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A Cross-Country Study on Intention to Use Mobile Banking:
Does Computer Self-Efficacy Matter?

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ABSTRACT

This is a cross-country study about intention to use mobile banking considering respondents from Brazil, South Korea, and the United States of America. The purpose of the paper is to analyze the role of an individual's computer self-efficacy ion mobile banking context. The authors employed the confirmatory factor analysis and the structural equation modeling to analyze the constructs and test the hypotheses of the study. They also relied on bootstrap confidence intervals to test the statistical significance of indirect effects. This study considers a comprehensive measure for computer self-efficacy (CSE), and a direct effect of this variable on two antecedents of behavioral intention to use mobile banking was found. CSE also had an indirect effect on the intention to use mobile banking. However, the effect of computer self-efficacy was not persistent among the different sub-samples considered in this study.

KEYWORDS

Cross-Cultural Study, Information Systems, Mobile Banking, Mobile Devices, Technology Adoption

INTRODUCTION

There are a broad set of variables and theoretical models used to understand technology adoption and customers' usage intention (Hassan & Wood, 2020). These variables include behavioral characteristics of individuals, cultural dimensions, gender differences, environmental facilities, and costs, among others. Considering this scenario, we combined variables from a traditional model (Technology Acceptance Model - TAM) with a comprehensive measure for an individual's computer self-efficacy (CSE) to improve the understanding of a contemporary technology, which is the case of mobile banking. CSE indicates the capability of an individual to use computers (Compeau & Higgins, 1995) and, in the case of this paper, to provide help to other individuals in solving some problems with computers.

The relevance of the CSE variables in the field of information systems has been recognized by previous research, as pointed out by Luarn and Lin (2005), Lee et al. (2007), and Lee et al. (2011). According to Venkatesh (2000), CSE can be considered as an anchor that influences initial perceptions about the ease of use of a new technology. In line with Venkatesh (2000), recent studies

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indicate that CSE may influence users' perceptions about the ease of use of a technology which, in turn, may have an effect on its adoption (Choi et al., 2018; Singh & Srivastava, 2018; Avornyo et al., 2019). Thus, in the present study, we intend to test the effect of CSE on users' perception of mobile banking's ease of use.

Since 2000, the number of mobile subscribers has increased significantly in comparison with the number of fixed line subscribers (Picoto, Bélanger & Palma-dos-Reis, 2014). Currently, mobile devices enable individuals to access diverse apps without barriers of location and time. Therefore, understanding the factors related to this technology represents an interest both for practitioners and academics. With the increased use of (and dependence on) the World Wide Web to do banking transactions and other personal activities, privacy and security concerns became an important issue (Junglas, Johnson & Spitzmüller, 2008; Zhang, Weng & Zhu, 2018; Malaquias & Hwang, 2019). Thus, internet and mobile technologies provide innovations for customers, but also face resistance from the market (Laukkanen, 2016). Considering such concerns with privacy and security, we also intend to explore the effect of an individual's CSE on trust.

There are different ways to estimate the individual's computer self-efficacy (Compeau & Higgins, 1995; Thatcher & Perrewé, 2002; Yi & Hwang, 2003; Luarn & Lin, 2005; Chakraborty et al., 2008; Al-Somali et al., 2009; Hwang & Grant, 2011; Lee et al., 2011; Zhou, 2012a). These estimations can consider general or specific application levels of CSE, since it is a multi-level construct (Marakas et al., 1998). This means that when analyzing the effect of self-efficacy on adoption of a given technology, it is possible to consider the user self-efficacy, specifically in the use of this technology (specific case), or consider the user self-efficacy in the use of computers in general (general case). In the context of mobile banking, we find a gap regarding studies using this construct (computer self-efficacy) represented by a more comprehensive scale (self-efficacy in the use of computers in general), and its potential effect on intention to use mobile banking.

We expect to expand upon previous literature with this paper, because we consider a scale for CSE that captures abilities to solve problems with computers, as well as with information systems. This scale was grounded on previous research (Durndell, Haag & Laithwaite, 2000). Based on this context, our main purpose is to analyze the role of an individual's computer self-efficacy in mobile banking context.

This study considers data from respondents of three different countries: Brazil, South Korea (Republic of Korea) and the United States of America (USA). We collected data from three different economies in order to analyze if the potential effect of CSE is equivalent in different environments. These countries have differences in variables related with mobile banking adoption (such as the case of the level of internet users). In addition, they present different localizations (South America, North America and Asia) and different numbers for GDP and population, as shown in Table 1. Therefore, in this study, we developed a quantitative model to analyze the robustness of the results among samples from diverse regions.

The increase in banking tasks that use the Internet gradually decrease the dependence of branch-based traditional banking services' need (Chung & Kwon, 2009). As pointed out by Al-Jabri and Sohail (2012, p. 379), "provision of mobile banking services has been broadly used, and an understanding of the customer adoption process will have important implications for bankers and customers alike". It is relevant to analyze the factors and challenges related with mobile banking adoption as a contemporary technology, and we expect to contribute to the literature by presenting cross-country research on the effect of CSE in different economies. Moreover, this study can expand the understanding about variables that affect the perceptions of ease of use and trust in mobile banking, with a focus on CSE. Using the structural equation model and bootstrap confidence intervals, we also tested a potential indirect effect of CSE on behavioral intention to use mobile banking.

The next section describes the research model. The third section of this research contains information regarding data collection and the quantitative tests we employed to test the study

Table 1. Some characteristics of the three countries of this study

Variables	Brazil	South Korea	USA
Population (million, in 2015)	207.8	50.6	321.4
Life Expectancy at Birth (in 2014)	74.4	82.2	78.9
GDP (US$ trillion, in 2015)	1.8	1.4	18.0
Internet Users (per 100 people, in 2015)	59.1	89.9	74.6
Localization	South America	East Asia	North America

Source: the content of the four initial lines was adopted from The World Bank Data (2017).

hypotheses. The fourth section contains the results and discussion. Finally, we present the implications, limitations and suggestions for further work.

Theoretical Model and Hypotheses

In this paper, we analyzed the variables associated with the Technology Acceptance Model (TAM), trust in mobile banking, and computer self-efficacy. TAM represents a framework proposed by Davis (1989) to explain an individual's acceptance of information technologies. It posits that perceived usefulness and perceived ease of use are determinants of usage behavior (Davis, 1989). Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320) and perceived ease of use (EoU) is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). TAM has been the most adopted theory used to predict an individual's intention and acceptance of different kinds of electronic banking channels (Alalwan et al., 2016). Shaikh and Karjaluoto (2015) did a literature review on mobile banking adoption, and of the 55 studies they analyzed, 42% used TAM as their theoretical framework.

Based on TAM (Davis, 1989) and the studies that have extended it (Venkatesh & Davis, 2000; Gu et al., 2009; Alalwan et al. 2016; Chitungo & Munongo; Choi et al., 2018; Jaradat, Imlawi & Al-Mashaqba, 2018), we established the hypotheses H_1, H_2 and H_3. Consistent with TAM, the study of Gu et al. (2009) found that EoU is the most significant determinant of PU and that EoU directly and indirectly affects behavioral intention to use mobile banking. Chitungo and Munongo (2013) and Alalwan et al. (2016) also identified that PU and EoU have a significant effect on a user's attitude toward mobile banking. The positive effect of PU on intention to use mobile banking was also identified by Saji and Paul (2018) and by Hassan and Wood (2020). According to Choi et al. (2018), information technology should be easy to use. Otherwise, users may give up on using them, despite their benefits. In the study of Akturan and Teczan (2012) PU was found to directly affect attitudes toward mobile banking, while no direct relationship between EoU and attitude was identified. Moreover, in some studies including more than one country, the authors also observed differences in the effect (and in the significance) of ease of use on behavioral intention (Merhi et al., 2019; Hassan & Wood, 2020). On the other hand, the results of Liu et al. (2009) indicated that individuals' intentions to use mobile banking is mainly affected by PU and that EoU has a great effect on PU. Thus, we hypothesized that:

H_1: Perceived ease of use presents a positive effect on intention to use mobile banking.
H_2: Perceived usefulness presents a positive effect on intention to use mobile banking.
H_3: Perceived ease of use presents a positive effect on perceived usefulness.

Although TAM has been extensively validated and there is an agreement among researchers that TAM is valid in explaining individuals' acceptance of new technologies (Chitungo & Munongo, 2013), most studies that used TAM as their theoretical framework extended or supplemented the original

TAM by including new variables (Shaikh & Karjaluoto, 2015). In this paper, we extended the TAM by including two additional variables: computer self-efficacy and trust.

Mobile banking involves risk perception related to security, privacy and financial loss possibility (Malaquias & Hwang, 2019). Thus, several studies show that trust is an important variable related to mobile banking adoption (Malaquias & Hwang, 2016; Zhang, Weng & Zhu, 2018; Malaquias & Hwang, 2019; Sharma & Sharma, 2019; Merhi et al., 2019). Baptista and Oliveira (2016) did a meta-analysis of mobile banking acceptance studies and found that trust is one of the most effective determinants of intention to use mobile banking. "Apparently, no matter where they live, consumers who trust m-banking providers and m-banking applications are more likely to use this innovation" (Hassan & Wood, 2020, p. 11). The results obtained by Hassan & Wood (2020) also supported a positive effect of trust on intention to use mobile banking when comparing Egypt and the United States. Thus, we hypothesized that:

H_4: Trust presents a positive effect on intention to use mobile banking.

"Self-efficacy, the belief that one has the capability to perform a particular behavior, is an important construct in social psychology" (Compeau & Higgins, 1995, p. 189). In this paper, computer self-efficacy represents an individual's perception about his/her own ability to solve problems with computers. It is important to highlight the main differences among the construct "computer self-efficacy" in the studies of Luarn and Lin (2005), Al-Somali et al. (2009), Chakraborty et al. (2008), Lee et al. (2011), Singh and Srivastava (2018) and Zhou (2012a), and the construct "computer self-efficacy" of this study. While the mentioned studies focus on the self-efficacy related to specific technologies, we focus on a comprehensive approach considering an individual's knowledge and abilities to solve problems with computers in general.

Studies show that the belief of computer self-efficacy has a positive effect on an individual's intention to use computers and accomplish specific tasks (Al-Somali et al., 2009), the willingness of an individual to adopt new technologies (Lee et al., 2007), their outcome expectations of information systems (Chang et al., 2011) and their preparation to use electronic banking services (Poon, 2007).

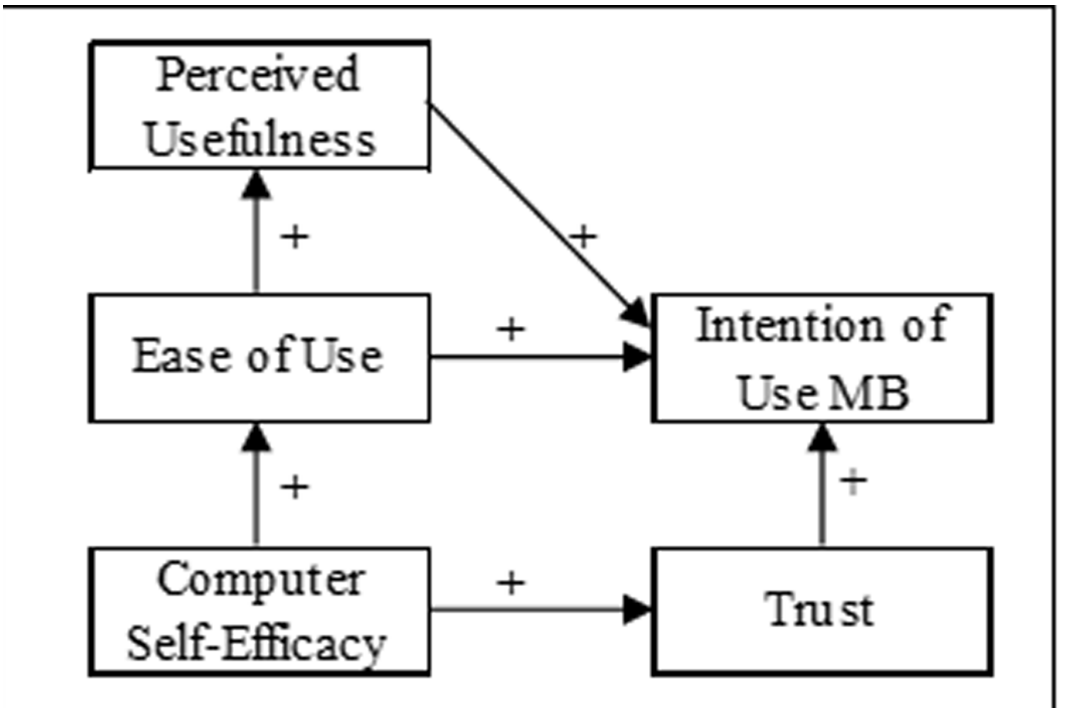
Other studies point out that there is a positive and significant effect of computer self-efficacy on the perceived ease of use of technologies (Venkatesh, 2000; Choi et al., 2018; Saji & Paul, 2018; Avornyo et al., 2019). Chakraborty et al. (2008) confirm that computer self-efficacy presents a positive effect on the ease of use and perceived usefulness of a new technology, and Singh and Srivastava (2018) also found a positive effect of self-efficacy in the use of mobile banking on the perceived ease of use of mobile banking. These positive effects of computer self-efficacy indicate the relevance of this variable for the development of perceived ease of use (Hwang & Grant, 2011) and subsequent adoption of new technologies. In this context, we expect that an individual's computer self-efficacy will present a positive effect on thier perception of how easy it is to use mobile devices to conduct banking activities. Therefore, we intend to test the following hypothesis:

H_5: Computer self-efficacy presents a positive effect on perceived ease of use.

The literature also shows that there is a link between computer self-efficacy and trust. Thakur (2018), for example, found that self-efficacy is significantly associated with trust. The study of Zhou (2012) identified that self-efficacy may moderate the development of initial trust in mobile banking, suggesting that banks should consider customers' self-efficacy and adopt different measures in order to promote their initial trust. Moores and Chang (2009) and Keith et al. (2015) highlight that a potential side effect of high self-efficacy is a sense of over-trust. Thus, we hypothesized that:

H_6: Computer self-efficacy presents a positive effect on trust in mobile banking.

Figure 1. Research model. Notes: MB= Mobile banking; the arrows indicate a direct effect among the constructs and structural equation models are used to test these effects. The positive signs indicate the expected relationship based on the literature review presented in this study.



Method

The aim of this research is to analyze the role of an individual's computer self-efficacy on mobile banking context. To do so, the first step was to develop a scale that estimates the individual's computer self-efficacy. Based on previous research, the final version of the scale is comprised of four items: a question about terms related with software and three questions regarding computer problems, as we can see in Appendix A. We employed the five-point Likert scale to collect the perception of respondents on each of these items. The questionnaire also considers two demographic variables, already explored by previous research in the context of mobile banking / mobile computing (Goh & Sun, 2014; Shaikh & Karjaluoto, 2015; Malaquias & Hwang, 2016; Saji & Paul, 2018; Avornyo et al., 2019): age and gender.

Regarding the respondents, the sample is comprised of responses from undergraduate students in the field of business. We collected data through anonymous online forms. In each country, we selected one university from which undergraduate students in the field of business were invited by a professor to participate in the research. We focused on the field of business to get responses from individuals that have equivalent experience with quantitative and technological courses. For example, undergraduate students in the field of technology could naturally present differences in individual CSE compared to students of other courses. This fact could generate some effect in the quantitative analysis if our sample was diverse in terms of different courses. The participation was voluntary. The period of data collection started collecting responses in the USA on July 2015, and finished in April 2016, when we obtained the last responses of students from Brazil and South Korea.

After obtaining the responses, we observed some cases of missing values in one or more items of individual constructs. We decided to exclude all these cases; therefore, 14 responses with missing values for any item of Appendix A were deleted from the database. Considering that age and gender

are control variables, 10 cases with missing values in these variables were also excluded. Moreover, we calculated the standard-deviation of the responses for all items and excluded 11 cases where the dispersion equaled zero. In other words, we excluded 11 observations with the same score for all items in Appendix I.

In order to check the persistence of the relationship between the variables in this research, we collected data from three countries (458 responses in total, after the exclusions explained in the previous paragraphs), namely: Brazil (59 responses), South Korea (231 responses), and the USA (168 responses). Considering that we received a low number (59) of complete online forms in Brazil, we opted to collect additional data through printed forms. After excluding missing values and the cases with the same score for all items, we obtained 198 responses in Brazil. We use these responses from printed forms only in a robustness analysis.

The respondents were 30.5 years old on average and the majority of participants are men (57.6%). These demographic statistics were also calculated for the sub-samples for each country, and some differences were observed. For example, respondents from the USA presented a lower average age (21.75 years) and respondents from South Korea presented, on average, more concentration among males (64.9%). Based on these results, the main conclusions of this study may need to be interpreted with caution, especially in regard to generalization.

As we presented in the theoretical review, the quantitative model of this research contains five constructs. Firstly, we estimate the coefficients in the model available in Figure 1. Then, we estimate the coefficients again, by country. Finally, we run a robustness analysis, considering only the responses of printed questionnaires in Brazil.

In the stage of confirmatory factor analysis (CFA), we analyzed the reliability and internal consistency of constructs using convergent and discriminant analysis. The convergent analysis is based on the correlations between the items of each construct and the discriminant validity represents the degree to which two pairs of constructs are distinct (Kline, 2011; Hair et al., 2014). Table 2 contains the Cronbach's alpha (CA), the composite reliability (CR) and the average variance extracted (AVE): the indexes used in the convergent analysis (Hair et al., 2014).

As the results of Table 2 indicate, all items presented higher indexes in comparison with the thresholds (0.70 for CR and CA; 0.50 for AVE). Regarding the discriminant analysis, we calculated the root square of AVE for each construct, and compared this value with each pair of correlations among the respective construct and the others, as Table 3 indicates.

The results indicated that the root square of AVE was higher than the correlation between each pair of constructs in all cases. Based on these results, the variables of the quantitative model present both internal consistency and discriminant validity, as shown in Tables 2 and 3.

Before testing the study hypotheses, we observed the goodness of fit of the model estimated (Figure 1). To do so, based on Hair et al. (2014), the following indexes were considered: a) absolute fit indexes, namely the qui-square statistic (that is usually expected to be non-significant); the normed qui-square, which is the ratio between the qui-square and the number of degrees of freedom (usually expected to be lower than 3); the Goodness-of-Fit Index (GFI), expected to be higher than 0.90; the root mean square error of approximation (RMSEA), which is expected to be lower than 0.05; and the root mean square residual (RMR), expected to be lower than 0.10; b) the incremental fit indexes: Normed Fit Index (NFI), Comparative Fit index (CFI), and Tucker-Lewis Index (TLI), expected to be, at least, equal to 0.90; and c) a parsimony fit index: the Adjusted Goodness-of-Fit Index (AGFI), expected to be above 0.90. We also evaluated the relative fit index (RFI) and the incremental fit index (IFI).

Results

After running the convergent and discriminant analysis, we evaluated the goodness of fit of the model used in the CFA. Although the qui-square statistics were significant at 1% (167.35; df: 94), the normed qui-square was 1.78. Moreover, the RMSEA was 0.041 (Lo: 0.031; Hi: 0.051), and the RMR was 0.032, indicating a good adjustment. The other indexes were above 0.90, indicating that the model

Table 2. Reliability of the constructs

Construct	AVE	CR	CA
TRUST	0.830	0.807	0.798
EoU	0.784	0.916	0.914
PU	0.718	0.884	0.884
INT	0.744	0.897	0.892
CSE	0.881	0.881	0.880

Notes: TRUST= trust in mobile banking; EoU= ease of use; PU= perceived usefulness; CSE= computer self-efficacy; INT= intention to use mobile banking.

Table 3. Discriminant analysis

Factor	TRUST	EoU	PU	INT	CSE
TRUST	**0.911**				
EoU	0.511	**0.885**			
PU	0.467	0.636	**0.847**		
INT	0.627	0.675	0.676	**0.863**	
CSE	0.136	0.120	0.086	0.120	**0.939**

Notes: the values in bold in the diagonal indicate the root square of the AVE; the values below the bold lines indicate the estimates for correlation among each pair of constructs; TRUST= trust in mobile banking; EoU= ease of use; PU= perceived usefulness; CSE= computer self-efficacy; INT= intention to use mobile banking.

fits well (GFI = 0.956; AGFI = 0.937; NFI = 0.965; RFI = 0.956; IFI = 0.984; TLI = 0.980; CFI = 0.984). The structural model presented equivalent adjustments; however, with the inclusion of the variables for age and gender, the RMR of the structural model was above 0.10 and the lower bound of the 90% confidence interval for RMSEA was 0.066. Considering that the majority of indexes were favorable, the structural model in Figure 1 was used to test the study hypotheses. Table 4 contains the main results considering all respondents in the sample, and Table 5 shows the results by country.

In Table 4 we can observe that for the entire sample there is an indicative for a positive effect of computer self-efficacy on trust in mobile banking and on ease of use perception about mobile banking. We also calculated the indirect effect of CSE on intention to use mobile banking and found a positive effect (0.124); using a bootstrap analysis (number of bootstrap samples: 2,000), we observed that this indirect effect was significant at 1%. These results are in line with previous research that documents a positive effect of self-efficacy or computer self-efficacy on variables related to the intention to use mobile banking (Luarn & Lin, 2005; Chakraborty et al., 2008; Al-Somali et al., 2009). The total effect of EoU on intention to use mobile banking was 0.569 (0.321 as a direct effect - Table 4, and 0.248 as indirect effect).

The result suggests that behavioral characteristics of respondents affect the intention to use mobile banking, specifically the ability to interact with computers. When we refined the results and estimated the coefficients by country, the effects of computer self-efficacy were different, as presented in Table 5.

Although the effect of CSE on EoU and on TRUST was positive in the entire sample, this effect was not consistent among the three countries of the sample. The positive effect of CSE on trust in mobile banking was positive only in the South Korea sub-sample. Moreover, the positive effect of CSE on ease of use perception was not significant in the USA sub-sample, but positive in the South

Table 4. Results for hypothesis testing

Construct	Dep. Variab.	All Respondents
TRUST	INT	0.348 ***
EoU	INT	0.321 ***
PU	INT	0.391 ***
Age	INT	-0.139 ***
Gender	INT	0.081 **
CSE	TRUST	0.143 ***
CSE	EoU	0.130 **
EoU	PU	0.636 ***
number of respondents:		458

Notes: TRUST= trust in mobile banking; EoU= ease of use; PU= perceived usefulness; CSE= computer self-efficacy; INT= intention to use mobile banking; Age = it is a scalar variable that contains the age of each respondent, in years; Gender = this is a dummy variable that receives 1 for males and 0 for females. All coefficients were estimated using structural equation modeling.

Table 5. Results for hypothesis testing, by country

Construct	Dep. Variab.	Brazil	South Korea	USA
TRUST	INT	0.199 *	0.418 ***	0.261 ***
EoU	INT	0.402 ***	0.201 ***	0.514 ***
PU	INT	0.441 ***	0.430 ***	0.238 **
Age	INT	-0.180 *	-0.164 ***	-0.060
Gender	INT	0.015	0.108 **	0.029
CSE	TRUST	0.133	0.317 ***	-0.034
CSE	EoU	0.073	0.298 ***	-0.029
EoU	PU	0.339 **	0.652 ***	0.579 ***
number of respondents:		59	231	168

Notes: TRUST= trust in mobile banking; EoU= ease of use; PU= perceived usefulness; CSE= computer self-efficacy; INT= intention to use mobile banking; Age = it is a scalar variable that contains the age of each respondent, in years; Gender = this is a dummy variable that receives 1 for males and 0 for females. All coefficients were estimated using structural equation modeling.

Korea and the Brazil (printed forms) sub-samples. The demographic variables were also significant only in the South Korea sub-sample.

Discussion

Firstly, the results of this study highlight an indirect effect of computer self-efficacy, measured through a more comprehensive scale, on the behavioral intention to use mobile banking. Such an

indirect effect emerges from the variables ease of use and trust. Moreover, the results confirm the relevance of TAM (Davis, 1989) to analyze the intention to use mobile banking in the context of the three countries, which is in line with previous research (Shaikh & Karjaluoto, 2015; Alalwan et al., 2016). The positive effect of ease of use and of perceived usefulness is also in the same direction of the results from previous research, such as Chitungo and Munongo (2013) and Alalwan et al. (2016), and other studies that found at least one of these variables significant (Liu et al., 2009; Akturan & Teczan, 2012; Saji & Paul, 2018; Merhi et al., 2019; Hassan & Wood, 2020).

When observing the independent variables of trust, perceived usefulness and ease of use, the highest effect (considering the sum of direct and indirect effects) on behavioral intention to use mobile banking comes from ease of use (since it affects both intention to use mobile banking and perceived usefulness), which confirms the importance of this construct in studies about mobile banking adoption.

Other studies in the context of mobile banking that considered respondents from different countries also have found differences in the significance and effect of the coefficients related to some of its determinants (Merhi et al., 2019; Hassan & Wood, 2020). The results of this study also highlight some differences among the countries, such as the effect of CSE on trust, and the effect of demographics on behavioral intention to use mobile banking.

Regarding the effects of CSE on the perceived ease of use, considering the sample with all respondents, the results are in line with previous research used to construct the hypothesis (Lee et al., 2007; Poon, 2007; Chakraborty et al., 2008; Al-Somali et al., 2009; Chang et al., 2011; Singh & Srivastava, 2018). Following our understanding, computer self-efficacy should present a positive effect on ease of use and trust in mobile banking in the entire sample and in the three sub-samples. Nevertheless, considering the coefficients segregated by country, the results from quantitative models indicate an absence of a positive relationship among these variables for all sub-samples.

CONCLUSION

We developed this paper in order to analyze the role of an individual's computer self-efficacy (CSE) in mobile banking context. The main results indicated a positive and significant effect of CSE on two antecedents of behavioral intention to use mobile banking: ease of use and trust. This effect, however, was not significant in all three of the sub-samples' analysis. Through these two variables, the indirect effect of CSE on intention to use mobile banking was positive and significant at 1% (this test was performed through the bootstrap analysis using SEM).

Moreover, the results showed that ease of use, perceived usefulness and trust are important variables to understand intention to use mobile banking. These results were consistent among samples with respondents from three different countries: Brazil, South Korea and the USA. As a response to the research question in the title of this paper, our results suggest that CSE does matter in the context of mobile banking, since it can affect two antecedents of behavioral intention to use mobile banking (ease of use and trust) and it indirectly affects the intention to use mobile banking.

Theoretical Implications

This study has implications for theory development, since we highlighted the relevance of the construct CSE (measured considering a more comprehensive approach) to the use of contemporary technologies. There are many alternatives for users to improve quality of life using contemporary apps. The results of this paper can motivate new research, even in the context of other mobile innovations, to consider the role of individual computer self-efficacy, estimated by the interaction with computers rather than specific technologies. Additionally, this research suggests an indirect effect of CSE on the behavioral intention to use mobile banking, so this indirect effect may be subject to research with other technologies and apps.

Moreover, the main results showed a good adherence of CSE (considering a more comprehensive approach) to a widely adopted research model, which can easily be implemented in new studies: TAM.

Therefore, this paper also contributes to the body of studies that rely on TAM to explore the challenges for the diffusion of new technologies. The use of CSE as an antecedent of trust can also expand the literature on mobile banking, since trust is one of the main determinants of mobile banking use.

Practical Implications

The evidence obtained through the quantitative analysis of this paper is in line with the argument that individuals that are self-confident about computers also tend to find mobile banking easy to use and assign more confidence to this technology. Therefore, individuals with higher scores on the computer self-efficacy construct are also those able to indicate advantages of mobile banking to friends/colleagues, especially to those with a tendency to present computer anxiety. If these individuals (with higher scores in computer self-efficacy) have an incremental level of ease of use perception and trust in this technology, a potential transference of this perception among users can benefit the expansion of mobile banking use. The returns of investments made to improve mobile banking may also be benefited.

The benefits from mobile banking are diverse, and the understanding of mobile banking challenges is being increasingly studied by researchers and practitioners. Specifically in the case of this study, we observed that people who identify themselves as self-efficient with computer interaction are candidates to motivate other individuals in using mobile banking. This is a major issue when we are talking about a new technology that depends on initial trust to be used, since the effect of CSE was positive and significant on trust in mobile banking. When individuals who need assistance with computers have some kind of concern about installing and starting to use mobile banking, naturally, they will try to obtain more information from banks, bank managers, the Internet and friends/colleagues. If some colleagues who are presumed to understand details of technology and usually help friends in solving computer problems comment that they usually trust mobile devices to perform banking transactions, this information may impact a potential user and can motivate him/her to start using mobile banking.

In this context, financial institutions should try to present mobile banking advantages, security and usability for those persons who are presumed to understand more details about computers and information systems. These persons can start to use mobile banking with more frequency, and when asked about mobile banking, they can inform friends and colleagues about the main features of this technology, especially regarding ease of use. An increasing number of individuals using mobile banking also generates less printed documents, lowers demands for ATMs, optimizes financial resources for banks and saves time for customers. To do so, banks and app developers also need to provide functional mobile apps that are easy to use and reliable.

Limitations

This research has four main limitations. The first is the extent of the use of responses from undergraduate students. Previous research on mobile banking was already developed considering responses from students, but further research with graduates could present new insights about the potential effect of the computer self-efficacy construct on mobile banking use. The second limitation relates to the locale in which data was collected. We used three samples from three different countries, but in each country, the respondents studied at the same university. The countries of the study, especially Brazil and the USA, have different dimensions of culture and regionalism inside their respective regions and these differences are not considered in this research. Therefore, despite that we have a sample of three different economies, caution is needed to avoid generalizations.

Thirdly, the results of this manuscript may be subject to a non-respondent bias, since we did not use a randomly selected sample. Finally, the data collected to test the hypotheses of this study were based only on questionnaires; so, the main results might be subject to the common method bias. Further studies can implement other strategies for data collection and test the persistence of the main results obtained in this paper. For new research projects, we also recommend the use of qualitative techniques to expand the understanding about mobile banking use.

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APPENDIX 1

Research Questionnaire

Trust in mobile banking (Zhou, 2012a; 2012b; Zhou, 2013; Oliveira et al. 2014)

Mobile Banking…
TR1 …seems trustworthy.
TR2 …seems secure.
TR3 …was created to help the client.

Perceived Usefulness (Davis, 1989; Al-Somali et al. 2009; Gu et al., 2009; Oliveira et al., 2014)

Mobile banking…
PU1 …enhances the efficiency of my banking activities.
PU2 …makes it easier to do my banking transactions.
PU3 …enables me to accomplish banking activities more quickly.

Perceived Ease of Use (Davis, 1989; Zhou et al., 2010; Zhou, 2012b)

EU1 It would be easy for me to become skillful at using mobile banking.
EU2 I find that mobile banking is easy to use.
EU3 I would find it easy to get mobile banking to do what I want it to do.

Intention to use mobile banking (Zhou, 2011; Zhou, 2012b; Oliveira et al., 2014)

I have the intention to…
IT1 … manage my accounts using my mobile phone.
IT2 … use mobile banking to conduct payment.
IT3 … use mobile banking in the next six months.

Computer Self-Efficacy (Durndell et al., 2000)

I feel confident about…
SC1 …understanding terms relating to computer software.
SC2 …providing help for problems in the computer system.
SC3 …troubleshooting computer problems.
SC4 …explaining why a software will or will not run on a given computer.

APPENDIX 2

Table 6. Robustness checking, considering the responses of printed forms in Brazil

Construct	Dep. Variab.	Printed Forms
TRUST	INT	0.290 ***
EoU	INT	0.422 ***
PU	INT	0.248 ***
Age	INT	0.002
Gender	INT	0.035
CSE	TRUST	-0.025
CSE	EoU	0.184 **
EoU	PU	0.431 ***
number of respondents:		198

Notes: TRUST= trust in mobile banking; EoU= ease of use; PU= perceived usefulness; CSE= computer self-efficacy; INT= intention to use mobile banking. All coefficients were estimated using structural equation modeling.

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