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| RESEARCH ARTICLE

Is Bangkok Ready for Open Banking? A Research Note on Exploring the Variables that Affect Innovation Adoption

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| ABSTRACT
Today, the globe is seeing rapid growth in digital banking. Many financial technologies are vital and have been implemented. The most ground-breaking financial technology is open banking. It is based on the principle that it allows third-party financial service providers access to customer banking, transactional, and other financial data from banks and non-banks. However, the implementation of open banking technology is restricted due to the presence of unclear government regulations. Furthermore, there are many variables that influence the adoption of such technologies by customers. Thus, this article aims to examine the numerous variables that influence the adoption of open banking innovation among customers in Bangkok. We extend the unified theory of acceptance and use of technology 2 by incorporating a conceptual model of perceived security. The hypotheses of the conceptual model were subsequently assessed with partial least squares structural equation modelling using an online survey of 210 Bangkok consumers. Our finding reveals that open banking innovation adoption is directly influenced by performance expectations, social influence, price value, and perceived security. The hypothesis model has a significant amount of predictive ability, with an R^2 of 51.3%. In addition, Q^2 values demonstrated a moderate to high degree of predictability for open banking adoption.

| KEYWORDS

Open banking, UTAUT2, innovation adoption, PLS-SEM

| ARTICLE INFORMATION

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1. Introduction

Open banking is a nascent framework within the financial services sector that places significant emphasis on the transferability and unrestricted availability of customer data maintained by financial institutions. The framework for open banking has three fundamental components. Initially, it is important to enhance the capacity of consumers to get and manage their financial data. Additionally, it is mandatory for financial organizations to provide consumer data to their clients. Furthermore, it should be noted that financial institutions engage in the practice of sharing client data with duly authorized third-party providers, contingent upon the explicit authorization obtained from the customers themselves (Leong & Gardner, 2022; Mansfield-Devine, 2016; Strachan, 2022; Zachariadis & Ozcan, 2017). Open Banking is characterized by its distinctiveness and notable divergence from conventional banking architecture. Traditional banking operates on closed and fragmented networks, wherein individual financial service providers maintain ownership and control over these systems. One significant outcome is that customer data becomes functionally inaccessible due to its confinement inside specific providers. In contrast, open banking advocates for increased transparency within the system, enabling providers to have a greater ability to exchange customer data with other providers through their application programming interfaces (APIs) (Mansfield-Devine, 2016). For example, one of the most well-recognized advancements in the financial industry pertaining to open banking is the implementation of the Payment Services Directive 2 (PSD2) that third-party providers have established a connection between the client, bank, and merchant through the utilization of APIs (Dinçkol et al., 2023; Mansfield-Devine, 2016; Polasik et al., 2020; Steennot, 2018). In addition to the direct payment aspect, open banking

encompasses several financial services such as PayTech (Polasik et al., 2020), digital finance, and also FinTech (Gomber et al., 2017; Nicoletti, 2017).

Unfortunately, the current academic research related to the variables that impact the adoption and implementation of this innovation is limited, thereby underscoring the significance of this study endeavor. Furthermore, it is essential to conduct an in-depth study into the various variables that have an influence on customer adoption of this invention. A clearly notable example is the implementation of open banking innovation in the United Kingdom in 2018. After open banking has been implemented, customers exhibit a certain degree of hesitancy when it comes to sharing their personal data with entities other than their current banking institution. This reluctance is mostly driven by apprehensions about potential dangers associated with fraudulent activities, safeguarding of data, and cyber threats. The aforementioned challenges are evidently interconnected with the distinctive characteristics of open banking, necessitating resolution by providers and various stakeholders (Borgogno & Colangelo, 2019; Mansfield-Devine, 2016). Therefore, it is essential to enhance comprehension of consumer viewpoints, which becomes especially relevant in the context of domestic and international adoption and the implementation of open banking, despite the fact that widespread acceptance has not yet been achieved (Chan et al., 2022; Leong & Gardner, 2022).

Therefore, this article seeks to enhance current comprehension of the key variables that explain consumers' propensity to use open banking. The study aims to examine the effect of numerous variables, including performance expectations (PE), social influence (SI), price value (PV), and extended perceived security (PS). Based on the preceding article, this will have implications for the development of open banking from an alternative viewpoint, as it requires more systematic research. Currently, there is a shortage of comprehensive research investigating the variables that influence the potential for the advancement of open banking (Chan et al., 2022). This will be useful for Bangkok, Thailand, directly because the implementation of open banking is now in its very early stages, with banks and government authorities still in the early phases of administration and regulating this financial practice (Fintech News Singapore, 2021). Unfortunately, upon conducting an in-depth search within the database, it has been found that a complete research study related to the variables that influence innovation is currently unavailable.

To the best of the authors' knowledge, this study is the first academic attempt to propose a conceptual framework for comprehending the adoption intents of consumers in Bangkok and investigating the numerous variables that influence the adoption of open banking innovation. The empirical findings of our study emphasize the significance of including these dimensions while also drawing attention to their prominence. Moreover, the findings of our study have implications for the marketing strategy and policy development of financial services firms, developers, and government bodies that are committed to improving the competitiveness and adoption of open banking.

2. Literature Review

2.1 The Unified Theory of Adoption and Use of the Technology 2 (UTAUT2)

In this research, we used the Unified Theory of Adoption and Use of the Technology 2 (UTAUT2) as the model to determine the impact of three selected variables for open banking innovations adoption, including performance expectancy (PE), social influence (SI), price value (PV) and we extended another variable of perceived security (PS). This model was modified from the Unified Theory of Acceptance and Use of Technology (UTAUT), and upon conducting an in-depth review of the relevant academic literature, it has been observed that the UTAUT has been widely employed within the realm of technology adoption, as substantiated by prior research studies (Abrahão et al., 2016; Bajunaied et al., 2023; Chan et al., 2022; Gunawan et al., 2019). However, a limitation of this model is that it was specifically developed to recognize the internal variables that influence the behavioral intention of the people inside an organization. In 2012, Venkatesh developed a novel model aimed at expanding the scope of customers' behavioral intentions outside the confines of an organization. The findings of the study indicate that the variables of entertainment motivation (hedonic motivation; HM), price value (PV), and habits (HB) have an important influence on the use of technology as well (Venkatesh et al., 2012). Concluded that the UTAUT2 model is most appropriate for use with external consumers. Use more variables involving entertainment motivation, price value, and habit that may influence the utilization of this technology. In addition, the model has been utilized in a number of business innovation adoption research studies (Aswani et al., 2018; Dakduk et al., 2020; Eneizan et al., 2019; Najib et al., 2021; Rahman et al., 2020).

We will use the UTAUT2 model to determine the influence of four selected variables on the adoption of open banking innovation. However, many research investigations have demonstrated that not all factors can influence technology adoption. In considering this, we are going to conceptual review these four variables in a variety of industries. At the end, we will propose a hypothesis based on these factors and a proposed research model (Figure 1).

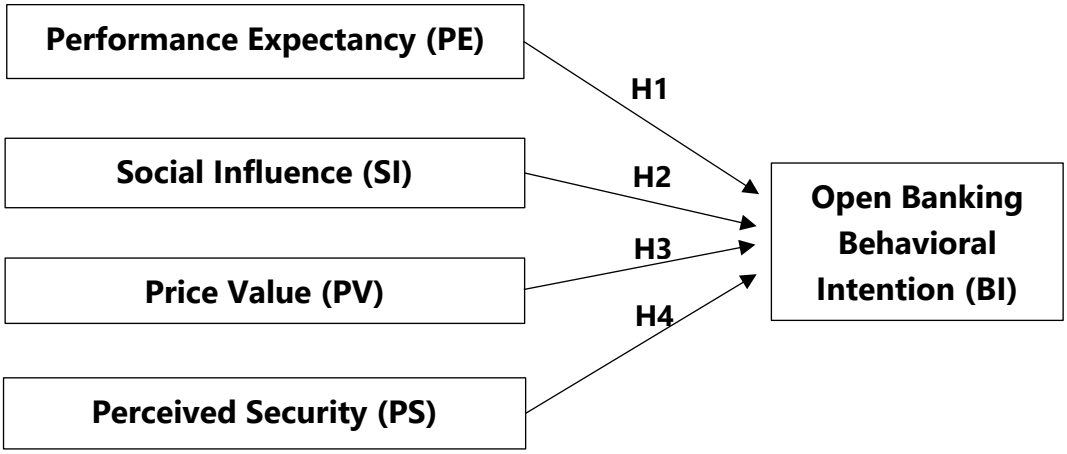

Figure 1 A proposed research model by researchers

2.2 Performance Expectancy (PE)

Performance expectation refers to the degree to which individuals have the belief that the utilization of an innovation will contribute to the enhancement of their performance (Venkatesh et al., 2003). In multiple studies, it has been consistently shown that this element plays a prominent role in influencing adoption (Lin, 2011; Oliveira et al., 2014; Wessels & Drennan, 2010). According to our review, this factor is the most important for innovation adoption. Table 1 demonstrated that PE influenced the adoption of innovations not only in the business sector (Eneizan et al., 2019; Merhi et al., 2019; Najib et al., 2021; Rahman et al., 2020) but also in the medical (Baudier et al., 2023; Schmitz et al., 2022) and social sciences (Aswani et al., 2018; Korkmaz et al., 2022). It may be the case that PE has an advantageous influence on both consumers and policymakers (Merhi et al., 2019). Moreover, in the SME business, PE is the most essential variable in gaining access to a bank loan through innovation (Najib et al., 2021). We hypothesize that consumers will be influenced to use open banking if they perceive its utility.

(Hypothesis H1): Performance expectancy has a positive influence on Open banking behavioral intention

2.3 Social influence (SI)

Social influence refers to the degree to which an individual perceives the potential impact of others' viewpoints and the necessity of adopting a new innovation (Venkatesh et al., 2003). On the other hand, one could argue that social influence may not be a significant determinant in the context of personal financial services, as these services typically include handling sensitive data that may not be readily accessible to others (Oliveira et al., 2014). As shown in Table 1, the influence of this variable has varied between industries. We also discovered that sometimes SI has no effect on the adoption of an innovation. According to previous research, the primary explanations for this phenomenon are cultural differences and how long it takes for those innovations to take hold in society (Dakduk et al., 2020; Merhi et al., 2019). In addition, we discovered that SI has no influence on innovation adoption in the medical industry (Baudier et al., 2023; Schmitz et al., 2022). Unlike the digital-only lifestyle of contactless payment (Rahman et al., 2020), mobile marketing (Eneizan et al., 2019), and banking service access (Najib et al., 2021), SI has a strong positive impact and influences the adoption of an innovation. Based on the same industry, we hypothesized that social influence has a substantial impact on individual attitudes towards the adoption of open banking.

(Hypothesis H2): Social influence has a positive influence on open banking behavioral intention

2.4 Price value (PV)

Price value refers to the degree to which an individual's decision-making is influenced by the factor of pricing. The price paid needs to be clearly based on the benefits or satisfaction that buyers anticipate receiving from an innovation (MacKenzie & Lutz, 1989; Venkatesh et al., 2012). As demonstrated in Table 1, this variable is not studied frequently. However, when there is a stake, such as when SME clients wish to utilize the bank's loan service, there is concern regarding the competitive service fee (Najib et al., 2021). Similarly to the digital-only lifestyle, we discovered evidence that PV has an impact when mobile banking services are implemented for consumers (Eneizan et al., 2019; Merhi et al., 2019). We hypothesized that customers would be encouraged to adopt open banking when the benefit they receive is cost-paid fulfillment.

(Hypothesis H3): Price value has a positive influence on open banking behavioral intention

2.4 Perceived security (PS)

Perceived security refers to the degree of confidence and trust placed on an online channel's capability to safely share sensitive information. Indeed, security breaches have been widely recognized as a substantial impediment to customers' ability to access confidential information via online platforms. Furthermore, the occurrence of security breaches has a significant impact on the adoption of the innovation (Ghosh & Swaminatha, 2001; Salisbury et al., 2001). This factor is typically excluded from the UTAUT2 model, but it has been extensively researched because it is one of the most problematic aspects of innovation implementation (Johnson, 2021; Mansfield-Devine, 2016; Sucasas et al., 2018). As shown in Table 1, several studies incorporated PS into the model. We discovered that PS has an impact on multiple fields, including business (Eneizan et al., 2019; Merhi et al., 2019), medicine (Schmitz et al., 2022), and the social sciences (Korkmaz et al., 2022). We hypothesize that the adoption of open banking by customers is contingent upon their confidence in and trust in the online platform.

(Hypothesis H4): Perceived security has a positive influence on open banking behavioral intention

Table 1 Examples of UTAUT2 publications that explored the factors that influence innovation adoption

Year	Industry	Innovation	UTAUT2								Statistic	References
			PE	EE	SI	FC	HM	PV	HB	PS		
2018	Communication	Public Wi-Fi	●	●	●	●	●	NT	NT	NT	SEM	(Aswani et al., 2018)
2019	FinTech	Mobile banking	●	●	No	NT	No	●	●	●	SEM	(Merhi et al., 2019)
2019	FinTech	Mobile marketing	●	●	●	●	●	●	●	●	PLS-SEM	(Eneizan et al., 2019)
2020	FinTech	Mobile commerce	No	NT	No	NT	●	NT	●	NT	PLS-SEM	(Dakduk et al., 2020)
2020	FinTech	Cashless payment	●	●	●	●	●	NT	NT	NT	SEM	(Rahman et al., 2020)
2021	Fintech	FinTech for SME	●	No	●	●	No	●	No	●	PLS-SEM	(Najib et al., 2021)
2022	Medical	Telemedicine	●	No	No	No	●	NT	No	●	SEM	(Schmitz et al., 2022)
2022	Medical	Telemedicine	●	●	No	No	NT	NT	●	NT	PLS-SEM	(Baudier et al., 2023)
2022	Public transport	Public transport	●	No	●	No	No	No	●	●	SEM	(Korkmaz et al., 2022)

● = Influence, No = No influence, NT = Not test

3. Methodology

A survey was conducted and focused on the population who have been working in the Bangkok area. The survey used a Google form and was distributed by social media platforms, such as a Facebook page with a Thai local language, during March – April 2023. The questions (see appendix) in the survey were adapted from previous open banking adoption's research (Chan et al., 2022). All responses from the Google form were extracted and screened to find out if they met the criteria.

The minimum sample size was calculated based on the 10-times rule method (Goodhue et al., 2007; Peng & Lai, 2012). We also reviewed the reference to determine if the number of samples satisfies the modeling criteria, which is between 100 and 200 samples (Hair et al., 2011; Ringle et al., 2009; Sarstedt et al., 2014). After the survey period concluded, 388 responses were collated and screened to determine if they met the criteria. The 210 qualified responses were subsequently incorporated into the statistical analysis.

This study applies the UTAUT2 as a theoretical model to investigate the variables that influence the adoption of open banking innovations. The variables consist of BI, PE, SI, PV, and we additionally extended PS. Our proposed research model is shown in Figure 1. To empirically examine the model, we used Partial Least Squares Structural Equation Modeling (PLS-SEM) and utilized SmartPLS 4.0 software (Ringle et al., 2022).

4. Results and Discussion

The demographic information for the analyzed 210 responses was shown (Table 2). The characteristics of the responses indicate that the percentages of females and males were comparable, at 53% and 47%, respectively. Most respondents fell within the age range of 30-44 years old. 71% of the respondents held a bachelor's degree. Lastly, respondents with annual incomes between 300,001 and 500,000 THB comprised the largest percentage for this study.

Table 2 Shows demographic information of the 210 responses with gender, working age ranges, education, and annual income.

Variables	Description	Frequency)N = 210)	Per Cent
Gender	**Female**	**112**	**53%**
	Male	98	47%
Working age range	15 – 29	46	22%
	30 – 44	**147**	**70%**
	45 Above	17	8%
Education	Below bachelor degree	26	12%
	Bachelor degree or equivalent	**149**	**71%**
	Above bachelor degree	35	17%
Annual income*	No more than 300,000 THB	51	24%
	Between 300,001 – 500,000 THB	**75**	**36%**
	Between 500,001 – 750,000 THB	45	21%
	Between 750,001 – 1,000,000 THB	13	6%
	Between 1,000,001 – 2,000,000 THB	17	8%
	Between 2,000,001 – 5,000,000 THB	9	4%

***THB = Thai Baht currency**

4.1 Reliability

Firstly, we began the analysis with reliability. Cronbach's alpha is a traditional method used in PLS-SEM for reliability evaluations. In general, Cronbach's alpha should be greater than 0.70 (Hair et al., 2016). Our results are presented in Table 3. The results indicated that BI, PE, and PS met the criteria, whereas PV and SI did not (0.571 and 0.675, respectively). Since this is the first exploration of variables influencing the adoption of open banking innovation in Bangkok, Thailand, we decided to proceed with this research after coordinating with the research team. This phenomenon might be the consequence of the respondents' lack of extensive knowledge of this topic. Similar to previous studies, Cronbach's alpha was discovered to have a low value of 0.40 in exploratory studies; however, composite reliability (CR) must be greater than 0.60 for the research to proceed as suggested previously (Griethuijsen et al., 2015; Taber, 2018).

Next, the inner reliability in the PLS-SEM is measured using CR. We have also evaluated the CR value using Joreskog's rho_a and rho_c methods. The results of the test indicate that the CR value of all variables is greater than 0.60. Thus, it has been determined that the statistical criteria have been satisfied, which supports the low value of Cronbach's alpha (Hair et al., 2019; Joreskog, 1971).

Table 3 The evaluation of measurement model

Construct	Coding	Outer loading	Outer weights	VIF	Cronbach's Alpha	rho_a	rho_c	AVE
BI	BI 1	0.828*	0.416	1.555	0.778	0.779	0.871	0.693
	BI 2	0.855*	0.401	1.768				
	BI 3	0.813*	0.384	1.568				
PE	PE 1	0.697*	0.303	1.319	0.753	0.757	0.844	0.575
	PE 2	0.785*	0.351	1.544				
	PE 3	0.778*	0.314	1.616				
	PE 4	0.772*	0.349	1.479				
PS	PS 1	0.708*	0.289	1.529	0.764	0.771	0.851	0.590
	PS 2	0.837*	0.339	1.831				
	PS 3	0.687*	0.323	1.364				
	PS 4	0.828*	0.351	1.746				
PV	PV 1	0.623*	0.312	1.221	0.571	0.601	0.773	0.536
	PV 2	0.835*	0.540	1.334				
	PV 3	0.722*	0.491	1.124				
SI	SI 1	0.778*	0.439	1.302	0.675	0.681	0.822	0.606
	SI 2	0.734*	0.386	1.272				
	SI 3	0.821*	0.457	1.406				

*P<0.05

4.2 Convergent validity and Discriminant validity

The average variance extracted (AVE) values were used to determine the convergent validity, which represented the degree to which it explained the variance of its indicators. Table 3 shows that all the results are acceptable by the rule of thumb of a value greater than 0.5 (Shrestha, 2021).

Evaluation of discriminant validity has become a standard prerequisite for analyzing relationships between latent variables. For evaluating discriminant validity in variance-based structural equation modeling, such as PLS-SEM, the Fornell-Larcker criterion and the examination of cross-loading are the most prevalent methods (Hair et al., 2016; Henseler et al., 2015).

Then, the Fornell-Larcker criterion for discriminant validity was analyzed to ensure that a construct has the strongest relationship with its own indicators. The results are shown in Table 4 and demonstrate that all constructs were within the requirements (Hamid et al., 2017). Moreover, regarding cross-loadings, each indicator's loading should be greater than the loadings of its corresponding variable's indicators. As shown in Table 5, it is evident that the cross-loading criterion is met.

Table 4 Discriminant validity - Fornell-Larcker criterion

	BI	PE	PS	PV	SI
BI	**0.832**				
PE	0.595	**0.759**			
PS	0.524	0.571	**0.768**		
PV	0.586	0.569	0.437	**0.732**	
SI	0.596	0.579	0.425	0.598	**0.779**

Table 5 Cross loading

	BI	PE	PS	PV	SI
BI 1	0.828	0.513	0.515	0.523	0.453
BI 2	0.855	0.502	0.388	0.482	0.535
BI 3	0.813	0.469	0.402	0.455	0.502
PE 1	0.415	0.697	0.476	0.404	0.465
PE 2	0.480	0.785	0.382	0.390	0.418
PE 3	0.429	0.778	0.437	0.398	0.398
PE 4	0.478	0.772	0.447	0.529	0.475
PS 1	0.356	0.355	0.708	0.325	0.247
PS 2	0.417	0.470	0.837	0.320	0.291
PS 3	0.398	0.402	0.687	0.309	0.391
PS 4	0.433	0.512	0.828	0.383	0.367
PV 1	0.290	0.255	0.133	0.623	0.400
PV 2	0.502	0.429	0.287	0.835	0.507
PV 3	0.457	0.524	0.489	0.722	0.407
SI 1	0.475	0.462	0.392	0.531	0.778
SI 2	0.418	0.334	0.175	0.333	0.734
SI 3	0.495	0.541	0.406	0.519	0.821

4.3 Analysis of the structural model

we created the conceptual model shown in Figure 2. Using SmartPLS 4.0 with 5,000 bootstrapping, the path coefficient values were determined and shown in the inner model with the *P*-value (Figure 2). The results showed the path coefficient ranged from 0.19-0.256 with a statistically $P<0.05$. For outer model showed both outer loading and outer weight (Table 3).

The outer loading represents the bivariate correlations between a construct and its indicators. When evaluating reflective measurement models, exterior loadings are of primary importance, but formative measurements also require the analysis of outer loadings (Hair et al., 2016). The results showed all outer loading values were statistically significant ($P<0.05$).

On the other hand, with the basis of multiple regression, a construct on its set of indicators is used to calculate its outer weight. Weights are the key criterion for determining the relative significance of each indicator in formative measurement models. The outcome was demonstrated by a positive correlation and is shown in Table 3.

Moreover, we evaluated the collinearity statistic, a variance inflation factor (VIF), to check if the variables are highly correlated. The rule of thumb for this value should be below 3 (Becker et al., 2015). The results, also shown in Table 3, indicate that all variables are acceptable.

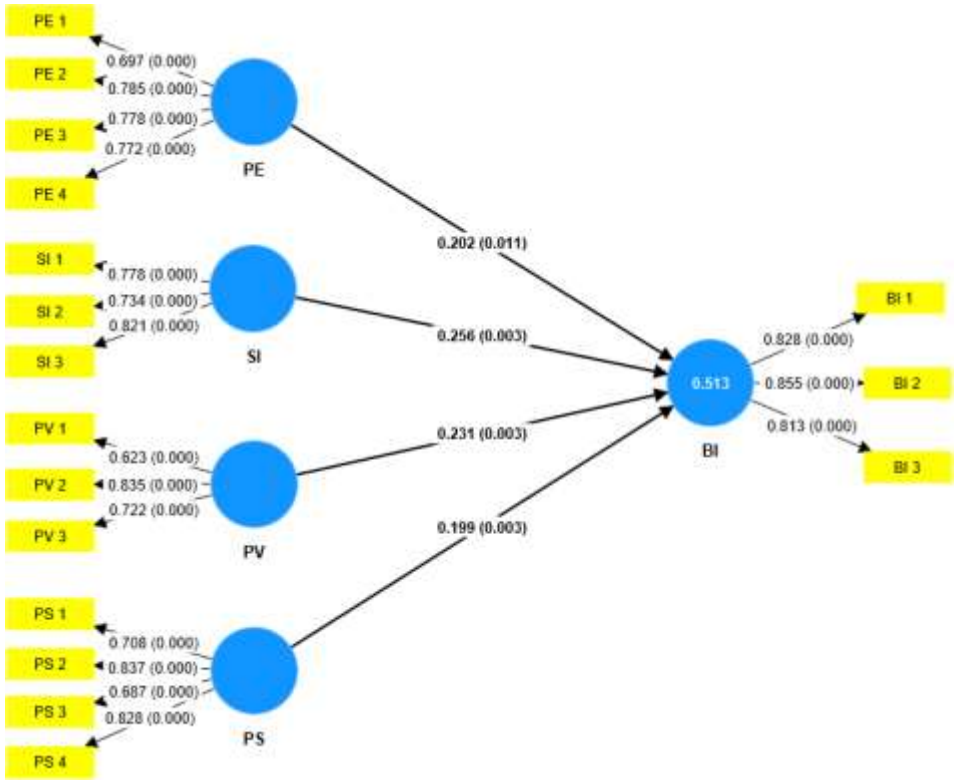

Figure 2 Analyzed conceptual model for PLS-SEM. Path coefficient values were analyzed with 5,000 bootstrapping and shown in the inner model with the *P*-value (also shown in Table 4). Path coefficient values ranged from 0.19 to 0.256 ($P<0.05$).

4.4 Evaluation of f^2 & R^2, Q^2 predict, and Hypothesis testing

f^2 value analysis

To evaluate the relative impact of a predictor construct on an endogenous construct in terms of its explanatory power, f^2 value measurement is utilized. It is used to indicate an exogenous construct's small, medium, or large effect in PLS-SEM (Mohammadi & Mahmoodi, 2019). The results showed PE, PS, PV, and SI had small effects (Table 6).

R^2 analysis

The R^2 and R^2 adjusted values are the common approaches to evaluating the structural model that can measure the coefficient of determination R^2 value, which affects the predictive power (Hair et al., 2016). The results in Table 5 showed R^2 and R^2 adjusted values of 0.513 and 0.506, respectively (representing 51.3% and 50.6% predictive power). The interpretation reveals BI was moderate to high for the effect size (Table 6).

Q^2 analysis

The Q^2 prediction was analyzed with SmartPLS 4.0 (Q^2PLSPredict) based on the blindfolding procedure. This value is used as a predictor of relevance (Henseler et al., 2009). The results are shown in Table 7. The Q^2 values ranged from 0.286 to 0.348, interpreted as having medium to large predictive relevance.

Table 6 Variables effect size

Quality Criteria	***R²***	***R²* Adjusted**	***f²***	**Effect size**
BI	0.513	0.506	-	**Moderate to high**
PE -> BI	-	-	0.042	**Small**
PS -> BI	-	-	0.053	**Small**
PV -> BI	-	-	0.061	**Small**
SI -> BI	-	-	0.075	**Small**

Table 7 The Q^2 value

	Q^2 predict
BI 1	**0.348**
BI 2	**0.325**
BI 3	**0.286**

Prior to testing the hypothesis, we analyzed the path confidence intervals. The confidence intervals that were analyzed are shown in Table 8, and zero was not included in all of them. Thus, we interpreted that every path was supported.

Lastly, all hypotheses were analyzed. Our hypotheses were outlined and described in Figure 1 and in the research methodology section. The hypotheses were tested using the two-tailed and percentile bootstrapping methods. The measurements of the path coefficient, standard deviation, T statistics, *P* value, and decision made are presented in Table 9. The results of the path coefficient were described during the session of structural model analysis with outer loading and outer weight (Figure 2 and Tables 3 & 5). The range for the standard deviation was 0.067 to 0.086. According to the rule of thumb (T statistic >1.96 and P<0.05), our hypotheses were all accepted (Hair et al., 2016).

Table 8 Confidence intervals

Path	2.50%	97.50%	Interpretation
PE -> BI	0.056	0.368	Supported
PS -> BI	0.066	0.332	Supported
PV -> BI	0.065	0.374	Supported
SI -> BI	0.101	0.432	Supported

Table 9 Hypothesis testing

Hypothesis	Path	Path Coefficient	Standard deviation	T statistics	*P* values	Decision
H1	PE -> BI	0.202	0.080	2.533	**0.011**	***Accepted***
H2	PS -> BI	0.199	0.067	2.967	**0.003**	***Accepted***
H3	PV -> BI	0.231	0.079	2.941	**0.003**	***Accepted***
H4	SI -> BI	0.256	0.086	2.983	**0.003**	***Accepted***

This is preliminary research to study the variables influencing open banking behavior intentions in Bangkok, Thailand. From analysis, we observed a low value of Cronbach's alpha, but we still proceeded with our research. This could be due to the new technological knowledge of the participants. In the references mentioned, we could see Cronbach's alpha as low as 0.4 as well in the exploration research (Griethuijsen et al., 2015; Taber, 2018). Our results were similar, as mentioned earlier. As a result of a lack of clarity in government policy, open banking has not been completely implemented, nor is it widely used, which, in our opinion, supports the participants' obvious absence of open banking technological knowledge.

Using PLS-SEM and analyzed by SmartPLS 4.0, our data provide strong support for all four variables in the conceptual model, including performance expectancy, social influence, price value, and perceived security on behavior intention. The results were validated and confirmed by the path coefficient analysis, which was statistically significant with T statistic and *P* value <0.05. We concluded and confirmed that all hypotheses of H1, H2, H3, and H4 had been significantly accepted. In addition, the confidence interval also supports all hypothesizes.

Additionally, from the hypotheses testing and Q^2, R^2 and f^2 analysis, we analyzed and confirmed that the variables in the study (PE, SI, PV, and PS) could be used as predictors to test the behavior intensions of the open banking in the consumers in Bangkok, Thailand. The size of the effect of the variables was represented as moderate to high (R^2 value) and small (f^2 value). Moreover, Q^2 predict revealed that variables had medium to large predictive relevance.

Furthermore, our findings revealed that variables that influenced open banking adoption in Bangkok, Thailand, were PE, SI, PV, and PS, and the results were confirmed statistically (P<0.05). Then, we go through every tested variable, PE; our finding is similar to previous research such as in business sector (Eneizan et al., 2019; Merhi et al., 2019; Najib et al., 2021; Rahman et al., 2020), medical (Baudier et al., 2023; Schmitz et al., 2022) and social sciences (Aswani et al., 2018; Korkmaz et al., 2022). As previously

investigated, PE bears considerable significance due to its beneficial impact on several stakeholders, including consumers and policymakers (Merhi et al., 2019). SI: Our results revealed that we have the same evidence in the same industry, such as a digital-only lifestyle of contactless payment (Rahman et al., 2020), mobile marketing (Eneizan et al., 2019), and banking service access (Najib et al., 2021). Whereas the demographic variables influencing the adoption of the innovation have not been subjected to investigation in this SI session. PV to the fact that this variable is not studied frequently. But from our findings, it has been evidenced that our results indicate a similarity to SME research (Najib et al., 2021), digital-only lifestyle payment and mobile banking research (Eneizan et al., 2019; Merhi et al., 2019). PS: Our results showed this variable similarity had the same influencing on innovation in multiple fields, including business (Eneizan et al., 2019; Merhi et al., 2019), medicine (Schmitz et al., 2022), and the social sciences (Korkmaz et al., 2022). From our perspective, the presence of security breaches holds considerable influence over the adoption of innovation, as this feature is commonly overlooked in the UTAUT2 model. However, it has been widely studied due to its status as one of the most problematic aspects of the implementation of innovation (Johnson, 2021; Mansfield-Devine, 2016; Sucasas et al., 2018).

In summary, our tested variables influencing innovation adoption were similar to previous research on FinTech adoption in small businesses (Najib et al., 2021) and mobile marketing (Eneizan et al., 2019). From the previous research on the adoption of financial innovation, we found that once the innovation had been implemented for a long enough time, the social influence might not be a crucial factor in its adoption anymore (Dakduk et al., 2020; Merhi et al., 2019). On the other hand, PE is the most crucial variable influencing innovation adoption in many research studies, both in business and non-business research (Aswani et al., 2018; Eneizan et al., 2019; Merhi et al., 2019; Najib et al., 2021; Rahman et al., 2020). In accordance with the findings of our investigation, supported by pertinent research, we concur with this particular circumstance.

5. Conclusion

In conclusion, the purpose of this study is to determine the variables that influence the adoption of open banking innovation. The researchers expanded PS into the UTAUT2 model using the PLS-SEM analysis with 210 respondents. Our findings indicate that PE, SI, PV, and PS have a direct impact on the adoption of open banking innovations. The adoption of open banking in Bangkok was influenced by various variables, including performance expectancy, social influence, price value, and perceived security. These variables were subjected to statistical analysis, which proved their impact on the adoption of open banking. Our study is the first academic investigation into the adoption of open banking innovations in Bangkok, Thailand. One of the highlights of this finding is that online security is also the most significant concern, despite not being represented in the UTAUT2 model, as online spam and cyberattacks are so prevalent today. Since this article is the first academic endeavor to present a conceptual framework aimed at explaining the adoption of open banking within the context of Bangkok, further investigation is required to adequately address the knowledge gap, as mentioned in limitations and future research sessions. On the other hand, it has been still said that the implementation of an open banking system in Thailand remains a far-off aspiration due to the possibility of fully implementing the open banking innovation is highly dependent on the government's role, which has not yet been explicitly defined (Fintech News Singapore, 2021; Ten Kate, 2023; The Nation, 2021). It is recommended that governmental and regulatory organizations adopt a proactive stance towards establishing open banking infrastructure and enacting legislation pertaining to data sharing and security. This will facilitate the realization of the sector's potential and enhance the nation's data-driven financial ecosystem (Ten Kate, 2023). Lastly, whether or not we are ready for this innovation, this innovation is already a part of our daily lives.

6. Limitations and future research

Like other academic research, this study possesses inherent limitations that necessitate acknowledgment. The data were acquired through a convenience sample approach, limiting the generalizability of the research findings to the entire population. Furthermore, the present study did not investigate the potential moderating influences of demographic variables. Based on our findings, we believe this information is useful and important for policymakers and application developers. For the future research and implementation of open banking innovations, it will be necessary to conduct additional in-depth research on a variety of extended variables. This is a good preliminary study for us to deeply plan on the extension of variables such as habit or hedonic motivation with a larger sample size for UTAUT2.

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