The adoption of commercial innovations in the former Central and Eastern European markets: the case of Internet banking in Estonia

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Abstract

Purpose – Businesses developed in Western markets may be so new to emerging and developing markets that they can be considered innovations. Knowledge of innovation adoption is therefore essential for western firms that expand into these markets.

Methodology – The data presented in this study are based on 1,831 questionnaires collected from individual Internet banking users in Estonia.

Findings – This study extends the applicability of the innovation adoption model developed by Everett Rogers to Estonian Internet banking. Estonia is one of the fastest-growing Central and Eastern European (CEE) economies. Internet use is more advanced in Estonia than in many Western countries. Because Western banking is steeped in tradition, it is essential to study adoption of innovations by Estonian banks, which, in many respects, have leapfrogged the development path that Western banks experienced.

Practical implications – The managerial implications of this paper include its contributions toward better understanding of the commercial viability in CEE economies of businesses based on Western-style technology.

Originality/value – This study suggests modifications to Rogers’s original model in order to apply it to the fast-growing new CEE economies, thus reaffirming the importance of his model.

Keywords: Innovations; Estonia; Emerging markets; Internet banking; Financial service.

Paper type: Research paper

Biographical sketches

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Introduction

The adoption of innovations in emerging and recently developed economies is an issue of great commercial importance not only to developed economies but also to the world economy at large. Determinants of innovation adoption may include the perceived attributes of an innovation, the voluntary nature of the decision to adopt it, and the channels by which an innovation reaches the adopter (Rogers, 1995). However, there is no consensus as to the relative influence of these factors, and they vary with the kind of innovation adopted (Gatignon and Robertson, 1985). Tornatzky and Fleischer (1990) have defined innovation as “the situationally new development and introduction of knowledge-derived tools, artefacts and devices by which people extend and interact with their environment”. This definition answers a call by Rogers to consider situational and environmental contexts of innovation adoption (Rogers, 1976). This study aims to examine innovation adoption in the context of Internet banking in Estonia because it is one of the fastest growing former Central and Eastern European (CEE) countries and because predispositions of Estonian consumers differ from those in the West (Lim *et al.*, 2004; Midgley and Dowling, 1993). A considerable number of research studies have explored the influence of national culture in the business domain; however, only a limited number have investigated its influence on the diffusion of products across countries (Dwyer *et al.*, 2005). Based on innovation adoption theory, this study investigates the use of Internet banking in an emerging market. The competitiveness of Western firms in emerging markets depends on the adoption in those markets of the technology that Western firms use. This study of Estonian Internet banking adoption thus has wider implications for the competitiveness of Western firms in emerging markets and provides clues as to what factors are the most important for Western firms to adopt.

In this decade, the Internet has fundamentally changed the ways in which consumers conduct their everyday banking activities. Given the successful application and widespread use of Internet banking, it is surprising that Gerrard and Cunningham (2003) identified only six studies investigating issues related to its adoption. This study adds to the large body of innovation adoption research by testing the applicability of the model in the post-adoption phase (Shih and Venkatesh, 2004). Innovation adoption theory has been used mostly to predict mental acceptance rather than actual adoption (Nabih *et al.*, 1997). To the best of our knowledge, our study is the first attempt to apply innovation adoption theory to an Internet-mediated service by employing quantitative data analysis and by modelling use, rather than intention to adopt.

This study begins with an overview of Internet banking use in Estonia and continues with a theoretical analysis of innovation adoption in general, followed by hypotheses regarding the adoption of Internet banking in Estonia. The study then describes data and methods and concludes with results and discussion.

Internet banking use in Estonia

Estonia, with one of the highest levels of Internet banking in the world, has a constantly growing part of its population using such banking. It is therefore important to examine what affects customers' usage of Internet banking in Estonia. This study aims to investigate how Estonian consumers' Internet banking adoption is influenced by their perceptions about compatibility, complexity, relative advantage and perceived risk.

Empirical data for this study were collected in Estonia, the leading CEE country in both Internet use and Internet banking adoption. Estonia's success can be gauged by several statistical data (e.g. 60 per cent of the population aged 6 to 74 currently uses the Internet) (Emor, 2006). During the research period, the usage rate was 45 per cent (Emor, 2003), and 57 per cent of

Internet users have used an Internet bank during the past 6 months (Emor, 2002). Thus, it is clear that adoption of Internet banking is no longer in its infancy in Estonia. The Internet is an integral part of banks' strategies, and all six Estonian banks offer their services over the Internet. Because Estonian Internet banking is only a few years younger than modern banking in general, consumers had not had enough time to develop branch-banking habits resistant to later change. Banks in Estonia were still in the process of setting up their businesses, and their branch network lacked density. Therefore, the creation of an alternative to long queues and poor service was warmly welcomed. The largest Estonian bank, Hansapank, has twice as many Internet banking customers per branch office as its Swedish parent, Swedbank, thus signifying how Estonian banks differ from their Western counterparts.

The success of electronic banking by and large depends on developments taking place in related industries, as well as on government initiatives and policies. The government plays a vital role in facilitating use of the Internet and computer technology (ICT) and sets an example with its successful applications. Estonia was first to introduce e-government—the use of the Internet for internal public administration communication. Several government and nongovernmental organization (NGO) initiatives make the Internet accessible to population segments of little interest to commercial vendors, with the focus on schools and rural areas. A network of public access Internet points covers Estonia, and connectivity is available in a number of wireless fidelity (Wi-Fi) areas.

A liberal telecom market has been a prerequisite for Internet-use growth because providing good-quality physical connections is vital for attracting a wider public to the Internet. Estonia has been a forerunner in creating a favourable legal framework for ICT development by adopting certain information-related legislation (e.g. enabling digital signatures).

Harvard University's global information technology report has ranked Estonian ICT development in 23rd place among 75 countries surveyed, ahead of France, Italy and Spain, for example. Estonia was the only CEE country ranked among the top 25. The Internet is the most popular channel for transactions and bill payments, followed by standing orders and direct debit. In-person, non-electronic payments represent less than 5% of private consumers' banking activities.

Theories of innovation adoption

Although personal characteristics have been identified as major predictors of consumers' adoption of an innovation, several researchers have shown that it is the perceived attributes of the innovation itself, rather than the characteristics of the innovators, that are stronger predictors of the adoption decision (Black *et al.*, 2001; Polatoglu and Ekin, 2001).

In 1962, the innovation adoption theory was formulated by Everett M. Rogers (1995) and has been widely used in analyzing the adoption of the Internet (Wolcott *et al.*, 2001), of various Internet-related applications (Black *et al.*, 2001; Polatoglu and Ekin, 2001) and of software products (Karahanna *et al.*, 1999; Kautz and Larsen, 2000). Rogers (1995) regards an innovation as an idea, practice or object that is perceived as new by an individual or other unit of adoption. Adoption is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995).

The perceived attributes of an innovation are the most powerful indicators of adoption rate, explaining between 49 per cent and 87 per cent of the variance in adoption rate (Rogers, 1995). Perceived attributes are usually studied in terms of an innovation's advantage relative to existing solutions, its complexity as perceived by the adopter and its compatibility with the adopter's context. Rogers identified an adopter's ability to try an innovation as important. Rogers did not

identify perceived risk of an innovation, but it has been found to be an important factor in several studies (Ostlund, 1974; Polatoglu and Ekin, 2001; Tan and Teo, 2000).

Adoption of electronic financial services has also been studied from the perspective of innovation adoption (Black *et al.*, 2001). People who buy financial services over the Internet have higher incomes and greater ICT use than those who do not. The feasibility of applying innovation adoption theory to Internet banking research was validated by Tan and Teo (2000), who combined it with the theory of planned behaviour.

Confusion frequently exists in separating innovation from invention. If these constructs were congruent, we would not need different words to describe them. Seminal works by Schumpeter (1934, 1939, 1942) have essentially stated that innovation is a new application of invention, discovery or new or existing knowledge.

Tornatzky and Fleischer (1990) have defined innovation as “the situationally new development and introduction of knowledge-derived tools, artefacts and devices by which people extend and interact with their environment”. In accordance with that definition, Internet banking can be considered to be an innovation that changes the patterns of consumption of its adopters. Innovations have typically been characterised across several dimensions, all of which affect an innovation’s adoption. Some of the dimensions proposed by Prescott and Slycke (1997) include the following:

- Radical versus incremental innovations. Radical innovations require extensive changes in an adopter’s everyday practices. We can say that Internet banking (IB) is an incremental innovation because it is an add-on to traditional banking; to use it, consumers can also rely on previous Internet experience. IB would be a radical innovation for a person who had previously used neither the Internet nor banking.

- Product versus process innovations. Product innovations have value in and of themselves, whereas process innovations provide a means to some end beyond themselves (Prescott and Slycke, 1997). Internet banking largely has a process orientation because it is a channel for conducting everyday banking activities that are quite similar to those performed through brick-and-mortar channels.
- Voluntary versus involuntary use. IB adoption is a voluntary decision; a consumer can remain unplugged and use more traditional channels, in spite of promotion efforts by service providers. How voluntarily an innovation is adopted is also an important precondition in most adoption models.

Internet banking is a cluster innovation, closely interlinked with related technologies (Rogers, 1995). Thus, it is not possible to examine this innovation in isolation. It would not be possible for an individual to adopt Internet banking if such banking were not supported by basic technologies, existing infrastructure and legal background. The limits of this study do not allow a deeper examination of cluster theory, but it should be noted that banking is usually considered an external driver to the technology cluster (Scheel, 2002). However, in Estonia, IB is considered central to the development of the information technology cluster (Kalvet *et al.*, 2002).

Hypotheses on factors influencing Internet banking adoption

Relative advantage means that a new innovative service must be perceived to be better than its predecessor. The new service must offer increased functional performance (Dickerson and Gentry, 1983). In the case of Internet banking, relative advantage is achieved primarily through added convenience in the form of freedom from time and place constraints. The Internet also helps consumers manage their personal budgets more efficiently, enabling them to keep an

eye on the status of their accounts and on other financial matters. Relative advantage is measured primarily by assessing an innovation's superiority in terms of overall convenience (Polatoglu and Ekin, 2001; Tan and Teo, 2000), better overview of banking matters (Tan and Teo, 2000) and speed of conducting banking activities (Karjaluoto *et al.*, 2002; Polatoglu and Ekin, 2001). Previous research conducted in the United States has shown relative advantage to be positively connected with use of Internet banking (Kolodinsky *et al.*, 2004). The following hypothesis was proposed to test whether relative advantage also influences consumers' use of Internet banking in Estonia:

H1: If a consumer perceives an Internet bank as offering relative advantage, the consumer will be more willing to use the Internet bank.

Complexity refers to the degree of difficulty a user faces in using Internet technology and the exchange of services via the Internet. Rogers and Shoemaker (1971) define complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use". The more complex an innovation is, the lower its rate of adoption (Tornatzky and Klein, 1982). If a service is very complicated and difficult to understand, it will take a lot more time for it to win over consumers (Black *et al.*, 2001). Previous studies have found a negative relationship between complexity and utilisation (Davis *et al.*, 1989; Thompson *et al.*, 1991; Tornatzky and Klein, 1982). Typically, consumers start using Internet banks for simple services (e.g. keeping track of payments received and doing transactions). When they become more familiar with Internet banking, used to the Internet bank, they move on to using other types of services, and the level of complexity increases according to the user's experience. Complexity of banking per se may increase the overall perceived complexity of Internet banking. As postulated by Zeithaml and

Bitner (1996), banking is rich in credence qualities, meaning that extra evaluative cues are needed to decrease risks perceived with a service provider. Previous research conducted in the United States has shown that complexity has a negative connection with the use of Internet banking (Kolodinsky *et al.*, 2004). The following hypothesis was proposed to test whether complexity also influences consumers' use of Internet banking in Estonia:

H2: If a consumer perceives Internet banking to be relatively easy to use and understand, the consumer will be more willing to use Internet banking.

Compatibility is defined as “the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopters” (Rogers, 1995). It also involves the degree to which the new innovation is consistent with existing consumer affect, cognition and behaviour (de Ruyter *et al.*, 2000). Thus, people with strong negative feelings towards the Internet (or computer technologies in general) might find it difficult to switch from branch banking to Internet banking. Compatibility has been measured, for example, via engagement in other Web-related activities (Karayanni, 2003). Internet banking is more likely to be compatible with consumers' previous attitudes if they have some Internet experience and reasonably high computer literacy (Karjaluoto *et al.*, 2002; Tan and Teo, 2000). Although complexity and compatibility are closely related, the distinction can be made that complexity has more to do with real skills and abilities, whereas compatibility reflects attitudes towards innovations and technology in general. Previous research conducted in the United States has shown that compatibility has a positive connection with use of Internet banking (Kolodinsky *et al.*, 2004). The following hypothesis was proposed to test whether compatibility also influences consumers' use of Internet banking in Estonia:

H3: Compatibility will have a positive influence on consumers' use of an Internet bank but will probably be less influential than relative advantage and complexity.

Several researchers have added **perceived risk** to the set of factors important to adoption (Eastlick and Lotz, 1999; Hansen, 2005; Polatoglu and Ekin, 2001; Tan and Teo, 2000). Consumers' perceptions of risk are considered to influence their evaluations, choices and behaviour strongly (Campbell and Goodstein, 2001). Lack of security and possible privacy concerns have been recognized as major obstacles to adoption. For example, Howcroft *et al.*, (2002) have found security concerns to be the major factor discouraging the adoption of electronic banking services. De Ruyter *et al.*, (2000) have argued that perceived risk, as a critical attribute, is particularly applicable to services where it is not possible to derive quality cues from tangible aspects. Perceived risk increases with higher levels of uncertainty or with an increased chance of negative consequences (Campbell and Goodstein, 2001).

In countries with high volumes of other online activities, people are more used to doing transactions over the Internet, so they are not afraid of misuse of their personal information. If Internet banking is an everyday phenomenon rather than an innovation, risk is considerably reduced as a large user base serves as an endorsement for the service.

Perceived risk and security issues can be addressed on three levels: overall trust in the service provider, trust in the technology and trust in data security. In Estonia, where there is a high volume of online activities, the consumers are not afraid of misuse of their personal information; therefore, the following hypothesis was proposed:

H4: Perceived risk will not influence consumers' use of an Internet bank.

Methodological review

This study aims to investigate how Estonian consumers' Internet banking adoption is influenced by their perceptions about compatibility, complexity, relative advantage and perceived risk.

Sampling and data collection

To examine what influences customers' use of Internet banking, a questionnaire was sent to 9,000 bank customers in Estonia. For 330 of those customers, the questionnaires were not delivered because we did not have their current addresses. In addition to background questions, the questionnaire contained questions concerning the customers' experiences with computers, their use of Internet banking and the factors that had convinced them to use Internet banking, along with several attitude questions. All of the measurements used in this questionnaire use a seven-point Likert scale (1=strongly disagree; 7=strongly agree). Respondents were asked to indicate how often they use Internet banking. Frequency of use was assessed with a 7-point scale, ranging from (1) not at all to (7) daily. Five items were developed to assess the relative advantage of using Internet banking. The items, contained in Table II, focus on convenience, efficiency and saving time. To assess complexity, two items were developed, focussing on how easy it is to learn and to use Internet banking. Two items were also developed to assess compatibility, focussing on the consumer's interest in using new technologies. Concerns about security and privacy have been identified as barriers to the use of electronic innovations (Weaver McCloskey, 2006). Two items, also contained in Table II, were designed to assess the extent to which the respondents perceive Internet banking to be safe and the personal and financial information they provide online to the bank to be secure.

The frequencies and percentages of the respondents, divided according to gender, age, education and personal net income, are presented in Table I. We received 1,831 questionnaires from Internet banking customers, a response rate of 21.12 per cent. The obtained results are well representative of all the bank customers in Estonia. The average demographic characteristics of the respondents follow national averages quite well, with a 60/40 ratio of city/rural respondents (national average is 50/50). In addition, the respondent group featured a slightly higher than average education level. All other features were close to the national averages. The surveyed bank has a 25 per cent share in the mainstream banking market.

*****Insert Table I here*****

Data analysis

Factor analysis

A factor analysis was conducted to develop constructs that will help to analyse the questionnaire responses and to evaluate factors that influence customers' actual usage of Internet banking. Factor analysis assists in condensing a large set of variables into a smaller number of basic components that include some connected variables (Pallant, 2001).

The factor analysis made use of 11 questions concerning customer usage of Internet banking. The 11 questions were subjected to principal component analysis (PCA) using Statistical Package for Social Sciences (SPSS) software. The suitability of data for factor analysis was assessed according to PCA. Inspection of the correlation matrix revealed the presence of many coefficients of 0.3 and above. The Kaiser-Meyer-Okin value reached 0.784, which is higher than the recommended minimum of 0.6 (Kaiser, 1974). Bartlett's Test of Sphericity

(Bartlett, 1954) reached statistical significance (0.000), supporting the factorability of the correlation matrix. PCA revealed the presence of four components that, together, explained 64.8 per cent of the variance. To achieve a better understanding of the four factors, a varimax rotation was performed. The varimax rotation matrix presented in Table II revealed the presence of a structure in which all components showed strong loadings, and all variables load to only one component (Pallant, 2001). The four components will be used to further evaluate customer usage of Internet banking.

The first component generated by the factor analysis illustrates consumers' perceived advantage of Internet banking. The second component is complexity, representing consumers' skills using Internet banking. The third component is perceived risk; it illustrates consumers' apprehension about the trustworthiness of the bank and of the Internet channel. The fourth component demonstrates the Internet bank's compatibility with consumers' values, past experience and needs. In Table II, we present the factors and the questions involved in these components.

*****Insert Table II here*****

Relative advantage

The first component generated from the factor analysis was the perceived relative advantage of Internet banking. Consumers perceive Internet banking to be more convenient than other banking channels. They also perceive that Internet banking gives them a better overview of their finances and that speed is an advantage of Internet banking. This component reflects consumers' attitudes towards the eventual benefits of using Internet banking.

Complexity

This component explains consumers' skills in using the specific technology associated with Internet banking. This component comprises ease of learning in using Internet banking and the level of complexity associated with its use.

Perceived risk

The perceived risk component shows consumers' attitudes towards perceived risks associated with using Internet banking. This component consists of questions about consumers' attitudes towards the Internet bank's trustworthiness and about the perceived security of consumer data files. Consumers are often concerned about Internet banking security, and this concern affects their adoption decisions (Howcroft *et al.*, 2002).

Compatibility

This component explains consumers' general attitudes and habits influencing Internet banking adoption. The questions used to explain these aspects focus on consumers' willingness to change habits and to use new technologies shortly after their introduction to the market. In addition, consumers' interest in matters related to electronic banking was found to be an important aspect of this component. Interest is a strong predictor of consumer involvement, which refers to perceived relevance of the subject matter (Solomon *et al.*, 2002).

Before testing the proposed model, it is necessary to assess the validity of the multi-item scales. A total of 11 questions were used to assess attitudes concerning the complexity, compatibility, relative advantage and perceived risk related to using Internet banking. Cronbach's alpha was calculated for each multi-item scale to assess the internal reliability. According to Weaver McCloskey (2006), alphas near 0.9 represent highly consistent scales, those near 0.7

reflect a moderate level of consistency and those below 0.3 indicate that the items have little in common. The alpha scores within this study are all around 0.7 (Relative advantage = 0.730, Complexity = 0.723, Perceived risk = 0.696, Compatibility = 0.663). However, the values of Cronbach's alpha are quite sensitive to the number of items in the scale (Pallant, 2005). In this study, the scale consisted of 7 items, and when short scales (fewer than 10 items) are used, it is common to find quite low Cronbach values (e.g. 0.5) (Pallant, 2005).

Multiple regression analysis

To gain insights into which factors are actually affecting usage and how they are interrelated, a model was developed using multiple regression analysis. The construct "years in Internet bank" was used as the dependent variable. Following the procedures of Tabachnick and Fidell (1996), we analysed the correlation between the four independent variables and realised that there is no considerable correlation (0.001-0.016); therefore, it is justified to perform the analysis. With the use of a $P < 0.001$ criterion for the Mahalanobis distance, no outliers were found among the cases (Tabachnick and Fidell, 1996). The normal probability plot is a straight diagonal line, which indicates that the analysis does not deviate from normality. Values in the scatter plot are centred along the 0 point and, therefore, do not violate this assumption. The reliability of this study is increased by a comparison of early and late respondents, which showed only limited differences. We also performed an analysis on split random halves of the sample, which did not result in any differences worth mentioning.

By comparing beta values of the standardised coefficients, it is possible to conclude that the component "relative advantage" makes the strongest unique contribution (0.366) in affecting consumers' adoption decisions. This variable makes a significant unique contribution (0.000). The variable "complexity" also makes a strong contribution (0.242) in affecting the

decision. The other variables make weaker contributions to the dependent variable, but they are still significant.

Additional analysis

After performing the multiple regression analysis, in which we used the construct “Years in Internet bank” as the dependent variable, we conducted an additional multiple regression analysis in which we used the construct “Years in bank” as the dependent variable. The reason for this additional analysis was that we wanted to investigate whether the adoption of Internet banking differs from adoption of banking services in general. None of the variables makes a strong unique contribution to the use of traditional banking. Use of Internet banking is, therefore, proven to be fundamentally different from use of other banking services. As a result of the difference between use of Internet banking and banking in general, the reliability of this study is increased because we have proven that the factors influencing the use of Internet banking are unique and not mixed with factors influencing banking in general.

Results

Analysis of the data revealed the influence of complexity, compatibility, relative advantage and perceived risk on consumers’ adoption of Internet banking and on banking services in general. Regression analysis generated a model explaining the influence of the components on adoption behaviour (Table III).

The model starts with the independent variables “Relative Advantage,” “Complexity,” “Perceived Risk” and “Compatibility”. The analysis shows that relative advantage and complexity have the strongest influence on adoption of Internet banking. Perceived risk has a

significant, but weak, negative effect on adoption. Compatibility also has a significant, but weak, effect on adoption.

*****Insert Table III here*****

Analysis of adoption of the bank in general shows only a weak significant connection (0.115) between relative advantage and adoption. The other components have no effect on adoption of the bank. This finding indicates that apprehension and learning about Internet banking are not connected to adoption of banking services in general. Adoption of Internet banking is fundamentally different from adoption of other banking services. Both models generated from the regression analysis show interesting results.

To test the robustness of our results, we divided the sample into groups according to educational level, age, gender, income and place of residence. Analysis shows the groups to be very similar, with only small differences among them. Tests of robustness demonstrate our results to be valid, irrespective of respondents' education, age, gender, income or place of residence.

Conclusions

The purpose of this study was to examine innovation adoption in the context of Internet banking in Estonia. Based on previous research (De Ruyter *et al.*, 2000; Rogers, 1995; Tan and Teo, 2000), we identify relative advantage, complexity, compatibility and perceived risk as indicators of innovation adoption.

To make advantageous market investments, firms from developed countries must possess knowledge about innovation adoption behaviour of consumers in recently developed and developing markets. Theories of innovation adoption are usually tested in established markets in

countries that have been developed for a long time. To broaden our knowledge about innovation adoption, we applied the theories of innovation adoption to consumers' use of Internet banking in Estonia, a market that has grown rapidly and where the bank market has existed for only 16 years. This study shows that attributes explaining consumers' use of innovations can also be used to explain Estonian consumers' behaviour, which strongly validates the model. Cultural differences between Estonian and Western markets, Estonia's turbulent history, the short history of its bank market and its comparatively small branch-office network are some of the factors that could be expected to influence consumer's Internet banking use. However, the results presented in this study are similar to those of previous research studies using innovation adoption theory, thereby validating them.

The results of this study clearly show that use of Internet banking in Estonia is influenced most strongly by the relative advantage and complexity of the technology. To further support our results, we found that relative advantage has a significant, but weak, influence on Estonian consumers' use of banking in general. Comparison of use of Internet banking to that of ordinary banks thus reveals that use of Internet banking (a) differs from use of ordinary banks and (b) is an innovation because it is influenced by innovation adoption factors. This study provides empirical evidence that adoption of Internet banking is differentiated from adoption of traditional banking services.

The technology acceptance model (TAM) by Davis *et al.* (1989) found a stronger relationship in the United States between perceived usefulness and use than between ease of use and use. Our results in Estonia are similar. We found that relative advantage has a stronger influence on use than does complexity. Although perceived risk has been found to be a significant factor in the adoption decision, this study clearly shows that once consumers start

using a service, the importance of perceived risk is rendered insignificant. In general, perceived risk perception had no influence on current users.

The findings of this study point to the idea that consumers' perceptions of the relative advantage of use of Internet banking are the primary reason that Estonian bank customers adopt Internet banking. The lack of complexity also plays an important role in the adoption. Similar to the TAM (Davis *et al.*, 1989), our study shows that it is most important that consumers perceive Internet banking to be more useful than the alternatives. The relative ease of use of Internet banking is also important but not as important as usefulness. Davis' *et al.* (1989) showed that users are driven to adopt a technology primarily because of the functions it provides them and secondarily because of the easiness of benefiting from those functions. Customers are often willing to overlook some difficulties of usage if the service provides critically needed functions; however, no amount of ease of use can compensate for a system that does not perform a useful function (Davis, 1989). As a result of our similar findings, we conclude that the theories used to explain consumers' use of innovations in Western markets can also, with small modifications, be applied to Eastern European and other emerging markets.

Implications for managers

This study finds that Internet banking adoption is similar in the West and in Estonia. This result implies that Western firms can use their Internet banks in Estonia and, thus, be very competitive not only in Estonia but also in many other Eastern European markets. The finding also implies that other innovative bank technologies, such as mobile banking, can also be used in Eastern European markets.

Based on our findings, we may speculate that future Estonian and other Eastern European markets may provide Western firms with innovative technology and business practices.

These countries have already created innovations, which may be exemplified by Skype and Kazaa (both partially developed in Estonia). Because adoption patterns are roughly similar, Western firms may benefit from the implementation of banking technology developed in Eastern European countries.

This study also emphasises the importance of the usefulness of the service for the customer. It is unfortunately very common for technological development not to include considerations of the usefulness of the services being developed for the customer. Service development needs to be focussed on customer usefulness. The customer will not buy a service if it is not useful, no matter how user-friendly it is.

Limitations and future research

This study has some limitations. The first is that our findings regarding determinants of the adoption of Internet banking might not be possible to generalise to the adoption of other innovations. Another limitation is that this study is conducted only in Estonia, and therefore, the findings may be specific to the culture in this country.

Future research could examine how these results hold up in a cross-cultural study. In Estonia, the adoption of Internet banking has been rapid, and therefore, it would be interesting to compare the Estonian case with other markets where the adoption has not proceeded as rapidly. Future research could also study other innovations that have not been implemented to the same extent that Internet banking has. Mobile-phone banking may be a good example.

In addition, future research could more clearly separate the relative advantage of Internet banking from its content and from the context in which it is used. Again, we identify the importance of the relative advantage of Internet banking for adoption. Future research could clarify the extent to which the effect of relative advantage on the continued use of Internet

banking may differ, for instance, depending on the service content of the Internet bank or the context of the service use.

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Table I Demographic overview of respondents

		No. Of respondents	Valid percentage (%)
Gender	Male	794	44
	Female	1009	56
Age	≤25	455	25.1
	26-35	370	20.4
	36-45	384	21.2
	46-55	349	19.3
	≥56	252	13.9
Education	Primary school	50	2.8
	Secondary school	401	22.3
	Secondary special	504	28
	University degree	760	42.2
	Post grad diploma (PhD, MBA)	87	4.8
Personal income, €	≤192	459	26.6
	193-320	352	20.4
	321-512	441	25.6
	513-769	259	15.0
	≥770	213	12.4

Table II Rotated component matrix (a)

No.	Dimensions	Factor loadings
<i>Relative advantage</i>		
1	Internet banking is more convenient to use than other banking channels.	.758
2	Using the Internet gives me a better overview of my finances.	.756
3	Internet banking has made communication with banks easier.	.654
4	I value speed in my banking transactions.	.639
5	Internet banking services have better prices than office services.	.582
<i>Lack of complexity</i>		
6	It is easy to learn Internet banking.	.828
7	It is easy to use Internet banking.	.817
<i>Perceived risk</i>		
8	I think that banks keep customer data securely.	.869
9	The bank I am using is safe.	.861
<i>Compatibility</i>		
10	I change my habits easily.	.871
11	I like to use new technologies as soon as possible.	.808

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.

a) Rotation converged in 5 iterations.

Table III Regression analysis

		Coefficients (a)				
Model		Unstandardised coefficients		Standardised coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.274	.018		124.979	.000
	Relative advantage	.312	.020	.366	15.760	.000
	Lack of complexity	.203	.019	.242	10.416	.000
	Perceived risk	-.077	.019	-.096	-4.134	.000
	Compatibility	.041	.018	.052	2.247	.025

a) Dependent Variable: Years in Internet Bank