that the p-value less than 0.05 to be considered significant. The t-statistic and p-value, indicating that these relationships with BI between the construct of PE (t = 7.130, p < 0.010), EE (t = 2.576, p < 0.010), SI (t = 1.977, p < 0.050), and FC (t = 2.798, p < 0.010) are all statistically significant (Table 6). As a result, all the proposed hypotheses are supported. PE construct's path coefficient value (β) accounted for 0.436; EE construct accounted for 0.132; SI construct accounted for 0.106; FC construct accounted for 0.186. All path coefficients are positive and not less than 0.100 [66], thus indicated that BI is affected positively by PE, EE, SI and FC.

4.4 Importance-Performance Map Analysis (IPMA)

IPMA is a useful technique for identifying important elements or areas of improvement that managers should focus on [67,68]. The IPMA results of the four independent variables with BI as the endogenous target variable are shown in Fig. 3 and Table 7. It should be noted that for one-point increase in the constructs (e.g., PE), BI is expected to increase by the value of total effect for the underlying constructs (i.e., importance value of PE).

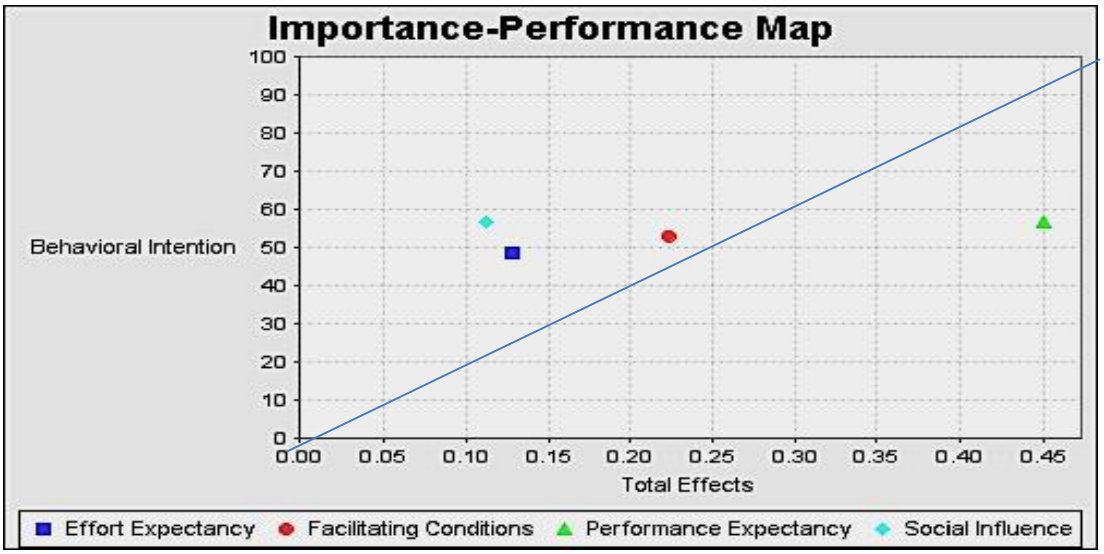

Fig. 3. IPMA Map

Table 7. IPMA result

Construct	Importance (Total Effect)	Performances (Index Value)
Performance Expectancy (PE)	0.450	56.828
Effort Expectancy (EE)	0.128	48.541
Social Influence (SI)	0.112	56.665
Facilitating Conditions (FC)	0.223	53.041

PE is a very important factors in determining the BI to adopt online stock trading as shown in its relatively high importance (0.450) and performance (56.828) value. This is logical that people will tend to use a service only if by using it, the effectiveness and conveniency of trades can be improved. FC have obtained intermediate level in terms of importance (0.223) and performance (53.041) value. Interestingly, although SI scored relatively high in performance (56.665), it had little relevance important in influencing BI due to its lowest importance value (0.112). This result can be interpreted as SI is only crucial at the initial phase of the experience, where people opinions at this stage are relatively uncertainty. Some even rely on their own principle or belief instead of the opinions of everybody else or may use their direct experiences to form an intention to adopt the particular system, thus lowering the importance of SI. Contrary to our expectations, results showed that EE exhibited a relatively lower importance (0.128) and had lowest performance (48.541) value among all constructs. This may be because of the current technological era facilitate the use of online services effortlessly. Taken as a whole, based on the result analysed, PE was considered as the most important factor to be taken into managerial consideration to improve the BI to use online stock trading, while minor attention should also be given to FC. Also, for the managerial implications, both EE and SI are not important determinants to be considered.

5. DISCUSSION ON MAJOR FINDINGS

PE has a significant positive relationship to people's intention in adopting online stock trading. The results are in line with the findings of Wang & Yang [36], Tai & Ku [32], and Sun et al. [40]. Malaysians are willing to use online platform to trade stock if they believe this online trading system could improve their trading performance when engaging in trading activities, especially in terms of time and cost benefits. Compared to conventional stock trading mode which requires an appointment by phone or in person, traders can execute trades via online trading immediately, which is timelier and to avoid missing of opportunity with relatively low transaction costs in addition to offering more advanced features, increases the intention of traders to use online stock trading. The quality or efficiency of the trading system seems to be a source of motivation to drive people desire to use it because of PE enhancing feature. If people view online stock trading as an efficient system that could assist in time saving, then this would lead to a positive behavioral intention adoption of the online stock trading system.

Next, EE has a significant positive relationship to people's BI in adopting online stock trading. The finding is consistent with the work of some prior researchers (Gaitan et al. [69], Raza et al. [70], and [40]. This means that most people consciously assess the level of effort required when trading stock using online systems. The less effort potential users think they expect to put in, the more likely they are to consider using online stock trading. However, it is worth noting that this determinant has a relatively weak impact on BI if it is to be compared to SI, EE. These results can be interpreted as technology has developed rapidly, leading people to rely growingly on the Internet in almost every aspect of daily life, and thus making people more experienced in using Internet, which largely reduces the effect of EE. As a result, individuals in Malaysia, in general, prefer an online stock trading with simple functionality, effortless, easy to use or user-friendly and highly accessible, which facilitate their intentions to adopt the system.

In addition, SI has a significant positive relationship with BI to adopt online stock trading, which is in line with the past studies [71,72,14]. People may rely on the opinions of others, family member or friends, rather than their own beliefs to form the intention to adopt online stock trading. Similarly, FC has a significant positive relationship to people's BI in adopting online stock trading. coherent with the research done by Abdullah et al. [71], Isa et al. [7] and Oliva, Borondo, & Clavero. [39]. Malaysian individuals have intention to adopt online stock trading if they can access to necessary resources or

supports from personal, technical, or institutional that facilitate their use of online stock trading or get assistance from others when face with difficulties in using the trading system.

6. CONCLUSION AND IMPLICATION

As the four factors are found to be significant toward people intention, these features should be enhanced when developing the online stock trading system. PE has proven to be the most influential and significant factor impacting the adoption intention of online stock trading. To promote PE, online stock trading system developer must concentrate on designing additional useful features and ensuring the sufficient and quality information to satisfy the demands and desires of the general public. Other than the basic functions typically provided by the system (e.g., stock analysis, screeners, market charts), developers can build features that are both innovative and convenient. For instance, the system can alert traders to the numbers of trades they have made over a period of times to avoid the possibility of over trading. Furthermore, online trading system also should be designed as a tool that enables users to backtrack and test their trading strategies and even customize different types of analysis to facilitate informed investment decisions. The developers or designers should ensure that the functionality or information provided meeting the users' needs to have an impact on users' intention to use online stock trading. In terms of EE, developers can focus on creating more user-friendly features and offering tutorials or training the result was consistent only raises their awareness of the advantages available, but also helps them gain more practical skills in operating online stock trading system. Therefore, structures or system of online stock trading should avoid complexity and pursue simplicity. In addition, cross-cultural factors should also be considered. The major languages, such as Bahasa Malaysia or Chinese, should be included in the online trading system to facilitate the use of online trading system by people with different language background.

Similarly, online stock trading service providers or brokers should be aware of the importance of SI and be advised to find ways to improve this variable to attract potential users. If majority of people around an individual have accepted or used the online stock trading system, then these people have the ability to convince the individual to follow. Therefore, in order to influence people to adopt online stock trading, it is suggested that securities firms should include the views of earlier adopters of online stock trading in their marketing practices, because their views tend to generate positive word-of-mouth effects on intention and adoption behavior of other people. Through partnerships between securities firms and brokers, they can reward incentives for early adopters, such as free of charge for few times and so on, to promote the acceptance of online stock trading. Online stock trading can be promoted and advertised through emerging social media (i.e., Facebook, Twitter, and YouTube) as well as traditional mass media (i.e., televisions, radios and newspaper) to attract the youngsters and the folks. A more extreme approach is to obtain celebrity endorsements. Practitioners should ensure that they provide services to users who experience hitch such as fraud or identity theft, potential transaction disruptions, such as delays, when trading through online stock trading systems. Supported by these services, it can increase people intention to trade stock via online systems by minimizing outages and downtime. As stock investment activity is one of the major contributions to a country's economy, the role of the government or regulator is also important. Policymakers or regulators can work with practitioners to play role in enhancing people's faith and trust toward the system, and even building confidence in people who do not trust the system, it could strengthen people's perception of online stock trading as trustworthy, thereby raising concerns about the protection of adopters. Practitioners should put more effort in identifying and solving the possible technical problems that users encountered when using online stock trading.

By and large, this study provides a broader understanding of the factors that may affect BI and can therefore serve as a guide for those online stock trading service providers.

7. RECOMMENDATION FOR FUTURE RESEARCH

The study suggests that further relevant studies should adopt a longitudinal study method to investigate the intention of adoption over time. Dynamic models or longitudinal evidence not only help predict and estimate constructs across different periods of time, but also help to infer causality and stabilize relationships between variables when the correlation of indicators and outcomes is not strongly predicted.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX A

Measures Items for Constructs

Construct	Item Code	Corresponding Items	Items Adapted from
Performance Expectation	PE 1	I think it is useful to use online trading in my daily life.	Venkatesh et al. [29], Yang [73], Yu [74], Tai & Ku [32], Sair & Danish [75]
	PE 2	I believe I can save more time using online trading when investing for stock.	
	PE 3	I think the use of online trading can bring convenience to my investment.	
	PE 4	Using online trading would enable me to accomplish stock trading more quickly.	
	PE 5	Using online trading would enhance my stock trading efficiency and quality.	
Effort Expectancy	EE 1	Learning how to use online trading would be easy for me.	Venkatesh et al. [29], Yu [74], Tai and Ku [32], Sair & Danish [75]
	EE 2	I would find the online trading to be flexible to interact with.	
	EE 3	It will be easy for me to use online trading.	
	EE 4	I believe it would be easy for me to become skilful in using online trading.	
	EE 5	Using online trading will be clear and understandable for me.	
Social Influence	SI 1	I will use online trading because it is very famous and used by many people.	Venkatesh et al. [29], Tai & Ku [32]
	SI 2	People who are important to me will think that I should use online trading.	
	SI 3	My family and friends can influence me to use online trading.	
	SI 4	I will discuss the feeling of using online trading with family and friends.	
	SI 5	People whose opinions I value will prefer me to use online trading.	
Facilitating Conditions	FC 1	I have the knowledge necessary to use online trading.	Venkatesh et al. [29], Yu [74]
	FC 2	I think I can get help from others when I have difficulties using online trading.	
	FC 3	I have the necessary resources, such as mobile device, computer and network, for online trading.	
	FC 4	Support from an individual or service will be available when problems are encountered with online trading.	
	FC 5	I believe online trading is compatible with other technologies I use.	
Behavioral Intention	BI 1	I intend to online trading my stocks in the near future.	Venkatesh et al. [29], Lee [76], Lee [27], Yang [73], Yu [74]
	BI 2	I expect that I would use online trading in the future.	
	BI 3	I plan to continue to use online trading for my stocks frequently.	
	BI 4	I will recommend others to use online trading.	
	BI 5	If I can use online trading, I would like to use it as much as possible.	

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