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An empirical investigation on disclosure about mobile banking on bank websites

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Abstract

Purpose – The purpose of this paper is to identify the level of disclosure about mobile banking (MB) on bank websites.

Design/methodology/approach – The study sample comprises Brazilian and American banks, and the authors employed both quantitative and qualitative approaches to analyze the data. An index of 14 items was used to measure levels of disclosure. The quantitative stage involved descriptive analysis of disclosure levels, which was associated with other variables through the application of multivariate regression analysis. The qualitative stage involved a content analysis technique.

Findings – The statistical analysis indicated that size and country were significant explanatory variables for the level of information disclosed on bank websites. American banks disclosed more information about MB on their websites than Brazilian banks.

Originality/value – In the approach, using elements of voluntary disclosure theories, the authors expect to provide insights on how to increase MB information for potential users through a low-cost mechanism, web-based disclosure.

Keywords Mobile banking, Voluntary disclosure, Mobile banking Apps, Web-based disclosure

Paper type Research paper

1. Introduction

Many technologists believe that superior technological innovations will sell themselves, that the advantages of these innovations will be widely realized by potential adopters and that they will therefore diffuse rapidly (Rogers, 1995). However, as pointed out by Rogers (1995), most innovations tend to diffuse at a disappointingly slow rate.

This is the case with mobile banking (MB), which is an innovative channel of communication that allows users to access banking services through mobile devices. MB has freed users from temporal and spatial constraints, enabling them to conduct banking transactions at any time and from any place (Zhou, 2012). However, despite the convenience and flexibility that MB provides, its adoption rate has grown slower than banks expected (Shaikh and Karjaluoto, 2015; FEBRABAN, 2015).

Rogers (1995, p. 8), pointed out that "more than just a beneficial innovation is necessary for its diffusion and adoption to occur." The diffusion of an innovation depends on the dissemination of information about this innovation through communication channels (Rogers, 1995).

According to Rogers (1995), the potential advantage of an innovation leads individuals to seek out information in order to learn more about it. At this point, mass media channels such as TV, newspapers and the internet are usually the most rapid and efficient means to inform potential adopters about an innovation (Rogers, 1995).

In the case of MB, one strategy that many banks are adopting to inform their customers about this technology is the disclosure of information on their websites. Disclosure about

MB on websites is a kind of voluntary disclosure that it is not driven by rules about the content that is published or the way in which the information is presented. It is a low-cost strategy that can contribute with a widespread rate of adoption of MB (Rogers, 1995). However, some banks are not disclosing enough information yet. Within this context, we identified a gap in studies on voluntary disclosure about MB provided on bank websites. As pointed out by Henchiri (2011, p. 155), "the study of communication through websites is of particular interest since the contents are not regulated and the company has complete discretion in this matter." Thus, the main objective of this paper is to identify the level of disclosure about MB on the bank websites. As secondary objectives, the study aims to: identify the potential determinants of this disclosure level; and analyze and compare the information disclosed by banks of two culturally different countries.

For the empirical research, we selected banks from Brazil, a developing country, and the USA, a developed country. These countries rank in the top 5 of the world's largest mobile cellular telephone markets according to the CIA (2014). Furthermore, according to the survey of more than 15 countries conducted by Lim *et al.* (2015), Brazil and the USA are among the five countries that have the most common frequency of visits to Apps stores (more than once a week). Despite these similarities, there are cultural differences between Brazil and the USA that may influence the level of disclosure of their companies (Salter, 1998; Hofstede, 2015) as well as the level of information on MB available at their websites. We measured this level of information and presented some points that banks can implement in order to better present MB technology. Therefore, the results of this study present implications for other developed and developing economies, since the set of items analyzed may serve as a framework for banks worldwide trying to promote their MB through their websites.

This paper contributes to the MB literature by obtaining results on an issue that, to the best of our knowledge, has not been explored in previous studies. A more detailed level of information on banks' websites could represent a less expensive strategy that can increase the number of MB users. By empirically exploring this panorama in two different countries (Brazil and the USA), our results can also be useful for banks in different regions and in countries with different levels of development.

This research gains significance when we show that banks have a powerful tool (websites) which potential can be better explored to guarantee complete information about MB to current and potential users. Moreover, we indicate that the information disclosed by banks can be available at their websites, but this information sometimes is hard to find and complementary measures are required to integrate and facilitate the access of such information.

2. Literature review

2.1 Voluntary web-based disclosure
Disclosure of voluntary information by companies has received a great deal of attention from researchers over the past years. Previous studies show that increased voluntary disclosure has positive consequences for firms because it reduces the information asymmetry between firms and their stakeholders (Boubaker *et al.*, 2011; Branswijck and Everaert, 2012).

Studies on voluntary disclosure include the measurement and analysis of intellectual capital disclosure (Branswijck and Everaert, 2012), corporate social disclosure (Kansal *et al.*, 2014), sustainability disclosure (Sobhani *et al.*, 2012), among others. In the area of electronic banking, Lim *et al.* (2010) proposed a security framework for internet banking based on security information disclosed by banks on their websites.

To provide voluntary and targeted information, the internet appears to be the preferred information channel (Henchiri, 2011). In fact, the internet is an important channel of communication (Jones and Xiao, 2004) both for mandatory and voluntary disclosures. Internet disclosure can reach customers in different geographical locations and it is fast,

flexible and cost-effective (Debreceny *et al.*, 2002). Furthermore, the use of multimedia resources allows the presentation of online information in different formats (Jones and Xiao, 2004), including interactive tools that enable more detailed analysis (Debreceny *et al.*, 2002).

Nevertheless, just including information on a website is not enough. Companies need to provide information with appropriate content that will be useful to their customers (Corritore *et al.*, 2003). Design elements such as appealing presentation, ease of navigation, ease of interaction and ease of searching play an important role in influencing the trustworthiness perceptions of users (Corritore *et al.*, 2003; Hwang and Kim, 2007).

2.2 MB adoption

Rogers (1995, p. 21) defined adoption as "a decision to make full use of an innovation." In the case of MB, market reports have indicated that it is still underused and its adoption rate has been low (FEBRABAN, 2015; Shaikh and Karjaluoto, 2015).

In the USA, a survey conducted by the Board of Governors of the Federal Reserve System (FED) (2015) showed that the most common use of MB was to check account balances or recent transactions. A study conducted in Brazil indicated that the use of internet and mobile channels is growing year after year, having already overcome the use of traditional channels. However, despite this growth, in 2014, the use of mobile channels amounted to only 12 percent of total transactions (FEBRABAN, 2015).

As a result of the low MB adoption rate in many countries, several studies have been conducted to understand the factors affecting adoption of this technology. Among the factors examined in previous studies, systems quality, social influence, complexity, risk perception, ease of use, trust and structural assurances were identified as the most significant factors affecting users' intention to adopt MB (Gu *et al.*, 2009; Luo *et al.*, 2010; Zhou, 2012; Oliveira *et al.*, 2014). Lack of information was also provided as a reason for the non-adoption of electronic banking in general (Muñoz-Leiva *et al.*, 2010; Cruz *et al.*, 2010).

Luo *et al.* (2010) suggested that to increase the intention of use and reduced the risk perception of MB, banks must, among other things, educate consumers about the wireless internet platform and disseminate the benefits and advantages of MB. Banks should also highlight the technologies implemented and inform customers about the security of these technologies. Finally, Luo *et al.* (2010) also indicated that banks may announce a financial loss protection policy to ensure minimal financial risk for the consumer.

Since an evident risk factor in e-services is the risk to privacy (Luo *et al.*, 2010), banks should place their privacy policies on their websites in order to build customers' trust and reduce their fear of having their personal information revealed. This is a relevant item since an information privacy guarantee has a positive influence on the intention of using a website (Hwang and Kim, 2007), which is also valid for MB.

The complexity problem can be minimized if banks provide facilitating conditions to help users to overcome their difficulties in the use of MB. Gu *et al.* (2009) argued that when customers perceive MB as easy to use, they feel more willing to adopt it. Using MB services requires skills such as using a mobile device, connecting to the internet and installing apps (Baptista and Oliveira, 2015). In this sense, banks should provide users guidance on how to install and use MB services (Gu *et al.*, 2009; Baptista and Oliveira, 2015).

Finally, in order to increase consumers' trust, banks may present trust-assuring arguments (Kim and Benbasat, 2006). To be more convincing, these arguments should present three basic elements: claim, data and backing. As Kim and Benbasat (2006, p. 286) stated, "data refer to the grounds for a claim, while backing is used for providing reasons for why the data should be accepted."

Considering the suggestions in these previous studies, we developed a list of 14 items that were used to measure the level of information about MB disclosed by banks. We introduce this list in the methodology section of this study.

2.3 Culture and its dimensions in Brazil and the USA

The term culture was defined as "the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede 2003, p. 861). Hofstede (2003) presented four dimensions whose scores can be used for predicting differences among national cultures. These dimensions are presented below.

Power Distance refers to the extent to which the members of a society accept the unequal distribution of power in institutions and organizations (Hofstede, 2003, 2015). With a Large Power Distance value of 69, Brazil is a society where people accept inequalities in power distribution and believe that hierarchy has to be respected. However, the USA has a lower Power Distance score (40), which reflects the American premise of "liberty and justice for all" (Hofstede, 2015).

Individualism vs Collectivism refers to the degree of interdependence among the members of a society. In individualist societies, individual interests prevail over group interests, while in Collectivist societies the group interests prevail over the individuals interests (Hofstede, 2015). Brazil has a score of 38 in individualism, while USA has a score of 91 and can be considered as one of the most individualist cultures of the world (Hofstede, 2015).

Femininity vs Masculinity indicates the extent to which a culture clearly defines its social gender roles. Masculine societies largely emphasize values of competition, achievement and success, while feminine societies are those in which the dominant values are caring for others and quality of life (Hofstede, 2003, 2015). The USA score on Masculinity is 62, while the score in Brazil is 49 (Hofstede, 2015).

Uncertainty Avoidance refers to the extent to which the members of a culture feel uncomfortable with ambiguous or uncertain situations (Hofstede, 2003, 2015). The high Uncertainty Avoidance characteristic in Brazil (76) justifies why Brazilians require a lot of bureaucracy, laws and rules. On the other hand, the low score of 46 on the Uncertainty Avoidance dimension in the USA indicates that in this country people are more likely to accept new ideas and innovative products (Hofstede, 2015). Americans also do not require a lot of laws and rules like the higher-scoring cultures.

Table I summarizes the two countries' scores of Hofstede's cultural dimensions.

3. Research model and hypotheses

As stated by Lopes and Rodrigues (2007), there is no single theory that explains voluntary disclosure. Agency theory, contingency theory and signaling theory have been used in empirical studies on the determinants of voluntary disclosure (Lopes and Rodrigues, 2007; Henchiri, 2011), and in particular on the determinants of corporate internet reporting (Aly *et al.*, 2010). These studies have shown that voluntary disclosure is a complex function that depends on both firm-specific factors (size, listing status, multinationality, industry, auditor type, leverage, among others) and external factors (those related to the environmental context of the firm such as culture and legal system, among others).

Based on background theories and the previous literature, we have developed the hypotheses below that relate certain bank-specific characteristics (size, listing status and multinationality) and one external factor (country) to the level of disclosure.

Dimensions	Brazil	USA
Power Distance	69	40
Individualism	38	91
Masculinity	49	62
Uncertainty Avoidance	76	46
Source: Hofstede (2015)		

Table I.
Scores of cultural dimensions in Brazil and in the USA

3.1 Size

According to agency theory, management incentives are useful to explain voluntary disclosure (Aly *et al.*, 2010). Since shareholders will seek to control the behavior of managers to verify if they are acting optimally, managers may have incentives to disclose additional information (Watson *et al.*, 2002). Therefore, one way of reducing these monitoring costs is to increase levels of corporate disclosure (Watson *et al.*, 2002; Lopes and Rodrigues, 2007).

Agency theory suggests that agency costs will vary according to different corporate characteristics, such as size and listing status (Aly *et al.*, 2010). According to this theory, larger firms generally present higher agency costs than smaller ones (Boubaker *et al.*, 2011). To reduce these agency costs, larger firms tend to present higher levels of corporate disclosure (Boubaker *et al.*, 2011).

Large companies are also expected to adopt superior information systems that allow them to generate reports at a lower cost (Lopes and Rodrigues, 2007). As larger companies are more visible to customers, they have greater incentives to disclose more information than smaller ones (Debreceny *et al.*, 2002; Kansal *et al.*, 2014).

Previous studies found that large firms provide more disclosure on their websites and that firm size is the most important determinant of web-based disclosure (Debreceny *et al.*, 2002; Gajewski and Li, 2015). Depoers (2000, p. 248) stated that "there is a general agreement that a positive relationship between the size of the company and the extent of disclosure is to be expected." Thus, we hypothesized that:

H1. Bank size will have a positive effect on disclosure about MB.

3.2 Listing status

The relationship between the firms' listing status and voluntary disclosure can also be explained by agency theory (Lopes and Rodrigues, 2007). As previously acknowledged, agency theory suggests that agency costs will vary according to the listing status of the companies (Aly *et al.*, 2010). Listed companies have their capital open to different kinds of investors in the capital market. Therefore, listed companies tend to exhibit greater agency costs (Oliveira *et al.*, 2011), and in order to reduce these agency costs, they are inclined to disclose more information (Boubaker *et al.*, 2011).

Previous researchers pointed to listing status as one of the factors that explain corporate disclosure practices. Buzby (1975) found that listed companies presented a higher level of disclosure in comparison with unlisted firms, although the difference in disclosure levels was not significant at 0.05. Oliveira *et al.* (2011) also found that listed companies disclose more risk-related information than unlisted companies. According to Branco and Rodrigues (2006), listed banks are considered to be more visible, being subject to more extensive media coverage than their counterparts. Thus, we hypothesized that:

H2. Listing status will have a positive effect on disclosure about MB.

3.3 Multinationality

Signaling theory argues that the market can interpret higher levels of disclosure as a good signal, since it reduces information asymmetry (Lopes and Rodrigues, 2007). Thus, higher quality firms will work to distinguish themselves from others through voluntary disclosure (Watson *et al.*, 2002).

When a subsidiary of a company goes to another country, the controller can expect that it will be necessary to provide higher levels of information to transmit credibility and reduce information asymmetry. Thus, companies operating in different countries "are prone to increase their voluntary disclosure to show their international presence to stakeholders as a perceived good signal" (Oliveira *et al.*, 2006, p. 17).

As stated by Lopes and Rodrigues (2007, p. 33), "the more internationalized a company is the more it has to show its stakeholders (customers, suppliers, government) that it is a good company." Based on these arguments, we state the third hypothesis of this paper:

H3. Multinationality will have a positive effect on disclosure about MB.

3.4 Country

Most theoretical frameworks used to explain variations in disclosure practices across countries rely on contingency and environmental-based models (Salter, 1998; Williams, 2004). Contingency theory states that corporate disclosure practices are influenced not only by firm-specific factors but also by the cultural and institutional environments in which firms operate (Lopes and Rodrigues, 2007).

Debreceny *et al.*'s (2002) study of 660 large companies in 22 countries identified that internet reporting varies across firms and across countries. According to the authors, the general disclosure environment in the firms' home country (including the dimensions of national culture) plays an important role in explaining their disclosure level. "Financial information users in high disclosure countries would be more accustomed to higher levels of disclosure when making economic decisions" (Debreceny *et al.*, 2002, p. 381).

Previous research has shown that the level of disclosure of the reports presented to the American capital market is higher than the level of disclosure of those provided to the Brazilian market (Malaquias and Lemes, 2013).

The literature also indicates that the cultural differences between Brazil and the USA may influence the level of disclosure of their companies (Gray, 1988; Zarzeski, 1996; Salter, 1998; Archambault and Archambault, 2003). According to Archambault and Archambault (2003), culture interacts with the national systems, which, in turn, influence corporate-level decisions. Zarzeski (1996, p. 19) highlighted that "culture underlies the business activities of a nation" and that "accounting standards appear to be culture-driven through market forces."

Disclosure was found to be negatively related to Uncertainty Avoidance and Power Distance, and positively related to the Masculinity and Individualism dimensions of culture (Gray, 1988; Zarzeski, 1996; Salter, 1998). In this way, according to the scores of cultural dimensions presented in Table I, we expect that the level of disclosure about MB in the USA will be higher than the level of disclosure in Brazil.

Thus, we hypothesized that:

H4. American banks present higher levels of disclosure about MB than Brazilian banks.

We summarized our research model in Figure 1. To estimate the dependent variable "Disclosure about MB," we considered 14 items, as explained in the next section.

4. Methodology

To achieve the overall objective of this paper, we performed a comparative analysis between banks operating in Brazil and banks operating in the USA. In January 2016, we visited the websites of all banks operating in Brazil, seeking for information about their MB apps.
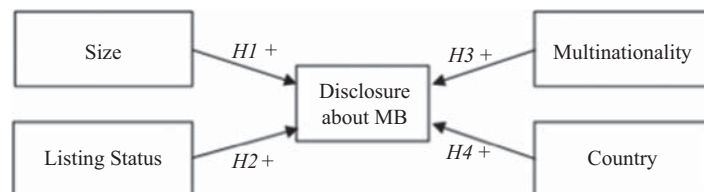
Figure 1.
Research model

Among the commercial banks that operate in Brazil, we found 19 banks that offer MB apps to their customers and that disclose some information about their apps on their websites. After this, we used the software Decision Analyst STATS™ 2.0 to randomly select 19 banks from the USA. So, our final sample is comprised of 38 banks (19 from Brazil and 19 from the USA). All of the banks deal with both retail and corporate customers.

4.1 Qualitative approach

First, we conducted a thorough search of the entire website of the banks to ensure that all relevant information related to the 14 items listed in Table II were captured. Any information about these 14 items was noted. We then performed an analysis of this material using the content analysis technique (Krippendorff, 2012).

The data were coded by two different researchers. Inter-coder consistency was analyzed and a high level of agreement between the two researchers was verified. The categories were established prior to the analysis based upon previous studies (listed in Table II). These categories are characteristics of the MB technologies, facilitating conditions, security and privacy, and way of presentation.

4.2 Quantitative approach

In the quantitative stage, we used a disclosure level index comprised of 14 items for the measurement of the level of disclosure about MB on the websites of the banks, as shown in Table II.

For Items 1–12, we assigned three notes each: 0 for banks that did not present any information about the item; 1 for banks that disclosed some information, even if incomplete; and 2 for banks that provided complete information about the item. For Item 13, we assigned 0 for "No," and 2 for "Yes." For Item 14, we assigned 2 when there was a direct link to information about MB on the main homepage of the bank, 1 when we had to search a link to information about MB on the menu of the main homepage and 0 when there was no link to information about MB on the main homepage of the bank.

Characteristics of the Mobile Banking Technologies (Based on Luo *et al.* (2010))
Item 1 Does the bank highlight the technologies used in its MB?
Item 2 Does the bank present the main functionalities of the technologies used in its MB?
Item 3 Does the bank present the benefits and advantages of its MB technologies?

Facilitating Conditions (Based on Gu *et al.* (2009), Luo *et al.* (2010) and Baptista and Oliveira (2015))
Item 4 Does the bank disclose how a wireless internet platform works?
Item 5 Does the bank provide guidance on how to install and use its Apps?
Item 6 Does the bank present the Frequently Asked Questions about its MB?

Security and Privacy (Based on Kim and Benbasat (2006), Lim *et al.* (2010) and Luo *et al.* (2010))
Item 7 Does the bank disclose security tips informing customers how to proceed to conduct their
        transactions safer?
Item 8 Does the bank provide arguments about the security of MB technology?
Item 9 Does the bank announce a financial loss protection policy (related to MB)?
Item 10 Does the bank announce a privacy protection policy (related to MB)?

Way of Presentation (Based on Debreceny *et al.* (2002), Corritore *et al.* (2003), Luo *et al.* (2010) and
Oliveira *et al.* (2014))
Item 11 Does the bank disclose how much its MB transactions represent of its total transactions?
Item 12 Does the bank encourage its customers to use MB?
Item 13 Does the bank use videos to present its MB apps?
Item 14 Is it easy to find information about MB on the website of the bank?

Table II.
Items of disclosure

Following the procedure adopted by Lopes and Rodrigues (2007), we used the responses to each question to estimate the disclosure level. Our disclosure index is unweighted (Lopes and Rodrigues, 2007), as we attributed the same level of importance to all items. We calculated the sum of the grades given to all items using the following equation:

$$S = \sum_{n=1}^{14} gi, \qquad (1)$$

where gi is the grade given for each item (from 0 to 2); n is the number of items; and S sum of the grades (Lopes and Rodrigues, 2007).

After obtaining the sum of the grades, we applied the following equation to obtain the disclosure index:

$$\text{Discl. index} = \frac{S}{28}, \qquad (2)$$

where Discl. index is the disclosure index for each bank; and S sum of the grades.

The denominator of the equation is 28 because the maximum grade for each item is 2; as we have 14 items, the maximum value possible for S is 28. According to the equation, the disclosure index can vary in a range from 0 to 1, in which 0 is the bank that did not disclose any items, and 1 is the bank that disclosed all items completely. This was the dependent variable in our model.

In order to test our four hypotheses, we used the following measures of the variables:

- Size (*H1*): we used the natural logarithm of the total assets for each bank (measured in US$) as a proxy for size.

- Listing status (*H2*): the listing status of the banks was measured as a dummy variable. US banks listed on the New York Stock Exchange or the National Association of Securities Dealers Automated Quotations received score 1 in this variable (if the bank is a subsidiary of a listed company, it also received score 1). Brazilian banks listed in the Securities, Commodities and Futures Exchange (BM and FBovespa) received score 1 in this variable (if the bank is a subsidiary of a listed company, it also received score 1). Unlisted banks received score 0.

- Multinationality (*H3*): the variable multinationality was measured as a dummy variable, in which banks with foreign branches received score 1 and the other banks received score 0.

- Country (*H4*): we used a dummy variable (named country) to represent country, in which the American banks received score 1 and Brazilian banks received score 0.

We used regression analysis to test the four hypotheses. To test the normality of the standardized residuals of the regression, we applied the Kolmogorov–Smirnov test. We also applied the variance inflation factor test in order to verify the absence of multicollinearity between independent variables.

5. Results
5.1 Quantitative analysis results
Table III contains the average disclosure by country and by item. Brazilian and American banks both disclose more information on their websites about their MB characteristics. The main weakness seems to be information about facilitating conditions for banks of both countries. We explored these results further in the qualitative analysis results section.

Table IV shows the descriptive characteristics of the study sample. It is of note that 31.6 percent of the sample was composed of banks that have foreign branches. The banks in the sample, on average, disclose more that 50 percent of the 14 items, as the mean of the dependent variable was 0.558.

We also observed whether any bank received the maximum for all 14 questions; the maximum disclosure index was 0.857 (out of 1.00). It is important to note that the disclosure of the items that we have analyzed is not mandatory for the banks. In order to test the hypotheses that we have presented, we ran a multivariate regression analysis. Table V contains the results.

In Table V, we show that our model explains 34.7 percent of the disclosure index variations. The results of the Kolmogorov–Smirnov test confirmed that the distribution of the standardized residuals did not differ from a normal curve (sig. = 0.620). Therefore, we consider our model an adequate test of our four hypotheses.

Larger banks provided more information about MB than smaller banks, which is in accordance with *H1*. The first reason for the positive relationship between size and disclosure may be due to the structure of large banks. As pointed out by several authors (Debreceny *et al.*, 2002; Lopes and Rodrigues, 2007; Boubaker *et al.*, 2011; Kansal *et al.*, 2014), larger companies tend to have better disclosures due to the lower costs of generating information. The cost of offering an MB service can also be lower for larger banks. Therefore, the general agreement that size positively affects the level of disclosure (Depoers, 2000) extends to the case of MB disclosure on bank websites.

Category	Brazilian banks	American banks	All banks
Characteristics of Mobile Banking Technologies	0.851	0.947	0.899
Facilitating Conditions	0.254	0.526	0.390
Security and Privacy	0.303	0.632	0.467
Way of Presentation	0.474	0.566	0.520
Total	0.459	0.658	0.558

Table III.
Disclosure behavior, by country

Variables	n	Mean	SD	Min.	Max.
Discl	38	0.558	0.181	0.072	0.857
Country	38	0.500	na	0.000	1.000
Size	38	11.947	4.932	5.746	19.698
Multinationality	38	0.316	na	0.000	1.000
Listing Status	38	0.579	na	0.000	1.000

Note: na = not applicable because these variables are dummies

Table IV.
Descriptive statistics of the sample

Variables	B	SE	T	Sig.	Hypoth.	Result
Constant	−0.087	0.230	−0.380	0.708	–	–
Size	0.035	0.015	2.300	0.028	*H1*	Supported
Listing Status	0.015	0.051	0.290	0.773	*H2*	Not supported
Multinationality	−0.072	0.073	−0.980	0.335	*H3*	Not supported
Country	0.486	0.129	3.760	0.001	*H4*	Supported
n	38		F	5.920		
adj. R^2	34.7%		Sig. (F)	0.000		

Table V.
Regression analysis for hypotheses testing

Regarding *H2* and *H3*, the results for the quantitative analysis indicated that listing status and multinationality did not affect the disclosure of the banks. The disclosure level seems to be affected in majority by the asset level of the banks (their size) and by cultural factors in each country. Whether the bank has branches in another country or if it is listed in the capital market seems to be irrelevant in explaining the level of information provided about MB. The result for *H2* is in accordance with results obtained by Buzby (1975), but differs from major arguments found in the literature (Branco and Rodrigues, 2006).

Based on the literature and on the scores of the cultural dimensions in Brazil and the USA, we hypothesized that the disclosure level about MB is not the same in different countries. The results of the study confirmed this assertion, as we found that the American banks disclosed more information than the Brazilian banks. When controlling for the other variables, the mean difference of the disclosure index for the two countries was 0.486. This difference is statistically significant, which indicates that Brazilian banks can improve information about MB on their websites.

This result is in line with *H4* and confirms that the country of the bank is important in explaining the MB disclosure level, as stated by Debreceny *et al.* (2002). Our results also conform to those of Malaquias and Lemes (2013) with respect to the Brazilian disclosure level in comparison with firms from the USA. The higher level of Power Distance and Uncertainty Avoidance and the lower scores of Individualism and Masculinity in Brazil may explain these results (Gray, 1988; Zarzeski, 1996; Salter, 1998).

We understand that the diffusion of MB is of interest to all banks, especially because it can lead potential users to adopt it. Thus, information about MB should be uniform between banks of different sizes and from different countries. Nevertheless, we empirically observed that certain factors affect the level of this information on bank websites.

In the next section, we present further details on the disclosures of the banks in the sample.

5.2 Qualitative analysis results

As stated before, the content analysis of the banks' websites resulted in four categories related to the objectives of the work: characteristics of the MB technologies; facilitating conditions; security and privacy; and way of presentation. We use these categories to present the qualitative results.

5.2.1 Characteristics of the MB technologies. Just one of the banks (a Brazilian bank) did not disclose any items related to the characteristics of its MB app. Another Brazilian bank presented poor information about its MB app. The other sampled banks presented their apps as well as their main functionalities and advantages.

As the most common functionalities, banks indicated that their apps allow users to check account balances, transfer funds, pay bills and find branch/ATM locations.

As advantages of MB, most of the banks highlighted the convenience and the possibility of using banking services anytime and anywhere.

Regarding the items related to the characteristics of the MB Technologies, the disclosures of most banks were in line with Luo *et al.*'s (2010) suggestion that banks should present the technologies implemented as well as the benefits and advantages of their MB system.

5.2.2 Facilitating conditions. Considering that banks should provide facilitating conditions (Gu *et al.*, 2009) for their customers, we noted if the banks provided guidance on how to use their apps, if they presented Frequently Asked Questions (FAQs) about MB, and if they presented how a wireless internet platform works.

In total, 4 Brazilian banks and 12 American banks provided complete guidance for the use of at least one of their apps. Some banks showed only how to download and install the apps.

FAQs were present on six Brazilian and ten American bank websites. Common questions were related to how secure MB is, what to do in case of loss or theft of the mobile

phone, how to enroll in MB, how to install and sign in for the first time, what it is possible to do with MB, etc. Through these FAQs, it is evident that banks realize that customers require more information regarding security of MB, its functionalities and how to start using it.

Only two banks in the sample (both American) presented information about how a wireless internet platform works, as suggested by Luo *et al.* (2010). We believe that this is a point of consideration for banks to improve disclosure about MB on their websites.

5.2.3 Security and privacy. Since structural assurance may affect trust (Zhou, 2012), we analyzed if the banks present security policies and arguments to inform their users about how safe their MB technologies are.

Regarding financial loss protection policies, some American banks indicated that in the case of unauthorized access to their account, the client is covered for funds removed from his/her account. We did not find guarantees like these on the Brazilian banks' websites. One Brazilian bank stated that all transfers from one account can only have other accounts belonging to the same customer as a destination.

Many banks stated that MB is safe, but most of them did not present enough elements to ground this assertion. The most common argument used by banks is that their MB is secure because they employ advanced encryption technology. In this argument, we have a claim (MB is secure) and data (we employ advanced encryption technology). However, the reasons for why the data should be accepted by the customers (backing) are missing in this argument. Since trust-assuring arguments are important elements of internet stores (Kim and Benbasat, 2006), we believe that banks could improve the arguments on their websites in order to be more effective in showing customers that MB is safe.

All of the sampled banks presented privacy policies on their websites. However, only eight banks (seven American) clearly stated that their online privacy policies extended to MB services. Although most banks disclosed security tips informing users how to make their transactions safer and how to prevent fraud, only 19 banks (5 Brazilian and 14 American) presented specific tips for safer use of MB.

5.2.4 Way of presentation. In our study, we verified not only if information about MB was disclosed, but also the way that this information was disclosed.

Nine Brazilian banks and ten American banks used videos to present their apps. After watching the videos, we believe that they are an important tool to attract the attention of the users.

We also verified if the banks encouraged their customers to adopt MB. We found that all American banks and 14 Brazilian banks encouraged their clients, using terms like: "Get started with Mobile Banking today! It's easy [...]," "Download the app and take the Mobile Banking always with you," "Bank quickly and get back to life" and "Download it now!"

Statistics showing how much MB transactions represent of their total transactions were little explored by the banks. Statistics about MB use and adoption can be relevant information for potential users because, if they perceive that many people are already using MB, they can be more willing to adopt this technology. Four Brazilian banks presented this item. They highlighted the growth of usage and acceptance of the MB channel, but this information was not disclosed together with other information about MB.

Finally, we analyzed if it was easy to find information about MB on the banks' websites. About 63 percent of the banks presented a direct link to information about MB on their main homepages. On the others banks' websites, it was necessary to search menu options or use the research tool to find information about MB.

It is important to note that most banks did not disclose the information about MB on the same page. We had to navigate through many pages of the banks' websites to find most information. Since ease of navigation and ease of searching are aspects that can improve

trust (Corritore *et al.*, 2003), we suggest that in order to facilitate access to content about MB, banks should include the main information about MB on the same page, including links to obtain more information.

6. Conclusions

The aim of this paper was to identify the level of disclosure about MB on bank websites. In order to measure the level of disclosure about MB on bank websites, we used an index consisting of 14 items selected from the literature. Some potential determinants of the level of disclosure were also exploited using quantitative tools.

Both quantitative and qualitative results showed that Brazilian banks have lower levels of disclosure about MB when compared with American banks. The main difference between their disclosure levels was related to disclosures about security. We observed that American banks included more information concerning security and financial loss protection guarantees offered to MB users.

Although cultural elements are not the only factors affecting disclosure practices, cultural differences between Brazil and the USA may explain these results. Previous studies pointed out that disclosure is negatively related to Uncertainty Avoidance and Power Distance, and positively related to the Masculinity and Individualism dimensions of culture. Our results are in line with these previous studies. Despite the significant difference in the disclosure levels between Brazilian and American banks, they all have areas for improvement. For instance, banks could do the following:

(1) use more videos to demonstrate how to use MB and how secure it is;

(2) show how much MB transactions represent of their total transactions;

(3) improve their trust-assuring arguments;

(4) have a webpage including information and links about MB; and

(5) include a direct link to information about MB on their main homepages.

Once these actions have been taken, we believe that users would be able to obtain information effortlessly and gain more confidence about MB adoption, even among countries with different cultural values. The widespread adoption of this technology has the potential to improve users' quality of life, as MB permits banking transactions without going to physical branches. Therefore, the use of web-based disclosure to improve MB adoption has a potential indirect effect on society by reducing bank costs and improving people's daily activities.

Disclosure about MB on websites is voluntary, and we measured the level of disclosure according to the information we found. It is possible that some banks have the information, but did not disclose it in a way that we could find, or they presented it in webpages that were not publicly available.

Our statistical analysis also showed that the size of the banks has a significant effect on explaining disclosure about MB. However, because MB is a technology that can facilitate improvements in customers' lives and increase bank profits, we argue that information about MB should be uniform between banks of different sizes and from different countries.

Banks have been investing in MB technology, and we recommend that they disclose this information to their customers. More clients using MB is a sign of suitable investment policy choices, as well as proper disclosure policy practices.

This study has theoretical and practical implications. In our approach, we integrated elements of different voluntary disclosure theories to IS Literature. We think that this integration may provide insights on how to increase MB information for potential users through a low-cost mechanism, web-based disclosure. At this point, we argue that this study extends the existing literature about electronic commerce. The factors that affect the

disclosure level indicate gaps that are useful for IS literature. For example: Does the bank's size also affect the functionalities of its MB app?; Is the perception of security of MB apps related to the bank's size?

We used a list of 14 items to evaluate the disclosure level of MB. There are practical implications regarding these items because they represent a guideline that banks can use to improve information about MB available on their websites. Further studies can use these items to evaluate the disclosure level in other countries.

This research has three major limitations. The first is related to the source of information that we evaluated. We used only public information, but some institutions may have internal mechanisms (through internet banking, for example) to encourage their users to adopt (or even to try) the MB apps. Other sources of information, such as banners in branches, flyers, TV advertising, etc., are public information, but they were not considered in this research. Nevertheless, we used an information source that can be considered an efficient means to inform potential adopters about an innovation (Rogers, 1995).

The second limitation is that our measure for disclosure level was based on the literature review, but it does not necessarily represent all items that customers will use as determinant information to adopt MB. Thus, in future studies, we recommend evaluating the relevance of these items to potential MB users, and an analysis of the extent to which voluntarily disclosed information affects the adoption of MB applications. This evaluation should contribute to academic literature regarding the practical value of increasing the level of voluntary information on MB. For future research, we also recommend a longitudinal study on the disclosure level of the banks over time.

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