Factors Affecting Customers' Use of Online Banking

Subjects: Business, Finance

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The online banking is a banking service that allows users to be “at home” and use the service at any time through an internet connection. In online banking services, the restrictions of time and geography have been removed, and customers can access their bank accounts and make transactions at almost anytime and anywhere via computers and an internet gateway.

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1. Introduction

From the early 1990s to the present, digital technology has continuously developed, reflecting the enormous revolution of new technologies and their application to corporations, firms, customers, as well as governments. In particular, the Internet is the most rapidly developing form of media in history, with the number of users increasing significantly year by year. The Internet has changed the business method in many fields. In the banking sectors, the Internet has created big changes in this business sector [1]. The banking sector is one of the sectors most affected by technology [2][3] due to its ability to process and provide service information to all users [4]. In addition, increasing competition in the banking sector forces suppliers to develop and use alternative distribution channels [5]. Therefore, the application of information technology and the Internet to create new products is a revolution in the approach of banks to provide convenient, reliable, and fast services to customers [4].

Many individual customers are reluctant to adopt and use online banking services because of many reasons such as society, culture, and economy [6][7][8]. This is because of two reasons: First, the perception of financial service customers is still limited, sometimes creating “security holes”, especially individual customers. People are still not aware of the confidentiality of personal information such as full name, identity card number, passport, address, date of birth, and account number. It greatly increases the risk of safety loss to customers themselves as well as commercial banks. Second, individual customers often have fewer online banking transactions than corporation customers, especially customers in small cities and rural and mountainous areas.

There are many studies aimed at determining the factors impacting the intention and decision to choose online banking. However, these studies mainly use the theory of reasoned action (TRA) [9][10], theory of planned behavior (TPB), and technology acceptance model (TAM) [11]. For example, the study of Naruetharadhol et al. [12] developed a model based on TAM to examine the factors affecting the intention to use mobile payments with 688 mobile payment service users in Thailand. Ananda et al. [13] extended TAM to examine the factors influencing the intention

to use digital banking with 200 individual customers of seven local banks and two Islamic banks across Oman. Mortimer et al. [14] developed a model based on TAM to empirically examine the motivations affecting the intention to use mobile banking of 348 consumers in Thailand and Australia. These studies have shown the factors affecting the consumer's acceptance of using banking services. However, according to Venkatesh et al. [15], the studies based on the above theories are not really comprehensive. On the basis of synthesizing the above theories in the most comprehensive way, Venkatesh et al. [16] proposed the Unified Theory of Acceptance and Use of Technology (UTAUT). Due to its high generalizability, UTAUT is used by many researchers to assess the adoption and use of technology [7][8][17][18]. However, UTAUT has still not covered all the factors affecting the adoption and use of technology [15]. Therefore, UTAUT2, as an extension of UTAUT, can assess the factors affecting the adoption and use of online banking services to overcome the limitations of previous studies.

Besides, the previous studies used structural equation modeling (SEM) to estimate the parameters and draw conclusions about the research hypothesis. However, SEM only evaluates the linear relationship between variables in the model but can not evaluate the non-linear relationship. To solve this issue, the artificial neural network model (ANN) can be used to evaluate the non-linear relationship between variables in the model.

2. Factors Affecting Customers' Use of Online Banking

The demographic structure of the samples is shown in **Table 1**.

Table 1. Demographic Structure of Participants.

		Frequency	Percent	Valid Percent	Cumulative Percent
Age	18–35	132	29.8	29.8	29.8
	35–45	239	54.0	54.0	83.7
	45 or more	72	16.3	16.3	100.0
	Total	443	100.0	100.0	
Gender	Female	244	55.1	55.1	55.1
	Male	199	44.9	44.9	100.0
	Total	443	100.0	100.0	
Degree	Bachelors	211	47.6	47.6	47.6
	Doctorate	79	17.8	17.8	65.5
	Masters	153	34.5	34.5	100.0
	Total	443	100.0	100.0	

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models. Specifically, the SEM model shows that the order of factors affecting the intention to use online banking services from strong to weak is effort expectancy, performance expectancy, perceived risk, brand image, social

Table 2 shows the results of the reliability analysis. The MLP model shows that the 8 factors affecting effort expectancy, performance expectancy, brand image, perceived risk, cost value, social influence, respectively. From the economic perspective, the results obtained from the MLP model show a better fit than the SEM model.

Table 2. Reliability Analysis.

Factors	Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Effort Expectancy	DSD1	10.13	3.396	0.601	0.751	0.797
	DSD2	10.05	3.192	0.606	0.747	
	DSD3	10.07	3.280	0.571	0.764	
	DSD4	10.10	2.990	0.658	0.720	
Performance Expectancy	HI1	9.49	3.065	0.637	0.790	0.827
	HI2	9.35	2.964	0.649	0.784	
	HI3	8.86	2.798	0.707	0.756	
	HI4	8.76	2.865	0.623	0.797	
Perceived Risk	RR1	8.33	3.037	0.637	0.812	0.838
	RR2	7.85	3.221	0.651	0.803	
	RR3	8.28	3.088	0.710	0.777	
	RR4	8.42	3.153	0.686	0.788	
Brand Image	HA1	10.19	3.351	0.638	0.801	0.833
	HA2	10.21	3.484	0.660	0.790	
	HA3	10.23	3.397	0.669	0.786	
	HA4	10.25	3.554	0.687	0.779	
Cost Value	CP1	10.15	4.320	0.631	0.872	0.885
	CP2	10.16	4.218	0.710	0.867	
	CP3	10.14	3.988	0.805	0.830	
	CP4	10.16	3.830	0.860	0.808	

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Factors	Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Social Influence	XH1	10.02	3.323	0.641	0.760	0.812
	XH2	9.96	3.324	0.620	0.769	
	XH3	9.98	3.327	0.600	0.779	
	XH4	10.13	3.098	0.662	0.749	
Behavioral Intention	YD1	10.22	4.171	0.739	0.798	0.855
	YD2	10.17	4.429	0.664	0.829	
	YD3	10.24	4.264	0.751	0.794	
	YD4	10.16	4.385	0.640	0.840	
Decision to choose	LC1	6.81	2.184	0.687	0.813	0.847
	LC2	6.74	1.887	0.770	0.732	
	LC3	6.79	2.086	0.691	0.810	

The result of the estimations of SEM is presented in **Figure 1**.

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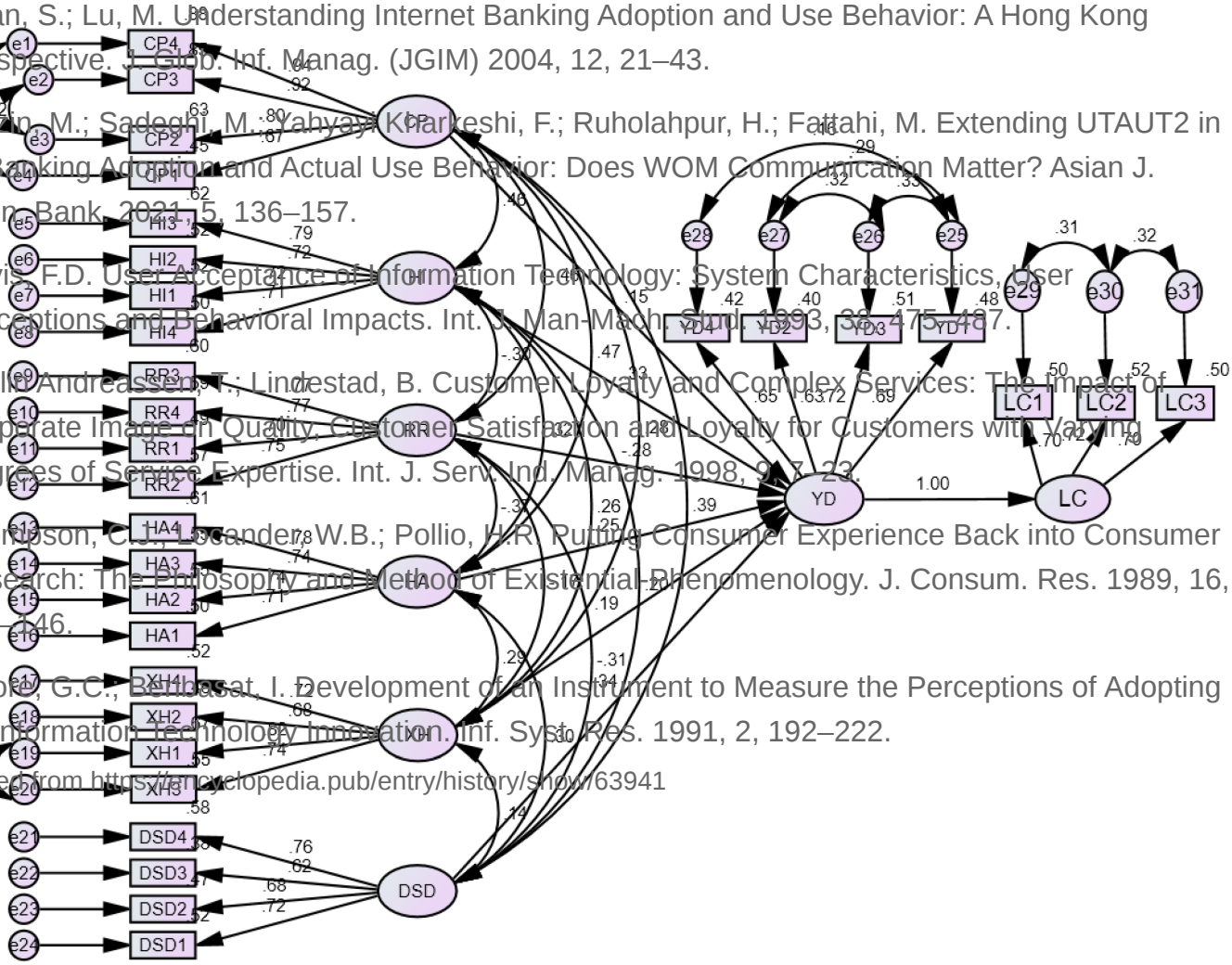

Figure 1. The Structural Equation Model. Effort expectancy (DSD), performance expectancy (HI), perceived risk (RR), brand image (HA), cost value (CP), social influence (XH), behavioral intention (YD), decision to choose (LC).

Table 3 presents the result of the intercorrelation matrix, the values of average variance extracted (AVE), and the composite reliability (CR) of each scale corresponding to each factor in the model. The result shows that AVEs are all greater than 0.5. Therefore, all of the factors in the model converge [19].

Table 3. Intercorrelation matrix, AVE, and CR.

	CR	AVE	Effort Expectancy	Cost Value	Performance Expectancy	Perceived Risk	Brand Image	Social Influence	Behavioral Intention
Effort Expectancy	0.798	0.598	0.706						
Cost Value	0.892	0.678	0.372	0.824					
Performance Expectancy	0.829	0.549	0.209	0.458	0.741				

	CR	AVE	Effort Expectancy	Cost Value	Performance Expectancy	Perceived Risk	Brand Image	Social Influence	Behavioral Intention
Perceived Risk	0.840	0.568	−0.314	−0.447	−0.301	0.754			
Brand Image	0.835	0.558	0.303	0.457	0.322	−0.370	0.747		
Social Influence	0.813	0.521	0.153	0.262	0.256	−0.168	0.294	0.722	
Behavioral Intention	0.858	0.603	0.495	0.636	0.575	−0.537	0.564	0.417	0.777

Table 4 shows that the Chi-square/df value of 2.124 is lower than the threshold of 3, recommended by Carmines and McIver [20]. The values of RFI, AGFI, GFI, and NFI are 0.870, 0.865, 0.890, and 0.887, respectively. For the CFI, TLI, and IFI, the obtained values are all greater than 0.90. The RMSEA is also in the desired range between 0.05 and 0.08 [21]. Thus, the SEM is consistent with the data.

Table 4. The SEM Model's Goodness of Fit Criteria.

Criteria	Value	Criteria	Value
Chi-square	860.212	NFI	0.887
p-value	0.000	CFI	0.936
Chi-square/df	2.124	TLI	0.927
RFI	0.870	IFI	0.937
AGFI	0.865	RMSEA	0.057
GFI	0.890		

The estimation result of SEM shows that the factors affecting the behavioral intention to use online banking services are cost value, performance expectancy, perceived risk, brand image, social influence, effort expectancy. Therefore, these six factors will be brought to the input layer of the MLP model. The output layer is the behavioral intention to use online banking services factor. To the hidden layer, in the case of six input factors, the number of neurons in the hidden layer is log2(6)=2.58. Thus, the number of neurons in the hidden layer is 3. The Sigmoid function is used as the activation function of the neurons in the hidden and the output layers. It uses 90% of the sample data to train the model, and the remaining 10% is used to test the accuracy of the model. An MLP model is shown in **Figure 2**.

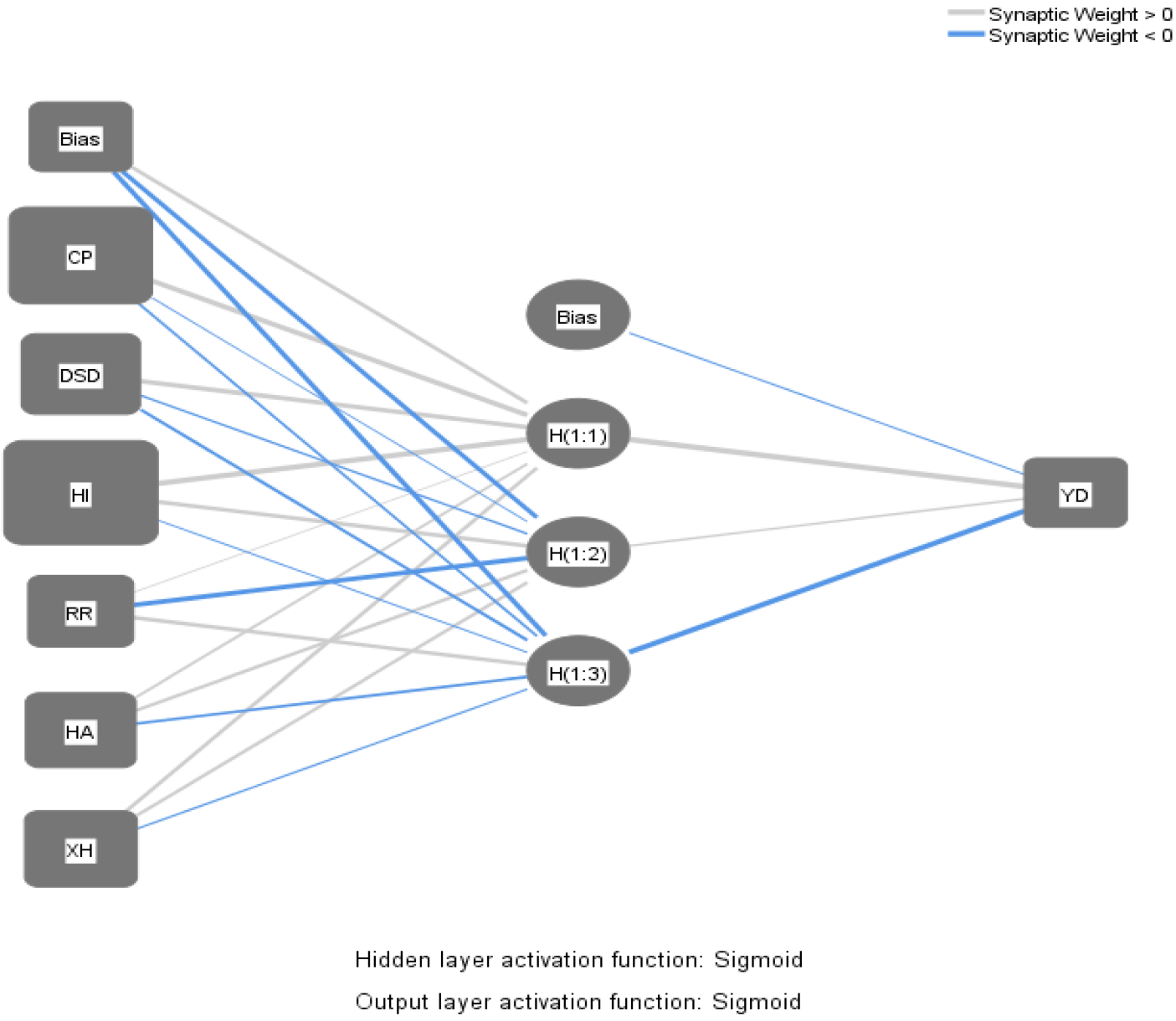

Figure 2. MLP model. Effort expectancy (DSD), performance expectancy (HI), perceived risk (RR), brand image (HA), cost value (CP), social influence (XH), behavioral intention (YD).

Image, and social influence all positively impact the intention to use online banking services. Thus, increasing the factors of performance expectancy, cost value, effort expectancy, brand image, and social influence can increase the customer’s intention to use online banking services. While the perceived risk has a negative impact on the intention to use online banking services. That means when customers feel that online banking services are risky, their intention to use online banking services will decrease