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The role of dimensions of perceived risk in adoption of corporate internet banking by customers in Iran

Hamid Reza Khedmatgozar[1] · **Arezoo Shahnazi**[2]

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Abstract During the recent years, one of the issues considered by the banks in the field of internet banking is the adoption of corporate internet banking (CIB) by corporate clients. The present article tried to examine the factors affecting adoption of CIB by corporate clients based on the perceived risk theory. The research hypotheses were tested using confirmatory factor analysis and the results showed that there was a significant relationship between all the risks and intent to adopt CIB by the corporate clients of the banks. The major factors decreasing the intent to adopt internet banking include performance, privacy, security, financial, time, and social risks respectively. Based on the findings of the present study and similar studies, a comparison was made between the importance of the dimensions of perceived risk in personal and CIB and suggestions were made for decreasing the effects of these significant risks for the corporate clients to adopt CIB.

Keywords Corporate internet banking · Adoption of technology · Corporate clients · Perceived risk theory

✉ Hamid Reza Khedmatgozar
h.khedmatgozar@gmail.com; khedmatgozar@alumni.irandoc.ac.ir

Arezoo Shahnazi
arezoshahnazi@yahoo.com

[1] Iranian Research Institute for Information Science and Technology (IRANDOC), No. 1090, Enghelab Avenue, P.O. Box 13185-1371, Tehran, Iran

[2] Department of Financial Engineering, University of Science and Culture, Asharif Esfahani Blvd., Park Street, P.O. Box 13145-871, Tehran, Iran

1 Introduction

Today, the development of information technology in banking industry has revolutionized banking operations and with the appearance of different forms of electronic banking, the nature of the connection between the banks and their clients has greatly changed in a way that the clients can perform their banking activities day and night [12]. Internet banking (IB) is one of the branches of electronic banking which gives the clients the possibility to use a wide range of bank services such as transferring funds, paying the bills, checking account balance, investment and check services using the internet and the websites designed by the banks [15]. Getting rid of the time and place limitations, becoming familiar with customer services, smaller operation costs and the potential for providing wide services are among the advantages of internet banking for banks [37, 48]. Besides, it provides the clients with the opportunity to carry out a wide range of financial transactions electronically using the bank website anytime and anywhere faster and with lower fees compared to other banking methods [21].

The development of the structures of providing electronic services requires the adoption of the services by clients and one of the issues facing the banks in the field of internet banking is the adoption of this banking service channel by the clients. This issue has attracted the attention of many researchers. In a review study by Hanafizadeh et al. [16], 165 studies related to the adoption of internet banking were examined. Based on their findings, they introduced lack of attention to the factors affecting adoption of internet banking by the corporate clients (legal entities) as one of the important gaps in the studies on the adoption of internet banking. 'Corporate clients' refers to the companies, organizations, institutions and firms that are active as legal entities in financial and commercial processes [40]. On the other hand, in their analysis of the models and theories that have been used in the studies in this area, they identified perceived risk theory (PRT) as an index theory the main feature of which is attention to different factors getting in the way of adoption of internet banking by the customers. Accordingly, the main purpose of the present study is to examine the factors influencing the adoption of corporate internet banking (CIB) by the legal entities in Iran based on the PRT. The primary question the present study attempts to answer is how corporate clients' perceived risk influences their intent to adopt CIB?

This paper has been organized in the following order: the second section explains the theoretical background and the research model and section three explains the research methodology. Then the data are analyzed and the research hypotheses are tested in section four. Section five analyzes and discusses the findings and presents their theoretical and administrative implications. Finally, section six presents the conclusions and suggestions are made for future research.

2 Theoretical background

In this section, the literature is reviewed in two parts. In the first part, adoption of internet banking by the corporate clients and in the second part PRT are reviewed. Then the research model is presented based on these two parts.

2.1 Adoption of corporate internet banking by corporate clients

Overall, a limited number of studies have investigated the adoption of corporate internet banking by the corporate clients. Claro and Rosa [11] in their research, based on a hybrid model derived from the Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT), examined the impact of certain factors such as firm management structure, firm demographics, competitive environment and moderating impact of firm's maturity on internet banking adoption by the firms. The results revealed that the firms with a high propensity to adopt IBS operate with a diverse management board, are large and young, and compete with a large number of firm users.

Based on the results of a study by Abeka et al. [1], aimed at identifying the factors affecting the adoption of internet banking services by the corporate clients in Eastern Africa, the only important factor influencing the adoption of internet banking by the corporate clients is the support provided by the banks and the ease of use perceived by the corporate clients. In another study by Alnsour and AL-Hyari [4], the effects of two important factors (security and trust) on Jordanian customers' adoption. The results showed that security directly affects perceived usefulness and trust indirectly influences perceived ease of use. Security was also introduced as an important and basic factor in adoption of internet banking among the corporate clients.

Alam et al. [2] also tried to identify the factors that have an influential role in adoption of internet banking by Malaysian corporate clients particularly Klang Valley customers. In this study, the relationship between adoption of internet banking and six factors affecting it including awareness, ease of use, cost, unintent to change and access was investigated. The findings were indicative of the influential role of awareness and security in adoption of internet banking. The effects of perceived ease of use and unintent to change was not found to be significant. Alam et al. attributed this to the fact that corporate clients still think that internet banking is a complicated process and that online trading is not safe enough.

The most serious and comprehensive studies in this regard have been carried out in Thailand. They include three continuous studies. In the first study, Rotchanakitumnuai and Speece [39] identified the obstacles perceived by the corporate customers to the use of internet banking in Thailand. The results of their study showed that 'trust' was one of the most important factors in adoption of internet banking by the corporate customers, which includes concerns about the security of the system, low trust in commerce via the internet banking system and lack of trust in the service providers. Besides, management attitudes are among the key organizational obstacles. Generally, internet security is an important dissuasive factor in wider adoption of internet banking and legal support is the main obstacle to their intent to adopt internet banking. In the second study, Rotchanakitumnuai and Speece [40] explored the advantages and obstacles to the adoption of internet banking by the corporate clients in Thailand finding that quality of information, access to information, sharing the information, and trading advantages are the four advantages that encourage the clients' adoption of internet banking. On the other hand, the obstacles are related to security, legal support and organizational barriers.

Furthermore, sharing of the information and lack of trust in the web are two main disadvantages preventing the adoption of internet banking. Finally in their third study [41], they sought corporate clients' views on the advantages and disadvantages of web-based services in the field of internet banking in Thailand and also investigated the effects of these advantages and barriers on the connection between the banks and the clients and on the costs of change. The results of this study showed that quality of information, access to information and the advantages of web-based trading services positively affect the strength of connection between the customers and the banks, but the effect of information sharing was not found to be significant. Based on findings, they stated that advantages such as access to information and quality of information decrease the costs associated with change and promote the connection with the clients.

Overall, the studies mentioned in the literature point to the importance of legal supports, trust and perceived ease referred to as security and performance risks are the common obstacles to the adoption of corporate internet banking.

2.2 Perceived risk theory (PRT)

The concept of consumer perceived risk was first introduced by Buer in 1960. According to this concept, the consumers' choices are classified under such terms as risk-increasing or risk-decreasing behavior. In this respect, a study was conducted by Fredrich and Fer (as cited in [28]) in which the effects of perceived risk and moral philosophy on moral decision-making were measured [44]. Perceived risk can be defined as lack of trust and potential side effects influencing the purchase of an article or services [27]. In other words, perceived risk refers to the customer's thought and belief in the likelihood of having an adverse outcome and consequence in online and electronic trading [24].

An influential factor in adoption of electronic services is the level of risk perceived by the users when they are using electronic services, i.e., the benefit or loss they will make [28]. This is considered as a significant factor that influences customer behavior [34]. Risk or perceived risk means lack of trust when purchasing, i.e., when consumers may decide that purchasing and the importance and consequences associated with it are a mistake or arbitrary decision [6]. In a theory known as perceived risk theory (PRT), researchers have considered perceived risk as a combination of several dimensions. These dimensions include performance, financial, social, psychological, security, privacy and physical risks [18, 22, 38].

This theory was used as the basic concept in the present study. Referring to the models and theories used in examining adoption of internet banking, Hanafizadeh and Khedmatgozar [15] pointed out that the main feature differentiating this model from others is the fact that in contrast with other theories and models which focus mainly on positive factors that encourage adoption of IB, this theory concentrates particularly on the negative factors (risks) that prevent it. On this basis, some researchers have examined the effect of different dimensions of perceived risk on adoption of IB. (see Table 1 for a summary of the dimensions of perceived risk and the effects of each dimension based on the results of the most important studies that used this theory.)

Table 1 Studies on the effects of perceived risk on adoption of IB

Prior studies	Year Author(s)	2008 Zhao et al. [51]	2006 Littler and Mlanthiou [27]	2009 Lee [26]	2009 Aldas-Manzano et al. [3]	2012 Hanafizadeh and Khedmatgozar [15]	2012 Moradi et al. [30]	2016 Roy et al. [42]
Perceived risk dimensions	Time	+	*	*	+	*	+	
	Financial	+	*	*		*	+	*
	Performance	+	*	*	*	*	*	*
	security	+	*	*	*	*	+	
	Privacy	+		*	*	*		*
	Social	+	+	+	*	+	+	*
	Psychological	+	+				*	
	Physical	+						

Dimensions of perceived risk are shown with + and dimensions found to be meaningful have been marked with *

As shown in the table, one of the gaps in the literature on adoption of internet banking is lack of attention to the issue of adoption of internet banking by corporate clients from the perspective of the different dimensions of the risks perceived by them based on PRT, which was also pointed out by Hanafizadeh et al. [16]. Now based on the gaps in the literature, each dimension is defined both generally and in the field of internet banking, and the importance of each dimension in adoption of corporate internet banking is pointed out.

Time risk: Generally, time risk can be defined as the likelihood of wasting time as the result of searching, repurchasing and learning how to use a product or service. It refers to the customer's concerns about such issues as how much time needs to be spent for learning how to use IB, how much time is needed solve the problems associated with the use of IB like proving that transaction errors have happened and how much time is spent for carrying out and completing the transactions in IB. The significant effect of organizational barriers in adoption of corporate internet banking confirmed in chen's [9] and Rotchanakitumnuai and Speece's [39–41] studies can also be a confirmation of the importance of time risk in adoption of internet banking.

Financial risk: It refers to the likelihood of financial loss in addition to the product or service maintenance costs as the result of purchasing. In the field of IB, it refers to the customers' concerns about financial loss due to impossibility of claiming compensation from the banks in case of transaction errors, making a mistake in entering a transaction such as the account number or the amount of money by the customer in IB and losing the control of one's personal account and, consequently, financial loss caused by the use of IB. Rotchanakitumnuai and Speece [39–41] emphasized the importance of this risk in adopting IB by corporate clients under the title of lack of financial support by the laws. Lack of financial support enforced by the laws can be related to financial losses mentioned in this section.

Performance risk: It refers to the likelihood of bad performance of the product or service in way that cannot satisfy the claimed benefits or facilities. In the area of IB, this risk is related to the factors that may influence the performance or output provided by IB not meeting the clients' expectations of IB based on the advertized priorities, poor system performance due to low download speed, server breakdowns or website repair and maintenance operations. The effect of a factor called ease of use, as confirmed in a study by Alam et al. [2], which can be interpreted as a positive role of decreasing performance risk in intent to use corporate internet banking, can be considered as a confirmation of the effectiveness of this risk in adopting corporate internet banking.

Security risk: It generally refers to the likelihood of fraud and abuse of personal information. In IB, this risk concerns the existing worries about the world wide web's insecurity for sending and receiving financial information (internet security) and the potential losses incurred by being hacked or online banking fraud which put the clients' security (IB security) at risk. This risk has been referred to in different forms such as fake transactions [39–41] and lack of trust in the web and the information presented on it [2, 9] in the field of corporate internet banking, which is an indication of the importance of this dimension of the perceived risk to the corporate clients.

Privacy risk: This risk concerns the possibility of losing control over personal information. It refers to IB users' control over all aspects of gathering personal information. Now if these personal data are gathered and registered without their awareness, it causes concern to them; this is referred to as privacy risk. The significant role of such factors as lack of trust in the privacy policy and the government's legal support, referred to as confidence barriers index, in adopting CIB in Rotchanakitumnuai and Speece's [39–41] study can be a confirmation of the importance of this risk in adopting CIB.

Social risk: This dimension of perceived risk is related to the likelihood of losing the position of an institution in a social group as the result of using a product or service that seems stupid. In IB, it refers to the customers' concern in such cases as the family's, friends' and colleagues' negative attitude towards IB and the loss of social status among these groups in the cases of error or fraud and lack of direct contact with the bank employees and asking for help from them when using IB. Rotchanakitumnuai and Speece [39–41] referred to the managers' negative attitude as an influential factor in the adoption of CIB. Alam et al. [2] also pointed to the importance of this risk in adopting CIB among the corporate clients. Abeka [1], Jagero and Abeka [19] and Chen [9] emphasized the importance of a third party in creating a better and easier relationship in adopting CIB. The effect of friends' and people's negative attitude in adopting CIB in Chen's [9] study further confirms the significance of this risk among the corporate clients in adopting CIB.

2.3 The research model

The model used in the present study was developed based on the literature and the presented hypotheses drawing upon the perceived risk theory (PRT). The research hypotheses, as presented in Table 2, are as follows:

H: The risks (H1: time, H2: financial, H3: performance, H4: social, H5: security and H6: privacy) perceived by the corporate clients in CIB negatively affect their intent to adopt CIB (Fig. 1).

3 Research methodology

Paper-and-Pencil, self-administered questionnaire survey was used in the present study. The indices used for measuring each of the perceived risk dimensions were obtained from the literature and valid measures obtained from previous studies. The overlapping of the concepts was examined in the use of measures from previous studies and an attempt was made to take into account the comprehensiveness of the concepts used in the measures based on the previous studies. A five-point Likert scale was used in each index to evaluate the respondents' views ranging from "completely disagree" to "completely agree". To ensure content validity of the questionnaire, it was piloted with 10 participants. Table 2 presents the questionnaire indices for measuring each construct and their references. Also, in order to reduce the rate of non-response, introduction letter at the top of the questionnaire was used.

Table 2 The indices used in the questionnaire

Construct	Items		References
Time risk	Time 1	From my institution's perspective, changing and starting a new IB method and the need to have enough human resources for using it takes a lot of time	[3, 15, 26, 27, 29, 30, 40, 51]
	Time 2	According to my institution, a lot of time needs to be spent on learning how to use the IB services	
	Time 3	In my institution, it is believed that more time is need for performing banking transactions and, overall, it wastes time	
	Time 4	According to my institution, if we use IB system, a lot of time is needed to resolve the problems associated with the use of this system	
Financial risks	Fin 1	My institution is concerned that it may undergo losses if it uses IB for transferring money due to the possible mistakes in entering the wrong account number or the amount of money to be transferred	[2, 15, 26, 30, 40, 50, 51]
	Fin 2	My institution is worried that in cases of transaction errors or incomplete transactions, it cannot get back its lost money	
	Fin 3	My institution is concerned that it may lose control over its accounts and undergo potential losses due to abuse, being hacked or online banking fraud and lack of enough support and justice on behalf of the law	
	Fin 4	Using IB is uneconomical and does not give the possibility to save	
Performance risk	Per 1	From my institution's perspective, IB is not useful and accountable in banking transactions because a bank's server may not be working properly and, consequently, the payment process may not be properly completed	[1, 3, 15, 26, 27, 29, 33, 40]
	Per 2	From my institution's perspective, the IB system may not be working properly due to low internet speed or website maintenance operations and server breakdowns and, as a result, online transactions may not be completed	
	Per 3	My institution is worried that IB system cannot support the claimed advantages or provide customized services according to the institution's needs and demands	
	Per 4	My institution believes that using internet banking services causes disturbance in its activities and as a result decrease its efficiency and effectiveness in performing banking transactions	
	Per 5	IB does not provide efficient systems to help my institution in sharing the experiences with my bank and other clients	

Table 2 continued

Construct	Items		References
Social risk	Soc 1	In the case of using IB system, if the institution's bank account is hacked, it may lose its position among its social groups (friends, colleagues, family and other institutes)	[9, 15, 23, 27, 29, 30, 49, 51]
	Soc 2	Many of the institutions which are at the same rank as mine, the people who are important for my institution and those who cooperate with the institution think that my institution should not use IB	
	Soc 3	I have an undesirable feeling when using IB systems due to lack of direct contact with the bank employees to ask for help and it is important for my institution to have someone in the bank or institution to help in technical and non-technical issues related to IB	
Security risk	Sec 1	My institution does not feel secure when using IB in the case of sending and receiving financial information	[2–4, 9, 10, 14, 15, 26, 27, 30, 49–51]
	Sec 2	According to my institution, IB system has low security and can be easily accessed by unauthorized people like hackers	
	Sec 3	According to my institution, world wide web cannot be a good and secure area for performing financial transactions and my institution has no trust in the security of the web and the information presented in IB	
	Sec 4	Iranian courts do not have the ability to gather evidence and resolve bogus electronic transactions	
Privacy risk	Pri 1	My institution is concerned that using IB system banks provide its private information to others without notice	[3, 14, 15, 23, 29, 32, 40, 49–51]
	Pri 2	My institution does not trust the bank business on the internet in terms of its privacy policy and is concerned that hackers gets access to its checking account and personal information, which threatens the institution's privacy	
	Pri 3	Using a bank website for performing secure financial transactions increases the possibility of receiving unsolicited emails	
	Pri 4	The laws in Iran do not provide enough support for the corporate clients' privacy	

Table 2 continued

Construct	Items		References
Intention to use	Int 1	My institution intends to systematically use IB system in the future	[10, 15, 26, 29, 33, 48]
	Int 2	My institution intends to use IB for gaining quick and easy access to its banking information	
	Int 3	My institution intends to use IB in the future mainly for its banking needs	

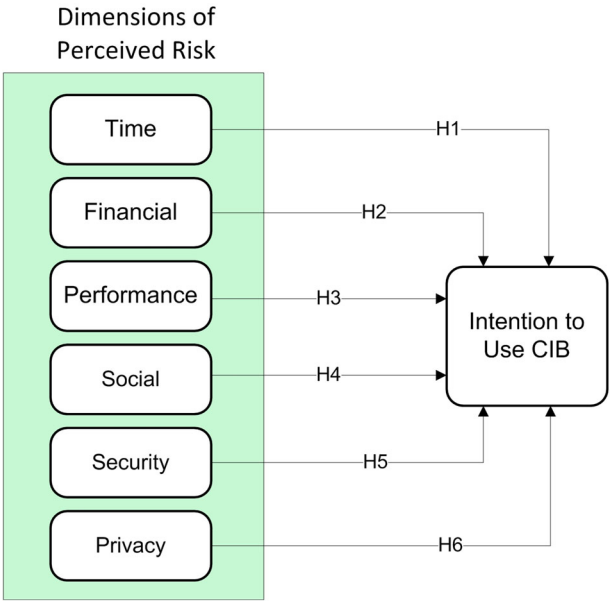

Fig. 1 Research model

The target population included the corporate clients of all bank branches in Tehran, Iran. The minimum required sample size was calculated 384 based on Tryfos' [45] formula and 370 based on Westland's [46] formula. The required sample population was randomly selected in Tehran and in locations like the private, state and cooperative companies and the companies that were a member of the Science and Technology Park in Tehran and the suburbs. The questionnaires were personally handed to respondents with a brief verbal introduction and then were collected. Two visits were made to remind those that did not complete the questionnaire. Data collection lasted two months in 2014. The selected sample satisfied the minimum requirements.

Descriptive statistics related to the respondents are presented in Table 3. Based on the results, out of the 486 collected questionnaires, 44 were incomplete and the other 442 were used for the analysis. Furthermore, out of the 442 companies, 311,

i.e., about 70% were private and the rest ($n = 97$) were state companies. In terms of the number of the personnel, a large proportion of the companies, i.e., about 30.8%, had less than 25 employees and a small proportion, i.e., about 3.2% of the companies, had more than 100 employees. Most of the respondents (about 30%) were accountants. Finally, 99.5% of all the respondents (the participating institutions) had a bank account and only 0.5% of the companies had no bank accounts. About 71% of these institutions using corporate internet banking.

4 Analysis

Structural equation modeling (SEM) was adopted as the main data analysis method. Among three statistical approaches account for almost all of the testing of path models, i.e., PLS-PA, AMOS–LISREL and systems of regression equations, AMOS–LISREL was selected to be used in the present study. AMOS–LISREL is a covariance-based SEM statistical approach, Which can account appropriately for the correlations between dependent variables, whereas considering the independent variables as independent in systems of regression equations may results in the overstatement of the unique effect of each one. In this approach, the model fit algorithms, correlated regression coefficients and correlated residuals are generated as standard output [47]. A critically important assumption in the use of AMOS–LIREL approach, is that the data are multivariate and normally distributed. This means that the SEM variables have to be normally distributed [43], Thus, before data analysis, it is important to check that this criterion has been met. Accordingly, Q–Q plots were drawn to check the normality of the measurement items, and no variables were observed to have heterogeneity. Moreover for normal distribution control, skewness and kurtosis values were analyzed. Because skewness values were between -1.243 and -0.386 and kurtosis values were between -0.744 and -0.512, they are both well within the acceptable threshold of ± 2, it can be stated that the data had normal distribution [25]. Then, we used SPSS 17 for descriptive analyses and LISREL 8.8 for the confirmatory factor analysis and structural equation modeling. The two-stage process, proposed by Anderson and Gerbing [5], was used for analyzing the data. First the measurement model is analyzed and then the structural relations among the latent constructs is examined.

4.1 Analysis of the measurement model

In the present study, average variance extracted (AVE) and composite reliability (CR) were used to fit the measurement model. In addition, confirmatory factor analysis (CFA) was conducted to test the model and establish discriminant and convergent validity. Table 4 presents the reported indices for each of the latent variables in the research model.

As shown in Table 4, the values related to CR were higher than 0.7 for all the constructs except the social risk perceived by the clients, which is indicative of a sufficient level of reliability. In the social risk construct, CR value was low due to the second question the load factor for which was less than 0.4 and insignificant.

Table 3 Respondents' demographic characteristics

Criterion	Factor	Frequency	Frequency percentage (%)	Criterion	Factor	Frequency	Frequency percentage (%)
Type of institute	Private	311	70	Number of employees	No answer	88	19.9
	State	97	22		Less than 25	136	30.8
	Cooperative	34	8		26 to 50	103	23.3
Respondent's position	Accountant	138	30		51 to 75	69	15.6
	Chief accountant	60	13		76 to 100	32	7.2
	Financial manager	71	16		More than 100	14	3.2
	Institute/project Director	88	21	Corporate IB use	Yes	314	71
	Employer/institute owner	83	20				
Corporate bank account	Has	440	99.5		No	128	29
	Does not have	2	0.5				

Table 4 Validation of the initial measurement model, composite reliability and convergent validity

Construct	Item	Factor loading	T value	CR	AVE
Time risk (TIM)	Tim 1	0.798	4.868**	0.805	0.558
	Tim 2	0.781	4.568**		
	Tim 3	0.605	3.194**		
	Tim 4	0.516	2.765**		
Financial risk (FIN)	Fin 1	0.501	2.331*	0.875	0.770
	Fin 2	0.635	2.890**		
	Fin 3	0.701	3.218**		
	Fin 4	0.695	2.760**		
Performance risk (PER)	Per 1	0.733	5.927**	0.752	0.482
	Per 2	0.735	5.855**		
	Per 3	0.754	7.650**		
	Per 4	0.416	2.524*		
	Per 5	0.166	1.425		
Privacy risk (PRI)	Pri 1	0.672	3.418**	0.854	0.725
	Pri 2	0.517	2.057*		
	Pri 3	0.912	3.823**		
	Pri 4	0.436	2.106*		
Security risk (SEC)	Sec 1	0.834	3.999**	0.849	0.683
	Sec 2	0.788	3.788**		
	Sec 3	0.417	1.978*		
	Sec 4	0.635	3.608**		
Social risk (SOC)	Soc 1	0.585	2.631**	0.602	0.430
	Soc 2	0.109	0.617		
	Soc 3	0.914	4.940**		
Intention to use (INT)	Int 1	0.817	28.185**	0.899	0.780
	Int 2	0.788	25.336**		
	Int 3	0.821	25.343**		

AVE average variance extracted, *CR* composite reliability

* $p < 0.01$; ** $p < 0.05$

This question was, accordingly, removed. AVE value for performance and social risk constructs were lower than 0.5, which indicates low convergent validity. To resolve this problem, the items with lower factor load (less than 0.4 and insignificant) related to each of the mentioned constructs (Per 5 and Soc 2) was deleted. These items also had the highest error values between their construct items (per 1=0.55, per 2=0.55, per 3=0.48, Per 4=0.43, Per 5=0.58; Soc 1=0.54; Soc 2=0.72; Soc 3=0.45). These revisions was done according to Anderson and Gerbing [5] recommendations.

Based on the analyses, after removing the invalid values and items (per 5, soc 2), the model was rerun. Table 5 presents the reported indices for each of the latent

variables in the research model after eliminating the items with low factor load. As shown in Table 5, all the minimum requirements were met for all the values.

Furthermore, after removing the variables with low factor load, Fornell and Larcker's [13] method was used to assess discriminant validity. As shown in Table 6, average variance extracted from each construct was greater than the variance shared between that construct and other constructs, which indicates discriminant validity of the model.

This study further tested whether common method variance (CMV) significantly exists to use one construct CMV to explain the variance of all items. Common method variance (CMV) was obtained using Harman's single-factor test [35]. The largest variance explained by an individual factor was 10.21%. Thus none of the

Table 5 Validation of the revised measurement model, composite reliability and convergent validity

Construct	Item	Factor loading	T value	CR	AVE
Time risk (TIM)	Tim 1	0.799	5.534**	0.805	0.558
	Tim 2	0.782	4.789**		
	Tim 3	0.602	3.359**		
	Tim 4	0.519	2.036*		
Financial risk (FIN)	Fin 1	0.503	2.331*	0.875	0.770
	Fin 2	0.636	2.829**		
	Fin 3	0.699	3.342**		
	Fin 4	0.694	2.856**		
Performance risk (PER)	Per 1	0.742	8.136**	0.832	0.625
	Per 2	0.741	9.241**		
	Per 3	0.758	12.729**		
	Per 4	0.480	3.224**		
Privacy risk (PRI)	Pri 1	0.673	3.408**	0.854	0.725
	Pri 2	0.514	2.241*		
	Pri 3	0.911	3.903**		
	Pri 4	0.439	2.354*		
Security risk (SEC)	Sec 1	0.838	3.628**	0.849	0.683
	Sec 2	0.786	3.247**		
	Sec 3	0.419	2.105*		
	Sec 4	0.631	3.892**		
Social risk (SOC)	Soc 1	0.689	2.895**	0.785	0.650
	Soc 3	0.912	3.146**		
Intention to use (INT)	Int 1	0.813	27.869**	0.899	0.780
	Int 2	0.785	30.74**		
	Int 3	0.826	31.613**		

CR composite reliability, *AVE* average variance extracted

* $p < 0.01$; ** $p < 0.05$

Table 6 Discriminant validity measurement matrix using Fornell and Larcker's [13] method after measurement model revise

Construct	FIN	INT	PER	PRI	SEC	SOC	TIM
FIN	**0.747**						
INT	−0.093	**0.877**					
PER	0.584	−0.198	**0.791**				
PRI	0.327	0.075	0.390	**0.851**			
SEC	0.432	−0.045	0.374	0.387	**0.826**		
SOC	0.170	0.110	0.147	0.225	0.307	**0.806**	
TIM	0.293	−0.086	0.417	0.222	0.168	0.064	**0.883**

The diagonal (bold) elements are the square root values of the AVEs. Off-diagonal elements represent the correlation between the constructs. For discriminant validity, diagonal elements should be greater than the corresponding non-diagonal elements

Table 7 Fit indices of models

Fit indices	Chi- square	Chi-square/*df*	RMSEA	NNFI	CFI	GFI	AGFI
Initial measurement model	566.21 ($df = 162$, $p = 0.001$)	3.495	0.082	0.952	0.958	0.912	0.887
Revised measurement model	247.46 ($df = 114$, $p = 0.012$)	2.171	0.035	0.983	0.986	0.935	0.910
Structural model	297.53 ($df = 128$, $p = 0.003$)	2.324	0.0424	0.9981	0.0986	0.933	0.910
Recommended value	$p > 0.05$	≤3.00	≤0.06	≥0.90	≥0.90	≥0.90	≥0.80

factors can explain the majority of the variance. We feel that CMV is not a significant problem in this research.

The overall fit of the initial and revised models is also reported in Table 7. As there is no perfect fit index, it is recommended that researchers employ a combination of fit indices to report their research results. Based on Hu and Bentler's [17] recommendation, to minimize errors under various conditions, an appropriate combination should contain both relative fit indices and non-centrality-based fit indices. The commonly suggested criteria for estimating overall model fit and the corresponding recommended values for accepting models [17] are also shown this tables. As shown in the first two rows of the Table 7, by excluding the items, a substantial drop in Chi square/*df* index (from 3.495 to 2.171). Substantial improvements in RMSEA were also observed (from 0.082 to 0.035). In addition,

Table 8 The values obtained from structural model

No.	From	To	β	R^2	T value	*P* value <	Supported?
H1	TIM	INT	−0.314	0.724	−2.875	0.01	Yes
H2	FIN		−0.371		−3.774	0.01	Yes
H3	PER		−0.573		−6.218	0.01	Yes
H4	SOC		−0.232		−2.241	0.05	Yes
H5	SEC		−0.402		−4.103	0.01	Yes
H6	PRI		−0.459		−4.722	0.01	Yes

improvements in the other reported indexes were obtained. Thus, the revised model shown in Table 7 received an adequate and good fit by all the fit indexes after excluding mentioned two items from the measurement model.

4.2 Structural model analysis and hypotheses testing

Once the measurement model estimation results demonstrated satisfactory reliability and validity as well as acceptable fit indices, we estimated the structural model. First, however, the same set of fit indices analyzed in the measurement section is used to examine the fit of the structural model. All fit indices exceeded the recommended levels for the structural model (see Table 7—Third row).

As argued by Anderson and Gerbing [5], when the measurement sub-model and alternate structural sub-models are simultaneously estimated, the pattern coefficient from the measurement model should change only trivially. As seen in Table 7, there is only one minor change from the measurement and the structural model. Thus, all metrics provide evidence that the structural model demonstrated a good fit for the observed data.

In general, structural equation modeling can be evaluated by two indices. The first is the path coefficients which show the power of relationship between the dependent and independent variables and the second is the R^2 values which represent the amount of variance explained by the independent variables and reflect the predictive power of the model. As shown in Table 7, the intent to use CIB is to a large extent influenced by time, performance, security, financial, privacy and social risks; jointly, they account for 72.4% of the variance in the clients' intent to use CIB.

As Table 8 clearly shows, H1 to H3, H5 and H6 were accepted at 99% significance. It means that performance, privacy, security, financial and time risks influence the intent to adopt CIB and their path coefficient values show that they have the highest effect respectively. H4 was also accepted with confidence coefficient of 95%. Accordingly, social risks also affects the intent to adopt CIB. Therefore, it can be stated that these six risks, i.e., performance, privacy, security, financial, time, and social risks influence the clients' intent to use CIB respectively.

Table 9 The results of comparison between findings of the present study and the Hanafizadeh and Khedmatgozar's [15] study

Order of importance	Current study (CIB)		Hanafizadeh and Khedmatgozar [26] (IB)	
	Risk dimension	Supported?	Risk dimension	Supported?
1	PER	Yes	TIM	Yes
2	PRI	Yes	PER	Yes
3	SEC	Yes	SEC	Yes
4	FIN	Yes	FIN	Yes
5	TIM	Yes	PRI	Yes
6	SOC	Yes	SOC	No

5 Discussion

As seen in Table 8, R^2 values have a high explanatory power in the presented model. In this section, first, the results will be analyzed focusing individually on each dimension of the perceived risk and solutions are provided to reduce these risks. Then, the findings are compared with Hanafizadeh and Khedmatgozar's [15] findings in the field of IB.

Drawing on the PRT, Hanafizadeh and Khedmatgozar [15] examined the effects of the dimensions of perceived risk on the bank clients' intent to use IB. The results indicated that except for social risk, all the other dimensions including time, performance, security, financial and privacy risks had a significantly negative impact upon the intent to adopt IB. A comparison between the findings of the present study and those of Hanafizadeh and Khedmatgozar [15] can help to explain the differences between the natural and legal customers in terms of the effects of perceived risks on adopting IB. The results of comparison are presented in Table 9. This comparison along with a comparison between the development of IB services and CIB services in Iran presented in Table 10 can also help to analyze the level of development of these services in Iranian banks and its role in adopting CIB.

The most important risk affecting the intent to use CIB is the performance risk. The institutions' concern in this respect is that the CIB server system may not work properly or face problems due to server breakdowns, maintenance and repair operations and also low web speed and that they may always see server breakdown and transaction failure messages. Consequently, it may result in incomplete payment. Another concern in this respect is that their bank may not satisfactorily provide the advantages, services and facilities they advertise for the CIB users or may provide services that do not accommodate the needs and demands of their institution. Based on the mentioned concerns, the following solutions are presented: (1) implementation of traffic management systems, (2) using server backup systems in CIB systems and making prior notifications to reduce this risk among the legal customers and increase their intent to adopt CIB [30].

Table 10 The results of comparison between personal and corporate IB services

Bank name	Personal IB services		Corporate IB services	
	Yes/No	Number of services	Yes/No	Number of services
Ayandeh	Yes	35	No	–
Day	Yes	42	No	–
Eghtesad Novin	Yes	19	Yes	17
Ghavamin	Yes	19	Yes	2
Karafarin	Yes	41	Yes	28
Keshavarzi	Yes	34	No	–
Maskan	Yes	36	Yes	9
Mellat	Yes	47	Yes	30
Melli	Yes	42	Yes	26
Parsian	Yes	22	No	–
Pasargad	Yes	41	No	–
Refah	Yes	22	Yes	15
Saderat	Yes	43	Yes	2
Saman	Yes	35	No	–
Sarmayeh	Yes	18	No	–
Sepah	Yes	43	Yes	8
Shahr	Yes	29	Yes	14
Sina	Yes	31	Yes	9
Tejarat	Yes	42	No	–
Tourism	Yes	35	No	–

The information provided in this table were obtained by face-to-face and telephone interviews and observation of the bank websites. The number of services specified based on protocol developed by researchers and counting is done based on it in October 2014

Based on the comparison between the two studies, as presented in Table 9, performance risk is the most important risk based on the findings of the previous study, which is due to the fact that in Iran CIB is at its early stages of development and has not reached a level of development and efficiency to be perceived by the companies and decrease their feeling of risk. Therefore, the high risk perceived by them is quite logical. But this risk is lower in IB compared to CIB due to its higher development. The comparison between personal and corporate IB presented in Table 9 clearly shows this.

The second influential risk in adoption of the intent to use CIB, in terms of significance, is the privacy risk. Inappropriate and illegal use of the customers' personal information by the banks without their notice and consent and its consequences such as receiving unwanted emails are among the major concerns of the legal customers with respect to this risk. The following solutions are presented for decreasing this risk: (1) keeping the customers informed about the articles of the Electronic Commerce Act, which holds the banks responsible for disclosing the CIB

customers' private information, (2) putting the protection of the CIB customers' private information in the quality policy of the banks and making notifications about it, (3) making notifications to the clients and creating trust in the protection of their privacy when they are opening an account, and (4) designing and implementing a CIB system that obviates the need for sending an email by the corporate clients. These solutions were mentioned by Bestavros [7] and confirmed in Aldas-Manazano et al.'s [3] study.

According to Table 9, in comparison with CIB, privacy risk is the fifth risk in terms of significance in IB. This is because in IB, when a person is doing his/her financial transactions, the issue of his/her privacy is limited to him/herself. That is s/he is careful about his/her personal information and is concerned that no one gets access to it and abuse it. But, in CIB the institutions' privacy is related to their accounting systems. Due to lack of transparency, accounting systems in Iran have two layers: real accounting systems and hidden accounting systems, which is to evade income tax. In this case, if the companies' and institutions' privacy is endangered, the information related to the hidden accounting books are easily revealed and exposed to others (for instance taxation) and they undergo financial losses.

Security risk is the third risk having a negative impact upon the intent to use CIB (see Table 9). Low internet security and, consequently, hackers' easy access when sending and receiving information and also shortcomings of Iranian law in identifying, tracking down and resolving bogus transactions are among the institutions' concerns in this regard. As a solution, banks can use different strategies such as Firewall, Filtering Routers, Callback Modems, Encryption biometrics, Smart Cards, Digital Certificates [31], and Two-factor Authentication systems [36]. But these concepts are vague to many legal customers. Familiarizing them with the technical and non-technical aspects can assure the legal customers that the bank is doing its best to ensure security of the CIB system. Another strategy that can encourage the clients to adopt CIB by creating a feeling of security in them is to familiarize them with different forms of fraud in CIB such as phishing [8] and provide guidance and instruction on how to protect themselves against these types of fraud. These cases and third-party trust certification bodies [3] can raise the customers' awareness of security considerations and, consequently, promote their intent to adopt CIB by reducing the perceived importance of this risk in their mind [15, 31].

In IB, because only one person is using the system, his/her security can be easily ensured by a unique username and password. But in CIB, several people use the same account. For example, in the bank account of an institute, there are three signers. These three signers should simultaneously confirm one transaction to be performed. In other words, when issuing checks for paying the staff salaries, the director, the financial manager and the accountant should simultaneously sign and confirm them. Therefore, ensuring the financial security for these three people is very difficult. Accordingly, security risk is quite high for these signers.

The fourth influential factor in the intent to adopt CIB is financial risk. Not being able to get compensation from the bank in the event of errors and incomplete transactions, fear of being hacked and abused and, consequently, losing control over

one's personal account and financial loss, lack of support by the law and the high cost of using a CIB system are among the concerns of the institutions with respect to this risk. The possible solutions to these problems include (1) developing and notifying the customers of instructions and guidelines that explain about the legal customers' rights and the banks' commitment in the area of CIB [20]; (2) notifying the customers of the articles of the Electronic Commerce Law based on the electronic documents obtained from CIB transactions; (3) planning, executing and notifying the customers of Consumer re assurance programme such as the After-sale redress policy; (4) notifying the customers of the possibility to approve a transaction while it is being performed, which decreases the possibility of error; and (5) developing the CIB services that increases the users' power in managing their personal account (such as the continuous payment plan) and making proper notifications [15].

Time risk is the fifth risk negatively affecting the intent to use CIB. The institutions are concerned about the long time it takes to change from a traditional banking system to CIB and to learn how to use this system and carry out bank operations or solve the likely problems due to payment failures and prompt delivery. Therefore, banks should take the required measures to decrease the possibility of payment delay and shorten the duration of the transactions and keep the customers informed about these measures. Appropriate instructions and guidelines should be prepared and provided to the legal customers so that they do not have to spend a long time to solve these problems. Creating telephone help centers can also be helpful for this purpose [15]. In another study, Yiu et al. [48] also suggested that by designing demonstration versions and advertising its use among the customers, banks can assure the customers that they can easily learn to use IB.

Time risk is the fourth significant risk in CIB but the first in IB. This difference can be attributed to the respondents' assumptions about the following: it is easier and faster to learn collectively in a institute next to the colleagues than to learn individually; the problems caused by mistakes can be resolved more quickly due to the higher formality of the legal compared to the natural clients; solving these problems becomes the responsibility of the finance department of the institute, which is not considered as time-wasting.

The results of the present study were consistent with the previous studies concerning the effects of different dimensions of perceived risk such as performance [1, 9, 19, 39–41], privacy risk [39–41], security risk [2, 9, 39–41], time risk [9, 39–41] and financial risk [2, 39–41].

The last risk found to be have an effect on CIB was social risk. Based on the findings, the institutions are concerned about their family's', friends' or colleagues' negative attitude to the use of CIB and also the possibility of receiving technical and non-technical instructions and manuals on the use of CIB systems from them. While the effect of this risk was confirmed on CIB, its effect on IB has been rejected. One of the reasons for the significant effect of this risk on CIB can be the fact that the institutes need to have more contact with the bank employees for performing their financial transactions, getting a loan or maintaining their financial relations considering their wideness and also the type of business they do. These relations between the bank employees and the institutions may bring certain advantages to

the institutions, which help them gain a competitive advantage. Therefore, they do not easily accept to lose these relations and contacts and with the change of contacts from physical to electronic they think that they are losing this channel of relations. The other reason might be that as CIB is not efficient enough at the present time and its use has not been accepted as a social norm. It means that considering the existing performance risk, if the institutions used CIB, their transactions would not be properly performed and, as a result, they would undergo financial losses and this would damage their reputation among the surrounding related institutions. Furthermore, the social status of the companies is lowered and it would not be an honor for the institution to use CIB.

6 Conclusion

The present study was an attempt to investigate the effects of each of the dimensions of perceived risk based on the PRT on the banks' corporate clients' intent to adopt CIB. The results were indicative of a significant relationship between all the risks and the intent to adopt CIB among the legal customers of the banks. The main risks decreasing the clients' intent to use CIB include performance, privacy, security, financial, time, and social risks. Based on the findings of the present study and the previous studies, suggestions were made for reducing the effects of these risks so that banks can decrease the risks perceived by their legal customers to adopt CIB using these solutions in the framework of marketing strategies such as pull–push, customer-orientation strategies [26] and technical strategies. In addition, the results showed that the risks perceived by natural and legal customers are different in nature. These differences can be attributed to two important factors, i.e., the business nature of the institutions and the process of the development of the CIB services by the banks.

As in the previous studies, the present study was constrained by certain limitations. The calculated beta value, which was the amount of variance explained by the perceived risk dimensions for the intent to adopt CIB, was 72.4%. It means that the rest of the variance can be explained by other variables. On this basis, future studies could examine other theories and variables. The second limitation is that doing a survey of institutions is more difficult than individuals. Due to the lack of trust, companies are reluctant to give information about their income as they worry about tax and insurance consequences. Finally, the present study and Hanafizadeh and Khedmatgozar's [15] study were conducted at different times. This time difference may make their comparison less rewarding. Taking this limitation into account, it should be also noted that banks in Iran have turned their attention to developing CIB rather than IB, and the rate of development of IB services in 2009, when Hanafizadeh and Khedmatgozar's [15] study was conducted, was similar to the rate of development of CIB at the present time (the present study). This relative correspondence can, to some extent, reduce the problem of time difference.

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