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MODELING PERCEIVED USEFULNESS ON ADOPTING ON LINE BANKING THROUGH THE TAM MODEL IN A CANADIAN BANKING ENVIRONMENT

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Abstract

Actually Internet is a powerful device that completes with satisfaction all other traditional channels used by banks. Based on the Technology Acceptance Model this paper focuses on the importance of the impact of two external latent variables 'Price' and 'Convenience' on the latent variable 'Perceived Usefulness' of online banking in a Canadian environment; the model highlights the predictive importance of this model and the accuracy of the results. Based on previous investigations in Spain the results are quite similar for the Canadian on-line banking environment and results explain without any doubt the level of 'Perceived Usefulness' in the TAM Model. Conclusions and recommendations are provided for future research.

Keywords: Technology Acceptance Model, Internet, on-line banking, 'Perceived Usefulness', Structural Equation Modeling, Canadian financial services.

INTRODUCTION

In the last years many important changes in the access of financial services have taken place in Canada; current usage and growth rates in the use of e-banking services (Fox 2005¹) suggest that there is a huge potential in the offer of related internet banking services. This situation has been offset by the necessity to reduce costs, increase revenues and sales and improve the quality of service finding new ways of doing business. The online banking allows customers to access information, do many banking operations (except perhaps cashing money) through a telecommunication network without leaving home or business in a complete virtual environment (Lallmahamood, 2007; Mukherjee and Nath, 2003).

The financial services offered by internet banking could include viewing all transactions and all accounts balances in real time, payment of bills, change of money in other

currencies, transfers of money, stocks operations, purchase of all kind of insurances, purchase of travel tickets and travel packages, etc.. (Ainin, Lim and Wee, 2005; Gerrard and Cunningham, 2003; Polatoglu and Ekin, 2001).

In a virtual environment there are two major factors to take into account when doing business: they are the risk of transactions first and the confidence that customers could give to a virtual address. Customers that do not feel confident about a virtual address will not be loyal and will not make business with the bank even if they are satisfied with it (Lee, Kwon and Schumann, 2005; Gerrard and Cunningham, 2003; Anderson and Srinivasan, 2003).

The purpose of this research is to analyze the adoption of the on-line banking services among Canadians based on the Technology Acceptance Modelⁱⁱ (TAM) (Mathieson, K, 1991; Davis, F, D, 1989) and the influence of the external latent variables 'Price' and 'Convenience' on the TAM latent dependent variable 'Perceived Usefulness'.

These external latent variables are very important and many authors think they should be added to the TAM Model; as the matter of fact, we will add them as external variables to the core TAM Model and test them in a North American environment, particularly in a Canadian financial environment.

THEORETICAL BACKGROUND

The TAM model latent variables

Ease of Use

The latent variable 'Ease of Use' is very important to accepting an information system because it is the basis of a system use (Davis, Bagozzi and Warshaw, 1989). The perceived 'Ease of Use' refers to the degree in which the future user thinks that the system use will be free of effort. A difficult system to use will be perceived as less useful by user and probably will be abandoned (Davis, 1989) by the user.

All researches offer evidence of significant effects of 'Ease of Use' perception on 'Intention to Use' directly or indirectly through 'Perceived Usefulness' and 'Attitude towards Using' (Venkatesh and Bala, 2008; Wixom and Todd, 2005; Moon and Kim, 2001; Venkatesh and Morris, 2000). 'Ease of Use' is a crucial factor for adopting and using services of banking on line (Gounaris and Koritos, 2008; Amin, 2007; Rigopoulos and Askounis, 2007). See hypothesis H1.

Perceived Usefulness

The TAM model is based on the Theory of Reasoned Action (TRA, Ajzen and Fishbein, 1975; Fishbein and Ajzen, 1980) that seeks explain behaviour and the intention of using a technology as well as factors that influence the user. The behaviour intention is determined by 'Perceived Usefulness' influenced by the technology 'Ease of Use' and the attitude by using this technology. The 'Perceived Usefulness' is defined as the subjective probability that user will increase its productivity using a specific application in

its work, this application will help them to do a better and more efficient job (Davis, Bagozzi and Warshaw, 1989).

See hypothesis H1.

Attitude towards Using

This latent variable is defined as the individual feeling towards behaviour objectives and realizations, it is a positive or negative feeling' evaluation. Nevertheless the bank customer attitude towards new bank technologies has been extensively analysed in many researches because they determine which people are more able to adopt new electronic channels (McKechnie, Winklhofer and Ennew, 2006; Al Sukkar and Hassan, 2005). It has been demonstrated that user attitude has a strong effect, direct and positive, on the real consumer intentions by using a new system or technology (Bobbitt and Dabholkar, 2001; Dishaw and Strong, 1999; Venkatesh and Davis, 1996). In conclusion, customers with a more positive attitude to new technologies will be more motivated to using new bank on line products and its financial services (Guerrero, Egea and Gonzalez, 2007).

See hypothesis H2.

Intention to Use

The Theory of Reasoned Action (TRA) as well as the TAM model says that technology use is determined by the intention to have a particular behaviour, the intention to use a technology. The behaviour to using a technology could be predicted measuring the intention and other factors influencing the user behaviour (Davis, Bagozzi and Warshaw, 1989). In the on-line banking context some authors confirm that there is a significant relation between 'Intention to Use' and the real use of banking operations by internet (Walker and Johnson, 2006).

See hypotheses H3 and H4.

The External Latent Variables to the TAM model

Price

Customers seem consider that they could obtain better prices using internet than going to the bank (Karjaluoto, Mattila and Pento, 2002; Sathye, 1999) due to the harsh competition between traditional banks outlets and on-line banking (Roman Gonzalez and Martinez Guerrero, 2004). There is a very stiff competition between bank offers of virtual financial services but that is not the case in Canada where there are only five major banks, all of them displaying on-line banking services as a complement to the services offered at the branch. In Canada, customers are clearly split on saying that on line banking permits them to save on the cost of their traditional financial operations. In other major countries customers are clearly solicited by internet and the prices services are very much competitive.

See hypothesis H5.

Convenience

Many customers think that to do business at the branch takes too much time and efforts (Pikksrainen, Pikksrainen, Karjalutoy, Pahnila, 2004), the 'convenience' is an advantage that customers associate with on-line banking (Karjaluto, Mattila and Pento, 2002) and appreciated by them (Lee, Kwon and Schumann, 2005; Sarel and Marmorstein, 2003). Canadian customers agree overwhelmingly with this affirmation. See hypothesis H6.

METHODOLOGY

The questionnaire

Data for this research are issued from a questionnaire handed out to a convenience sample of full time students in a Quebecer metropolitan university and received 225 fully useful responses, which include missing data.

The questionnaire is divided in 48 questions directly related to bank operations made by internet and 10 general questions related to gender; age; level of education; social and personal questions; questions directly related to using internet and general questions related to internet and banking services. All respondents are at least 18 years old, have a bank account and make some too many bank operations using internet.

Table 1: Sample description

Universe	People using internet for bank operations
Sample	People with a bank account using on line banking services
Regional Area	Ottawa-Gatineau area
Data Collect Method	Direct questionnaire
Sample Size	225 useful questionnaires
Collection Period	September-November 2010

Table 2 shows the four TAM model latent variables 'Ease of Use', 'Perceived Utility', 'Attitude towards Use' and 'Intention of Use', three external latent variables used in our model, as well as the observed variables (items) explaining the latent variables all measured on a five points Likert Scale ranging from 'not agree at all' to 'completely agree'. The items or observed variables are just a part from a more extended questionnaire; these items have been directly adapted from the referenced literature and from the authors mentioned in the table 2. We used multi-item scales adapted to the suitability of the research, the instrument was translated into French and a prior confirmatory factor analysis was also performed. Some items were deleted on substantive and statistical grounds (Anderson and Gerbing 1988ⁱⁱⁱ), as the result only 17 items remained but all very significant for $p < 0.000$.

Table 2: Items in the questionnaire

Items in the questionnaire	
Items (in French)	Adapted from
Attitude towards using	
5. Utiliser les services bancaires par internet est une bonne idée.	(Chau y Hu, 2002; Klopping y McKinney, 2004; Morris and Venkatesh, 2000; O’Cass y Fenech, 2003; Reid y Levy, 2008; Robinson, Marshall y Stamps, 2005)
6. En général, mon attitude sur l’usage des services bancaires par internet est positive.	(Lu y Lin, 2002)
Convenience	
18. J’aime l’idée de réaliser des opérations bancaires par internet car les horaires ne sont pas limités.	(Parasuraman and Colby, 2001)
19. Avec une connexion, internet me permet de faire de réaliser des opérations bancaires depuis n’importe où.	(Parasuraman and Colby, 2001)
Ease of Use	
24. Il est facile que les services bancaires fassent ce que je désire qu’ils fassent.	(Agarwal and Prasad, 1998; Chan and Lu, 2004; Chen, Gillenson y Sherrell, 2002; Davis, 1989; Pikkarainen, Pikkarainen, Karjaluoto and Pahnla, 2004; Robinson, Marshall and Stamps, 2005; Venkatesh, 2000; Venkatesh and Bala, 2008; Venkatesh and Davis, 1996, 2000; Venkatesh and Morris, 2000; Venkatesh, Speier y Morris, 2002)
25. Les services bancaires par internet sont clairs et compréhensibles.	(Agarwal y Prasad, 1998; Chen, Gillenson and Sherrell, 2002; Davis, 1989; Pavlou, 2003; Pikkarainen, Pikkarainen, Karjaluoto and Pahnla, 2004; Reid and Levy, 2008; Robinson, Marshall and Stamps, 2005; Venkatesh, 2000; Venkatesh and Bala, 2008; Venkatesh and Davis,

	1996, 2000; Venkatesh and Morris, 2000; Venkatesh, Speier and Morris, 2002; Wang, Wang, Lin and Tang, 2003)
26. Les services bancaires par internet sont d'un usage facile..	(Brown, Hoppe, Muger, Newman and Stander, 2004; Chan and Lu, 2004; Chen, Gillenson and Sherrell, 2002; Davis, 1989; O'Cass and Fenech, 2003; Pavlou, 2003; Pikkarainen, Pikkarainen, Karjaluoto and Pahnla, 2004; Robinson, Marshall and Stamps, 2005; Venkatesh and Bala, 2008; Venkatesh and Davis, 1996, 2000; Venkatesh and Morris, 2000; Venkatesh, Speier and Morris, 2002; Wang, Wang, Lin and Tang, 2003)
Intention to use	
31. Si j'avais accès aux services bancaires par internet je les utiliserais.	(Agarwal and Prasad, 1998; Chen, Gillenson and Sherrell, 2002; Pavlou, 2003; Robinson, Marshall and Stamps, 2005; Venkatesh, 2000; Venkatesh and Davis, 1996, 2000; Venkatesh and Morris, 2000; Venkatesh, Speier and Morris, 2002; Wang, Wang, Lin and Tang, 2003)
32. Je veux utiliser les services bancaires par internet plutôt que d'effectuer mes opérations au comptoir de la banque.	(Agarwal y Prasad, 1998)
33. J'ai l'intention dans l'avenir d'augmenter mon usage des services bancaires par internet.	(Chau y Hu, 2002; Lu and Lin, 2002; Pavlou, 2003; Reid and Levy, 2008; Wang, Wang, Lin and Tang, 2003)
Price	
36. Les opérations effectuées au comptoir de la banque sont plus coûteuses que celles des services bancaires par internet.	(Akinci, Aksoy and Atilgan, 2004)
37. L'usage des services bancaires par internet me permet d'économiser de l'argent.	(Chen, Gillenson, and Sherrell, 2002)

38. Grâce aux services bancaires par internet j'obtiens de meilleures conditions financières qu'à la banque.	(Chen, Gillenson, and Sherrell, 2002)
Perceived Usefulness	
45. Effectuer des opérations bancaires par internet permet d'économiser du temps.	(Chen, Gillenson y Sherrell, 2002; Davis, 1989)
46. Je trouve que les services bancaires offerts sur internet sont utiles.	(Brown, Hoppe, Muger, Newman and Stander, 2004; Chau and Hu, 2002; Chen, Gillenson and Sherrell, 2002; Davis, 1989; Klopping and McKinney, 2004; O'Cass and Fenech, 2003; Pavlou, 2003; Reid and Levy, 2008; Robinson, Marshall and Stamps, 2005; Venkatesh, 2000; Venkatesh and Bala, 2008; Venkatesh and Davis, 1996, 2000; Venkatesh and Morris, 2000; Venkatesh, Speier and Morris, 2002; Wang, Wang, Lin and Tang, 2003)
47. Les services bancaires par internet me permettent de gérer mes finances plus efficacement.	(Agarwal and Prasad, 1998; Brown, Hoppe, Muger, Newman and Stander, 2004; Chan and Lu, 2004; Chau and Hu, 2002; Chen, Gillenson and Sherrell, 2002; Davis, 1989; O'Cass and Fenech, 2003; Pikkarainen, Pikkarainen, Karjaluoto and Pahlila, 2004; Reid and Levy, 2008; Robinson, Marshall and Stamps, 2005; Venkatesh, 2000; Venkatesh and Bala, 2008; Venkatesh and Davis, 2000; Venkatesh and Morris, 2000; Venkatesh, Speier and Morris, 2002)
48. La plupart des opérations bancaires que j'ai besoin d'effectuer sont disponibles en services bancaires par internet.	(Akinci, Aksoy and Atilgan, 2004)

The model is analyzed using Structural Equation Modeling; the original TAM model presents four latent variables, the 'Perceived Usefulness' using internet for banking

operations, 'Attitude towards Use' of internet for banking operations and the 'Intention of use'. We added two external latent variables 'Price', and 'Convenience'.

VALIDATION OF SCALES

The scales of measure used in this research comply with all psychometric criteria establish in literature; in the TAM model, the latent variable 'Ease of Use' has been measured by three items, 'Perceived Usefulness' by four items, 'Attitude towards Use' by two items and the 'Intention of Use' by three items. As stated before, we added two external latent variables or dimensions, 'Price' measured by three items, 'convenience' represented by two items. Each item has been measured in a five points' scale ranging from 'not agree at all' to 'completely agree'. The results obtained for the reliability analysis show that all Cronbach's Alpha for the latent variables are significant and superior to 0,70, like in table 6^{iv} (except for 'Convenience').

Before analyzing convergent and discriminant validity we proceeded to perform a confirmatory factor analysis (Table 3) with those latent variables showed in figure 1. We kept only those loadings superior to 0.60 (Hair *et al.*, 1999; Bagozzi and Baumgartner, 1994; Bagozzi and Yi, 1988).

**Table 3 : Standardized Regression Weights for the Factorial Confirmatory Model
Standardized Regression Weights: (Group number 1 - Default model)**

		Estimate
Q45_SBI_permet_économiser_temps	<--- Perceived Usefulness	.781
Q46_Je_trouve_SBI_utiles	<--- Perceived Usefulness	.891
Q47_SBI_permet_gérer_finances_personnelles_efficacement	<--- Perceived Usefulness	.778
Q6_Attitude_positive_sur_SBI	<--- Attitude towards using	.936
Q5_SBI_bonne_idée	<--- Attitude towards using	.897
Q31_Si_avais_accès_aux_SBI_je_les_utiliserais	<--- Intention to use	.758
Q32_Veux_utiliser_SBI_plutôt_que_comptoir	<--- Intention to use	.795
Q33_Intention_augmenter_usage_SBI	<--- Intention to use	.760
Q26_Usage_facile	<--- Easy of Use	.751
Q25_SBI_clairs_compréhensibles	<--- Easy of Use	.840
Q24_Usage_SBI_fait_ce_que_je_veux_pour_moi	<--- Easy of Use	.692
Q48_Plupart_opérations_bancaires_SBI_disponibles	<--- Perceived Usefulness	.663
Q36_Opérations_comptoir_plus_coûteuses_que_SBI	<--- Price	.756
Q37_Usage_SBI_permet_économiser_argent	<--- Price	.840
Q38_Grâce_SBI_meilleures_conditions_financières_que_banque	<--- Price	.683
Q18_Aime_idée_réaliser_SBI_pour_horaire	<--- Convenience	.881
Q19_Avec_connexion_SBI_n_importe_où	<--- Convenience	.394

Table 3 bis: Correlations between latent variables

		Estimate
Price	<--> Perceived Usefulness	.395
Price	<--> Intention to use	.464
Price	<--> Attitude towards using	.283
Price	<--> Easy of Use	.271
Perceived Usefulness	<--> Intention to use	.841
Perceived Usefulness	<--> Attitude towards using	.814

			Estimate
Perceived Usefulness	<-->	Easy of Use	.688
Attitude towards using	<-->	Intention to use	.828
Intention to use	<-->	Easy of Use	.648
Attitude towards using	<-->	Easy of Use	.646
Convenience	<-->	Price	.280
Convenience	<-->	Perceived Usefulness	.747
Convenience	<-->	Intention to use	.715
Convenience	<-->	Attitude towards using	.723
Convenience	<-->	Easy of Use	.508

The table 4 shows that the confirmatory factor analysis model responds to the major acceptable criteria. Incremental indices CFI and the IFI are superior to 0.90 and the RMSEA is inferior to 0.09, so the model could be considered as significant (Q19 has been erased because it does not comply with the minimum loading 0.60, the next model fit indices for a re-specified factor model have been computed without this variable).

Table 4: Confirmatory Model Fit

Chi-Square	Degrees of Freedom	Probability	NFI	IFI	CFI	TLI	RMSEA
170.590	90	0.000	0.923	0.962	0.961	0.942	0.063

These tables allow us to confirm that the Critical ratios or Student T tests are very significant for $p < 0.05$ ($T > 1.96$) and there is a significant convergent validity between the observed and the latent variables of the model.

The next stage will evaluate discriminant validity to identify the specificity of each factor (or latent variable); for this reason correlations between factors should not be superior to the 0.80 value. Correlations between 'Perceive Usefulness' (PU) and 'Attitude towards Using' (AU) (0.814) and 'Intention to Use' (0.841) as well as 'Attitude towards Using' (AU) and 'Intention to Use' (IU) (0.828) do not respect this criteria. Usually the square root of the extracted average variance (AVE) should be superior to the correlation between latent variables, this makes that the correlation between 'Attitude towards Using' (AU) and 'Intention of Use' (0.828) should be acceptable because it is inferior to the AVE square root 0.915 (Fornell and Larcker, 1981). In conclusion we can say that there is substantial suspicion of lack of discriminant validity between 'Perceived Usefulness' and 'Intention to Use' (0.784 versus 0.841) and some between 'Perceived Usefulness' with 'Attitude towards Using' (0.784 versus 0.814).

Table 5. Correlation between Latent Variables for the TAM Model. In diagonal the AVE square roots

Latent Variables	EU Ease of Use	PU Perceived Usefulness	AU Attitude towards Using	IU Intention to Use	Price	Convenience
EU	0.761					

PU	0.688	0.784				
AU	0.646	0.814	0.915			
IU	0.648	0.841	0.828	0.772		
Price	0.271	0.395	0.283	0.464	0.571	
Convenience	0.508	0.747	0.723	0.715	0.280	0.560

The AVE figures in the table 6 represent the average extracted variance for each latent variable, they are superior to 0.50 which is usually recommended and accepted (Fornell and Larcker, 1981). The reliability and the Cronbach's alpha are superior to 0.70 (with exception of 'Convenience' which has a very low loading for Q19, this variable has been suppressed) which means that the instrument is reliable.

Table 6. Reliability Measures and Average Extracted Variance

Latent Variables	Cronbach's Alpha	Reliability	AVE
EU	0.795	0.805	0.580
PU	0.846	0.862	0.615
AU	0.795	0.918	0.839
IU	0.818	0.816	0.596
Price	0.802	0.805	0.571
Convenience	0.515	0.673	0.560

Traditional criteria were used to analyze measurement reliability and validity, Cronbach's alpha values (with the exception of 'Convenience') and Average Variance Extracted measures provided evidence of reliability measurement (Fornell and Larcker 1981; Nunnally and Bernstein, 1994). The results indicate a reasonably good fit between the factor model and the observed data, the main fit indices are significant, (Chi-Square= 150.590, df=90, p<0.000), the Comparative Fit Index (CFI)= 0.961, the Tucker Lewis Index (TLI)= 0.942 and the RMSEA= 0.063.

In conclusion we can say that once tested, the scales comply with all psychometric properties established in the literature; next we will present the hypothesis the model will have to test.

THE TAM MODEL

Many versions of the TAM model have been used in different settings; here we will adapt the general model for the banking services offered on line. The actual technology seems particularly suitable to the internet operations for banking services (see figure 1). As stated before we added two external latent variables to the traditional TAM Model: 'Price' and 'Convenience' then, we will test the next set of hypothesis:

Hypothesis related to the TAM Model

H1. There is a significant positive relationship between the 'Ease of Use' and the 'Perceived Usefulness' of banking by internet.

H2. There is a significant positive relationship between the 'Perceived Usefulness' and 'Attitude towards Using' banking by internet.

H3. There is a significant positive relationship between the 'Perceived Usefulness' and 'Intention to Use' banking by internet.

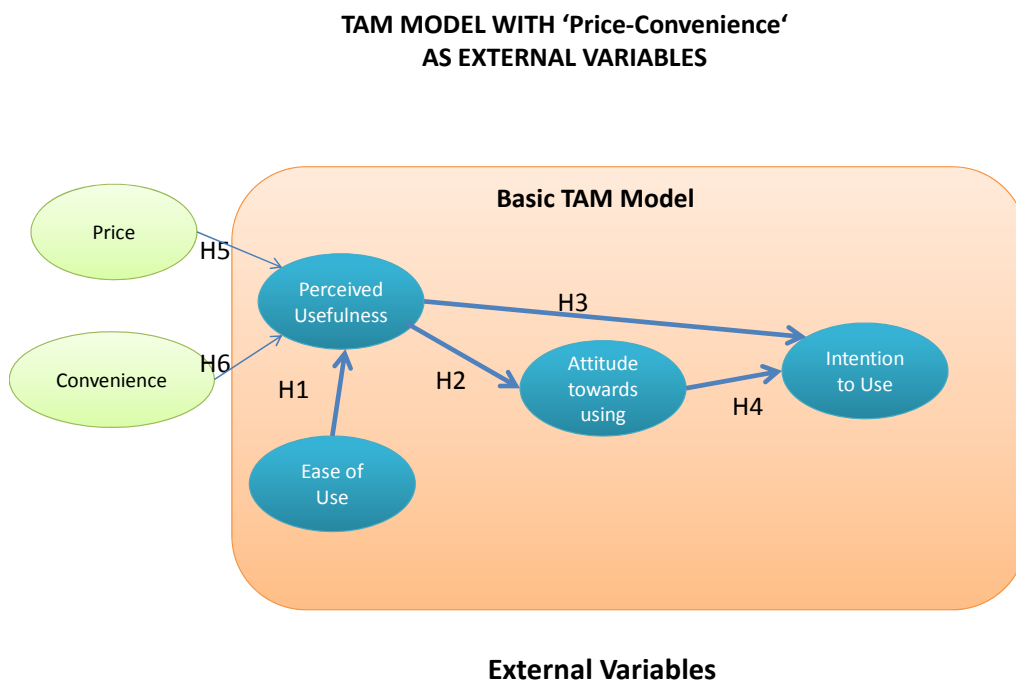
H4. There is a significant positive relationship between 'Attitude towards Using' and 'Intention to Use' banking by internet.

Hypothesis involving external variables

H5. There is a significant positive relationship between 'Price' and 'Perceived Usefulness'.

H6. There is a significant positive relationship between 'Convenience' and 'Perceived Usefulness'.

Figure 1. TAM Model and External variables hypotheses



Results

The TAM Structural Model

The TAM structural model applied to on-line banking for services offered in Canada are highly significant. Table 7 shows that the Comparative Fit Index of the global model is superior to 0.90 as well as the Incremental Fit Index, the RMSEA is inferior to 0.09 and the confidence interval ranges from 0.069 to 0.09 which is highly acceptable.

Table 7: Fit Indices for the TAM Model with External Variables

Chi-Square	Degrees of Freedom	Probability	NFI	IFI	CFI	TLI	RMSEA
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249.654	98	0.000	0.888	0.929	0.927	0.899	0.083
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The TAM model has also a high predictable capability. All R² (or explained variances) displayed in Table 8 are superior to 0.50; for the variable ‘Perceived Usefulness’ the prediction strength increases with the introduction of two external variables ‘Price’ and ‘Convenience’; comparing with the TAM basic model, the prediction increases 0.206 for ‘Perceived Usefulness’, and it remains stable with a slight decrease for the two other latent variables.

Table 8: Capability of Prediction for the basic TAM model versus the TAM Model with External Variables

Latent Variables	Ease of Use	Perceived Usefulness	Attitude towards Using	Intention to Use
R ² for the TAM Model with the three external variables	-	0.701	0.681	0.750
R ² for the basic TAM Model without external variables	-	0.495	0.691	0.763

Regression Weights and Measurement Model

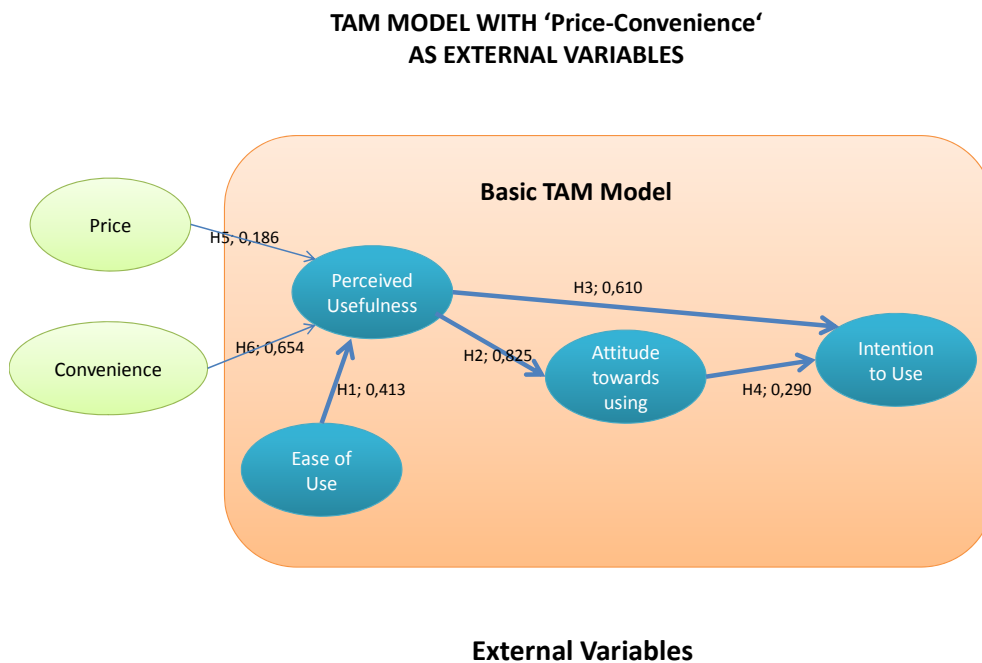
Table 9 shows the standardized estimates for all relationships between latent variables of the structural model as well as loadings for all items on latent variables. All standardized regression weights are significant for p<0.05 (Student T or Critical Ratios are >1.96).

Table 9: Standardized Regression Weights for the TAM Model

		Estimate
Perceived Usefulness	<--- Easy of Use	.413
Perceived Usefulness	<--- Price	.186
Perceived Usefulness	<--- Convenience	.654
Attitude towards using	<--- Perceived Usefulness	.825
Intention to use	<--- Attitude towards using	.290
Intention to use	<--- Perceived Usefulness	.610
Q45_SBI_permet_économiser_temps	<--- Perceived Usefulness	.723
Q46_Je_trouve_SBI_utiles	<--- Perceived Usefulness	.846
Q47_SBI_permet_gérer_finances_personnelles_effacement	<--- Perceived Usefulness	.733
Q6_Attitude_positive_sur_SBI	<--- Attitude towards using	.910
Q5_SBI_bonne_idée	<--- Attitude towards	.897

		Estimate
	using	
Q31_Si_avais_accès_aux_SBI_je_les_utiliserais	<--- Intention to use	.721
Q32_Veux_utiliser_SBI_plutôt_que_comptoir	<--- Intention to use	.773
Q33_Intention_augmenter_usage_SBI	<--- Intention to use	.741
Q26_Usage_facile	<--- Easy of Use	.753
Q25_SBI_clairs_compréhensibles	<--- Easy of Use	.866
Q24_Usage_SBI_fait_ce_que_je_veux_pour_moi	<--- Easy of Use	.664
Q48_Plupart_opérations_bancaires_SBI_disponibles	<--- Perceived Usefulness	.627
Q36_Opérations_comptoir_plus_coûteuses_que_SBI	<--- Price	.748
Q37_Usage_SBI_permet_économiser_argent	<--- Price	.847
Q38_Grâce_SBI_meilleures_conditions_financières_que_banque	<--- Price	.683
Q18_Aime_idée_réaliser_SBI_pour_horaire	<--- Convenience	1.000

Figure 2. TAM Model and External variables hypotheses tested



HYPOTHESES TESTING AND DISCUSSION

Table 10 shows the results of hypothesis testing relative to the TAM Model; hypotheses H1, H2, H3 and H4 are accepted and are perfectly significant and all these hypotheses corroborate the nomological structure of the model.

The relation 'Ease of Use' to 'Attitude towards Using' as well as 'Ease of Use' to 'Intention to Use' have not been added because they are not significant to the model for $p < 0.05$.

Without the direct relation 'Perceived Usefulness' to 'Intention to Use' the regression weight value between 'Attitude towards Using' to 'intention to Use' should have been 0.610 (significant for $p < 0.05$) and significantly high in comparison to 0.290 (with the relation 'Attitude towards Using' to 'Intention to Use').

Table 10: Hypothesis testing and results

H1	Ease of Use → Perceived Usefulness	0.413	accepted
H2	Perceived Usefulness → Attitude towards Using	0.825	accepted
H3	Perceived Usefulness → Intention to Use	0.610	accepted
H4	Attitude towards Using → Intention to Use	0.290	accepted
H5	Price → Perceived Usefulness	0.186	accepted
H6	Convenience → Perceived Usefulness	0.654	accepted

The TAM Model applied to on-line banking with the two external variables 'Price' and 'Convenience' applied to 'Perceived Usefulness' represents a substantial and significant increase in the model predictability (table 8).

In conclusion, our model integrates all latent variables of the TAM original Model; they are all significant and the TAM Model could easily be applied to analyze the adoption of on line banking on a Canadian environment in North America (Davis, Bagozzi, Warshaw, 1989).

Limitations

This research has some limitations; the first one could be the sample selection, which is made of university students that have a banking account and generally use on line banking and have proven abilities in computer manipulation. These people are very opened to new technologies; they enjoy using them and in majority prefer to have an internet connection with their bank instead to go to the branch to perform some operations. For these reasons they think they control reasonably well on line banking operations over internet. It would be interesting examining if we obtain the same results over on line banking operations with other people than university students.

Management Implications

To attract people and new users to online banking, banks and credit unions should offer a complete selection of financial services based on perceived usefulness and not only with an easy system to manipulate. Banks and credit unions should offer utility completing the financial services in internet at the same level than those they offer at the branch. Banks should differentiate the products they offer from those of competitors' and this differentiation will not come from technology or products' complexity but from innovation and creativity. Actually Canadian banks offer some financial products by internet that you can only manage by on-line banking.

A common problem with on-line banking is to lose financial counselling you normally get when going to the bank and for that reason it is important for user-customer to have an easy access to direct help through special phone numbers for customer support, chat

opportunity and customer e-mail help and support as well as develop all channels to interaction between bank branch and users.

Banks in Canada are trying to start direct communication with their customers through special e-mail accounts that they give to their customers; some countries are using Facebook or Twitter as communication channels in both directions for sharing news of interest, offering new products, financial counselling and even to manage customer' complaints. This way of doing things by social networks seems very much appreciated in some European countries.

CONCLUSIONS

The TAM model is strongly supported in a Canadian banking environment (and more specifically in Québec), the influence of the 'Perceived usefulness' on 'Attitude towards using' is very strong as well as the 'Attitude towards using' on the 'Intention of use' banking on line.

Our findings have significant meaning to encourage Canadian people to use internet for making all their personal banking operations in a secure, easy and self efficacy way. All Canadian banks or Credit Unions operating in all provinces should be encouraged to continue investing and developing services offered in the net (particularly for people that do not have an easy access to a branch) and complete the financial services offered by e-mails, telephone, internet, on line help, chats and all means that will permit and accelerate communication.

We would like also notify that the social networks as Facebook or Twitter are extensively used in other countries to inform customers, to chat with bank representatives or to lodge a formal complaint, this avenue should be explored by Canadian financial institutions to improve communication with customers.

In conclusion to attract customers, banks should develop usefulness completing financial products' offer on internet at a very close level they offer at the branch. This is good for the customer and for controlling bank costs (Wang, Wang, Lin and Tang, 2003).

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APPENDIX A – SURVEY INSTRUMENT- (in French as handed out)

QUESTIONNAIRE

Bonjour,

Le but de ce questionnaire est de connaître votre utilisation des services bancaires par Internet offerts par les banques, les caisses d'économie comme Desjardins et les autres institutions financières, que vous soyez usager ou non. Ce questionnaire est confidentiel. Nous vous présentons une série d'affirmations pour lesquelles vous exprimez votre niveau d'accord ou de désaccord sur une échelle de 1 à 5 où le chiffre 1 représente l'assertion *complètement en désaccord* et le chiffre 5 *complètement d'accord*.

Complètement en désaccord	1	2	3	4	5	Complètement en d'accord
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Complètement
d'accord

1. Je pourrais réaliser des opérations bancaires sur internet sans l'aide de personne.	1	2	3	4	5
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2. Je pourrais réaliser des opérations bancaires sur internet sans l'avoir fait auparavant.	1	2	3	4	5
3. Je pourrais réaliser des opérations bancaires sur internet avec les informations d'aide fournies par la banque sur son site Internet.	1	2	3	4	5
4. Je pourrais réaliser des opérations bancaires sur internet s'il existait un numéro de téléphone d'aide auquel je pourrais appeler en cas de problèmes ou de doutes.	1	2	3	4	5
5. Utiliser les services bancaires par Internet est une bonne idée.	1	2	3	4	5
6. En général, mon attitude sur l'usage de services bancaires par Internet est positive.	1	2	3	4	5
7. La qualité de l'information offerte pour les services bancaires par Internet est élevée.	1	2	3	4	5
8. La qualité des opérations des services bancaires effectuées par Internet est élevée.	1	2	3	4	5
9. L'utilisation des services bancaires par Internet est compatible avec mon style de vie.	1	2	3	4	5
10. L'usage de services bancaires par Internet s'ajuste bien à la façon dont j'aime effectuer les opérations bancaires.	1	2	3	4	5
11. Mon institution bancaire maintient ses promesses et ses engagements.	1	2	3	4	5
12. Je suis satisfait des produits et services offerts par ma banque.	1	2	3	4	5
13. J'ai confiance en ma banque car elle tient compte de mes intérêts.	1	2	3	4	5
14. J'ai un bon contrôle des opérations bancaires par Internet.	1	2	3	4	5
15. J'ai les connaissances informatiques nécessaires pour utiliser les services bancaires par Internet.	1	2	3	4	5
16. J'ai les connaissances financières nécessaires pour utiliser les services bancaires par Internet.	1	2	3	4	5
17. J'ai les ressources nécessaires (ordinateur, connexion) pour utiliser les services bancaires par Internet.	1	2	3	4	5
18. J'aime l'idée de réaliser des opérations bancaires par Internet car les horaires ne sont pas limités.	1	2	3	4	5
19. Avec une connexion, Internet me permet de réaliser des opérations bancaires depuis n'importe où.	1	2	3	4	5
20. Je crois que je pourrais communiquer à d'autres gens les avantages et les inconvénients de l'usage des services bancaires par Internet.	1	2	3	4	5
21. Les résultats de l'usage des services bancaires par Internet sont évidents pour moi.	1	2	3	4	5
22. L'usage des services bancaires par Internet est amusant.	1	2	3	4	5
23. L'usage des services bancaires par Internet est agréable.	1	2	3	4	5
24. Il est facile que les services bancaires par Internet fassent ce que je veux qu'ils fassent pour moi.	1	2	3	4	5
25. Les services bancaires par Internet sont clairs et compréhensibles.	1	2	3	4	5
26. Les services bancaires par Internet sont d'un usage facile.	1	2	3	4	5
27. L'usage des services bancaires par Internet requiert trop d'effort mental.	1	2	3	4	5
28. L'usage des services bancaires par Internet augmente mon statut social parmi mes connaissances.	1	2	3	4	5
29. Je retire plus de prestige professionnel parmi mes connaissances en utilisant les services bancaires par Internet que les personnes qui ne le font pas.	1	2	3	4	5
30. Utiliser les services bancaires par Internet est à la mode.	1	2	3	4	5
31. Si j'avais accès aux services bancaires par Internet je les utiliserais.	1	2	3	4	5

32. Je veux utiliser les services bancaires par Internet plutôt que d'effectuer mes opérations au comptoir de la banque.	1	2	3	4	5
33. J'ai l'intention dans l'avenir d'augmenter mon usage des services bancaires par Internet.	1	2	3	4	5
34. Les personnes qui m'influencent pensent que je devrais utiliser les services bancaires par Internet.	1	2	3	4	5
35. Les personnes importantes pour moi (amis et famille) pensent que je devrais utiliser les services bancaires par Internet.	1	2	3	4	5
36. Les opérations effectuées au comptoir de la banque sont plus coûteuses que celles des services bancaires par Internet.	1	2	3	4	5
37. L'usage des services bancaires par Internet me permet d'économiser de l'argent.	1	2	3	4	5
38. Grâce aux services bancaires par Internet j'obtiens de meilleures conditions financières qu'à la banque.	1	2	3	4	5
39. Effectuer des opérations bancaires peut supposer des pertes d'argent.	1	2	3	4	5
40. J'ai confiance que les systèmes de sécurité des services bancaires par Internet protègent mes comptes et mes données personnelles.	1	2	3	4	5
41. L'utilisation des services bancaires par Internet augmente les possibilités que des personnes non autorisées obtiennent mes données personnelles et bancaires.	1	2	3	4	5
42. Mes amis et camarades de travail me considèrent comme une bonne source d'information et de conseils pour Internet.	1	2	3	4	5
43. Mes amis et camarades de travail me demandent des conseils sur Internet et sur les pages web à visiter.	1	2	3	4	5
44. Habituellement j'aime essayer de nouveaux produits.	1	2	3	4	5
45. Effectuer des opérations bancaires par Internet permet d'économiser du temps.	1	2	3	4	5
46. Je trouve que les services bancaires par Internet sont utiles.	1	2	3	4	5
47. Les services bancaires par Internet me permettent de gérer mes finances plus efficacement.	1	2	3	4	5
48. La plupart des opérations bancaires que j'ai besoin d'effectuer sont disponibles par services bancaires par Internet.	1	2	3	4	5

Voici des questions d'ordre général. Le questionnaire est anonyme et confidentiel. S'il y a des questions auxquelles vous ne souhaitez pas répondre, n'écrivez rien..

D.1 Genre ☐ Féminin ☐ Masculin	D.2 Âge ____ ans	D.3 Niveau d'études complété ☐ Études primaires ☐ Études secondaires ☐ Études techniques, collégiales ou universitaires	D.4 J'habite ... ☐ Dans un village ou une zone rurale ☐ Dans une ville petite ou moyenne ☐ Une grande ville
D.5 Mon état civil... ☐ Célibataire ☐ Marié/e ☐ Conjoint de fait ☐ Divorcé/e ☐ Séparé/e ☐ Veuf/ve		D.6 Les revenus bruts de ma famille sont de _____ dollars par année.	
D.7 J'ai Internet à la maison ☐ NON ☐ OUI avec connexion ...		D.8 Mon niveau de connaissances en informatique? ☐ Débutant ☐ Moyen ☐ Avancé ☐ Expert	
D.9 Je suis un usager d'Internet ☐ NON (passer à D10)		D.10 Je suis un usager des services bancaires par Internet? ☐ NON	