Mobile Users' Switching Intention:
A Comparative Study between Brazilian and German Markets.

Autoria: Rodrigo Ciaravolo Martins, Luis Fernando Hor-Meyll, Jorge Brantes Ferreira

ABSTRACT

The Brazilian mobile telephone market can be considered a mature market, boasting more than 100 lines per 100 inhabitants. The implementation of number portability was concluded in March 2009, thereby reducing switching barriers, increasing competition, and making the switching process among carriers easier. This study attempts to identify factors that influence the mobile consumer's switching intention, and to compare the influence of these factors in both the Brazilian and German mobile markets. Performance is significantly related to consumer satisfaction (Shin and Kim 2008). Fornell *et al.* (1996) defined perceived value as the perceived quality relative to price. Marchetti and Prado (2004) considered the economic dimension as the relationship between perceived costs and benefits. Turel and Serenko (2006) demonstrated strong correlation between perceived value and consumer satisfaction. Jones, Mothersbaugh, and Beatty (2000) defined switching barriers as factors that may make it more difficult/costly to switch providers, including lock-in techniques. Oliver (1996) defined loyalty as a deep commitment to repurchase a service in the future. Gerpott, Rams, and Schindler (2001) identified relationship between satisfaction and loyalty in the German mobile market. In US, Lim, Widdows, and Park (2006) studied the relationship between satisfaction and loyalty to the supplier. Kim et al. (2004) identified a positive relationship between switching barriers and customer retention in Korea. Switching costs was found to have a mediating effect between satisfaction and re-purchase intent (de Matos, Henrique and de Rosa 2007). A survey was conducted on two convenience samples (202 users in Brazil and 200 in Germany). Data was collected on a website where the questionnaire was published. A link leading to the questionnaire was sent via e-mail to undergraduate and graduate student discussion groups in Brazil (Rio de Janeiro) and Germany (Ingolstadt). Structural equation modeling suggests that, in both markets, customer satisfaction is an important factor with respect to switching intention. In the Brazilian market, the influence of perceived service quality is higher than in Germany, while Germans consider perceived price to be more important than do Brazilian users. The results also suggest that perceived service quality and perceived price rank higher in the German market, while Brazilians still perceive the existence of high switching barriers. There were no significant differences in perceptions of German and Brazilian users in relation to customer lock-in strategies, despite the difference in stages of maturity between the two markets.

INTRODUCTION

Latin America, with 530 million wireless subscribers, has surpassed Western Europe to become the second largest cellular market in the world. The Southern Cone countries of the continent and, notably Brazil, the region's largest market, were largely responsible for this advance (Estadão 2010).

With over 205 million mobile phones in operation and penetration of approximately 106 mobile lines per 100 inhabitants, the Brazilian mobile telephony market — a third of the Latin American market and the fifth-largest national market in the world — recently reached maturity (characterized by an average of 100 or more devices per 100 inhabitants). The latest regulatory changes in the mobile phone industry, made by the Brazilian regulator (Teleco 2011), illustrate the search for alignment with more developed markets, evidenced by the implementation of cell phone number portability when switching carriers (as of March 2009). Its main objective was to reduce users' barriers to switch between mobile carriers, thus stimulating competition (Anatel 2007).

In the early stages of market growth, the wireless industry players in Brazil bet on winning new customers. But when the market matured, the importance of subscriber retention became the main focus.

In mature markets, signing up new subscribers becomes more difficult and more expensive than retaining customers already acquired, in part because the carriers already have information on the preferences and behavior of their users, thereby facilitating the adaptation of their strategies to specific needs (Seo, Ranganathan and Babad 2008). Costs associated with acquiring new subscribers, such as setting up and configuring new accounts, credit analysis, advertising, and operating expenses, can render the cost of acquiring a new subscriber five times higher than retaining a current subscriber (Farber and Wycoff 1991; Peters 1988).

Such arguments emphasize the importance of understanding the various constructs related to consumer's formation of switching intention in order to identify the dynamics of these intentions.

The literature on number portability has focused on studying whether the effects intended by the introduction were, in fact, obtained after deployment, diffusion, and absorption by the market. This study was conducted when the option of number portability had just completed its implementation cycle in Brazil; its uniqueness lies in the comparison of two environments in different stages of maturity and the attempt to identify differences in the process of forming switching intentions. Based on the findings, an effort was made to identify trends in the Brazilian market and possible implications for consumers, service providers, and regulators.

The subjects consisted of residential users (i.e., those who use mobile phones for non-commercial purposes only) who used the postpaid service method. The choice is justified by the fact that, despite representing only 18.57% of total mobile phone users in Brazil, this group had an average monthly income up to seven times higher than users of prepaid service. Because of high cost of conducting a more comprehensive collection of data, mobile phone service users were surveyed in just one city in each country: Rio de Janeiro in Brazil and Ingolstadt in Germany.

NUMBER PORTABILITY

Number portability has been the subject of several studies (Buehler and Haucap 2004; Lyons 2006; Mzanza 2008; Shin and Kim 2008; Shin 2006; Sutherland 2007) that have

examined the effects of its introduction in several countries, assessing whether expected results were actually achieved and the reactions of the participants of those markets.

Sutherland (2007) studied the introduction of number portability in different countries and concluded that the demand for portability is potentially high, since consumers show resistance to switching service providers when they cannot keep their current numbers. The resistance is due mainly to non-monetary costs such as reprinting business cards or other custom materials or the repainting of signs on vehicles, for corporate clients. With the change of number, personal and professional contacts could be lost, resulting in financial losses. Sutherland concluded that in many countries, regulators have allowed carriers to adopt cumbersome procedures, rendering the porting process less attractive to potential customers, and that, as such, the primary objective of number portability had suffered from a less than stellar take-up.

Mzanza (2008) looked at the results obtained from the implementation of number portability in South Africa, completed in late 2006: the number of users with switching intention remained stable after the introduction of portability, and local carriers did not experience any significant impacts after the introduction of the service, since the reduction of tariffs to attract new customers was not enough incentive for significant migration between carriers.

Lyons (2006) conducted an econometric analysis with time series data of 38 countries to estimate the effect of implementation of number portability, both on the price of mobile services and on consumer switching behavior. His findings showed that the quality of the portability service (based on the maximum time to complete migration of the number) helps explain the impact on tariffs and numbers of users who switched service providers. In countries where the migration process was completed within five days, portability resulted in increased subscribers and reduction in tariffs.

The analyses conducted by Lyons (2006) also revealed that in countries with high quality portability (completed in five days or less) rates fell on average of 6.6% in the four months following deployment. Long term, there was an average decrease of 12% in tariffs. Lyons also noticed that the lower the tariff the greater the use of mobile phone services.

Based on the classification of mobile service providers by users, Lee, Kim and Park (2006) estimated the costs of switching and impacts of the introduction of number portability in the Korean market. They selected seven attributes considered relevant in a previous study (Oftel 2000) in the choice of mobile phone providers (brand, service level, Internet accessibility, price, dropped calls, number portability and the need to buy a new handset when switching providers). The results showed that 88.6% of respondents pointed to a drop in utility if the carrier were switched (i.e., they would not switch carrier without some type of compensation), which seemed to indicate that in the Korean market, significant switching costs were perceived. Furthermore, 72.7% of the sample would opt for number portability, were they to consider switching carriers.

Lee *et al.* (2006) found that the inconvenience of changing numbers should be among the main switching costs perceived by Korean users. While the cost of number portability can be reduced through interference from regulatory bodies, there would still be a significant portion of costs that would discourage carriers from lowering rates, since other barriers (not identified in the study) make it difficult for subscribers to switch.

After a brief examination of the introduction of number portability in several European countries, Björkroth (2005) evaluated the impact in Finland of the implementation of portability on user's perceived cost of switching. The results indicate that barriers have been

considerably lowered since the introduction of portability, mainly due to effects on the reduction of contractual costs and informational costs.

Shin (2006) studied the effects of number portability based on the perceptions and behaviors of U.S. consumers and found that even after the introduction of portability, users still perceived high barriers to switching, barriers that discouraged migration between carriers. In turn, portability led carriers to come up with new ways to retain customers, locking them in to a greater degree.

FACTORS INFLUENCING SWITCHING INTENTION

In the mobile market in the United States, number portability has been in full force since 2003. Initial expectations suggested that within the first year of its introduction some 30 million users would switch carriers, taking their numbers with them. However, three years after implementation, only 10 million users had switched provider (Shin and Kim 2008).

Shin and Kim (2008), through the model depicted in Figure 1, tried to assess the relationships between the constructs value, service quality, switching costs, lock in, satisfaction and perceived switching barriers, while also evaluating their influence on the switching intention of subscribers in the mobile industry. Their findings suggest that both consumer satisfaction and switching barriers impacted intentions and attitudes to switching. A significant relationship was also found between the perceived quality of service (perceived performance) and customer satisfaction, implying an indirect effect on intention to switch.

Price, understood as perceived value, did not present significant effects upon consumer satisfaction and does not seem to influence intention to switch. Satisfaction had an inverse influence on switching intention, suggesting that satisfied customers are less likely to switch than unhappy consumers.

The relationships found suggest that if consumers perceive they are getting a high-value service in relation to the rates paid, they will tend to be satisfied and continue with their service providers, with perceived price being converted into quality of service (performance improvement) and satisfaction with service.
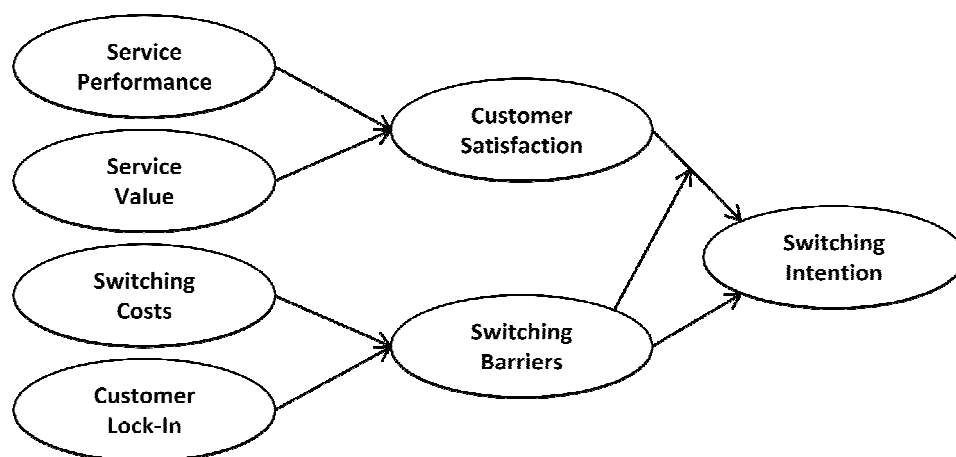

Figure 1. Factors influencing Switching Intention (Shin and Kim 2008)

Switching barriers appeared to be influenced by customer lock-in tactics used by the provider and the rising cost of switching, resulting in barriers having an inverse influence on intention to switch. Number portability seemed to have no significant effect on switching

decisions of U.S. customers since the existing barriers to switching continued to negatively influence switching intention. However, the introduction of portability seemed to bring indirect benefits to consumers by reducing tariffs, improving services and increasing promotional offers to attract new customers (Shin and Kim 2008).

With portability, carriers augmented their retention strategies, offering longer term contracts, increasing cancellation fines and creating other hidden costs—actions that countered the regulatory agency's original objective, which was to remove switching barriers perceived by consumers (Shin and Kim 2008).

Neither did the introduction of number portability in England achieve the expected results; there, besides lifting certain barriers to migration, as had happened in the United States, a difficulty of another sort was identified: a lack of awareness among consumers regarding what portability meant (Xavier and Ypsilanti 2008).

Economic impacts of the introduction of number portability were studied by Buehler and Haucap (2004). One result was users' difficulty to identify the carrier based on the phone number being called. Without portability, users can easily recognize the various carriers based on the prefix of the phone number. With portability, however, the prefixes of phone numbers can no longer be relied on to indicate the network to which the number is connected. If there is a difference in connection rates between different networks (as is often the case), consumers will fail to realize they may be paying a higher rate than that to which they are accustomed, which can result in carriers raising rates (Buehler and Haucap 2004).

To avoid this inconvenience, in some countries, such as Germany and Finland, users can call a free service and find out which network owns the number they wish to call. In Portugal, a beep warns when the user makes a call outside her (his) home network. However, for such mechanisms to have a positive effect, additional investments will be needed for the cost of implementation to be lower than the benefits of avoiding this "consumer ignorance" (Buehler and Haucap 2004).

HYPOTHESES

Shin and Kim (2008) investigated the nature of the relationship between the perceived performance of mobile telephony services and levels of consumer satisfaction and showed that performance is significantly related to consumer satisfaction. Serenko and Turel (2006), in applying the American Customer Satisfaction Model (ACSM) (Fornell *et al.,* 1996) in the Canadian mobile market, identified a strong relationship between the perceived quality of service performance and consumer satisfaction. The foregoing observations allow the following to be proposed:

H1. High levels of perceived service performance are associated with high levels of customer satisfaction.

Fornell *et al.* (1996) defined perceived value as the perceived level of quality relative to price paid. Zeithaml, Berry, and Parasuraman (1988) reinforced this definition by considering perceived value as the consumer's perception of benefits obtained minus the costs of maintaining supplier relationships. Marchetti and Prado (2004) stressed aspects of the economic dimension, considering it as the relationship between costs and benefits perceived by consumers.

In the mobile phone industry, high perceived value means satisfaction with the total amount paid by the user for the combined cost of the line, voice calls, and other services included in the plan (Kim, Park and Jeong 2004). In view of the results for the US mobile phone market, if consumers feel they are getting a high-value service in relation to the price charged, they will be more likely to be satisfied and will tend to remain as customers of their

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current carriers (Shin and Kim 2008). Turel and Serenko (2006) have demonstrated a strong correlation between perceived value and consumer satisfaction with mobile services in the Canadian market. It can be proposed that:

H2. High levels of perceived service value are associated with high levels of customer satisfaction.

Jones, Mothersbaugh, and Beatty (2000) defined switching barriers as factors that may make it more difficult or costly to switch service providers. In the mobile phone industry, such barriers would include costs incurred in switching carriers and the effects of lock-in techniques used by carriers (Shin and Kim 2008). Therefore, it can be assumed that:

H3. High switching costs are directly associated with high perceived switching barriers.

Dick and Basu (1994) defined loyalty as a strong relationship between relative individual attitudes and repeat purchases, manifesting as the proportion, sequence, and likelihood of additional purchases from the same supplier. Oliver (1996) defined loyalty as a deep commitment to repurchase a product or service in the future, despite situational influences or marketing efforts with the potential to cause behavior change. Based on the above, one can assume that a low level of switching intention would be an indicator of loyalty. Given the continuous nature of mobile phone services, if the consumer does not intend to switch, the consumer's loyalty to the provider may be inferred.

Gerpott, Rams, and Schindler (2001) tried to identify, in the German mobile phone market, the relationship between customer satisfaction and loyalty: they found that an increase of one unit in customer satisfaction translated to growth of 0.75 units in loyalty to the service provider. In the US market, Lim, Widdows, and Park (2006) studied the relationship between satisfaction and loyalty to the supplier, obtaining results similar to the study of Gerpott et al. (2001). Customer satisfaction seems to be a powerful indicator of consumer loyalty, there being a strong positive effect between the level of customer satisfaction and customer loyalty to the service provider. This observation suggests that:

H4. High levels of consumer satisfaction are associated with low levels of switching intention.

In addition to switching costs, barriers such as the imposition of longer contracts, contract termination fees, and the existence of customer loyalty clubs can act as resources for customer retention, even when satisfaction with the service is lacking (Lee, Kim and Park 2004). Kim et al. (2004) identified a positive relationship between switching barriers and customer retention in the Korean mobile phone market. The relationship was also encountered in a study of beauty salon and bank customers, increasing the possibility for a positive relationship between perceived barriers to switching and repurchases intentions (Jones, Mothersbaugh, and Beatty 2002). It can be assumed that switching barriers would act as agents inhibiting switching among carriers, thus it would follow that:

H5. High levels of switching barriers are associated with low levels of switching intention.

Perceived switching barriers have a mediating effect on the relationship between consumer satisfaction and switching intention, suggesting that consumers who perceive high barriers to switching tend not to switch carriers, even when not satisfied with the service received (Shin and Kim 2008). Lee and Feick (2001) found that the propensity of certain customers to not abandon their carriers could be explained by satisfaction with services received or by dissatisfaction with certain product categories where high switching costs act as inhibitors to switching carriers.

By comparing customers with future switching intention with customers without such intention, Shin (2006) noticed that barriers to switching perceived by users have a strong influence on the decision to continue with the current carrier. The connection between

satisfaction and loyalty, besides having a direct relationship, depends also on intervening factors, including the cost of switching. In a study conducted in the banking sector, switching costs presented a mediating effect between satisfaction and re-purchase intent (de Matos, Henrique and de Rosa 2007). It is proposed therefore that:

H6. High levels of customer lock-in are associated with high levels of switching barriers.

H7. High levels of perceived switching barriers mediate the relationship between consumer satisfaction and switching intention.

Shin and Kim (2008) found that the factors that constitute switching barriers directly affect users' intention to switch cell phone carriers, even in environments where portability has already been consolidated. Portability benefits consumers indirectly, by reducing tariffs, improving the performance of services offered, and increasing offerings to attract new customers. However, it results in service providers stepping up lock-in tactics by requiring subscribers to sign longer contracts, increasing contract cancellation fines, and building in other hidden costs.

Results obtained by Lee *et al*. (2006) showed that in the Korean market, although switching costs persist in the wireless industry, the implementation of number portability led to reduction of switching costs, something that also occurred in the Finnish market (Björkroth 2005).

Assuming that number portability has been consolidated in the German market and that, in Brazil, the process is still in the introductory stage, hypotheses H8, H9, H10, H11 and H12 can be formulated.

H8. Perceived levels of performance in mature markets tend to be higher than perceived levels of performance in markets that have not yet reached maturity.

H9. Perceived value in mature markets tends to be higher than perceived value in markets that have not yet reached maturity.

H10. Perceived lock-in strategies in mature markets tend to be higher than retention strategies in markets that have not yet reached maturity.

H11 Perceived costs of switching in mature markets tend to be lower than perceived switching costs in markets that have not yet reached maturity.

H12 Perceived barriers in mature markets tend to be lower than perceived barriers in markets that have not yet reached maturity.

METHOD

To test the proposed hypotheses, a survey was conducted on samples of mobile phone users in Brazil and Germany. The choice of variables was based on the study of Shin and Kim (2008), and their model was also used to identify the relationships among the constructs that influenced the formation of switching intention.

Development of the Research Instrument

The initial version of the questionnaire used the constructs suggested by Shin and Kim (2008), i.e., Customer Lock-In, Customer Satisfaction, Perceived Price, Barriers to Switching, Costs of Switching, Switching Intention, and Service Quality. For their measurement, scales used and tested in earlier studies were chosen (Gerpott et al. 2001; Kim et al. 2004; Hansemark and Albinsson 2004).

As the scales were developed for use in other cultures, as a first step to scale localization, exploratory interviews were carried out with Brazilian and German, among the so-called *heavy users* of mobile phone services. In the interviews, an attempt was made to

capture additional relevant factors, as well as to fit the original indicators to the cultures of both countries.

During the interviews, respondents were asked to highlight service attributes related to the constructs of interest and that they believed to be relevant, besides being asked to comment on the introduction of number portability. Three users were interviewed in Germany and six in Brazil. The interviews lasted an average of one hour.

The survey instrument was refined with the conduction of three pre-tests on different samples, totaling 102 participants. These pre-tests, conducted via the web and in person, resulted in the elimination of some items and the re-wording of others in order to obtain the final form of the questionnaire.

The German version was written by a student of marketing, a native speaker of German and proficient in Portuguese (forward-translation). Then, to ensure that the translated questions had the same meaning in both languages, the questionnaire was translated back into Portuguese by a Brazilian scholar proficient in German (Hambleton 1993). Several modifications were necessary to maintain the same meaning in both languages, since certain words and phrases had no exact equivalent in German (Brislin 1973).

The first part of the questionnaire contained questions with transactional variables, to identify the customer usage profile, and filter questions to separate the sample with respect to the user's service plan and carrier. The second part presented questions to capture the perception of respondents about the constructs of interest, while the third part involved questions of demographic nature.

Except for those concerning users' usage profile and demographic issues, questions were based on five-point Likert scales, ranging from "strongly disagree" to "strongly agree" with the "neither agree nor disagree" as the central point.

Selection of sample

The two samples consisted of residential mobile telephony customers (i.e., those who utilize the service for non-commercial purposes, and who are responsible for selecting the service provider and paying the bills) who used postpaid service.

In Brazil, the universe included only users of the Brazilian category Personal Mobile Service. Despite also being used by users considered as residential, the modality Specialized Mobile Service was not considered, since only Personal Mobile Service carriers are required by regulation to provide number portability.

Structural equation modeling appeared to be the most appropriate method for data analysis (Shin and Kim 2008). Taking into account the recommendations of Garson (2009), Loehlin (1992), Hoyle (1995) and Kline (1998) and the number of indicators involved (28), it was attempted to obtain a minimum of 200 valid questionnaires. Due to restrictions related to cost and time, convenience sampling was employed.

Procedure for Data Collection

Data was collected on a website where the questionnaire was published. A link leading to the questionnaire was sent via e-mail to undergraduate and graduate student discussion groups in Brazil (Rio de Janeiro) and Germany (Ingolstadt). 256 questionnaires were obtained in Brazil, 235 of which were valid (91.8%). Questionnaires that presented as a response to the question about the type of plan the options pre-paid (12 questionnaires), business line paid by the company (11) and others (2) were discarded. In addition, questionnaires were eliminated from users of a carrier categorized as Specialized Mobile Service and therefore outside the universe of interest. After discarding, there remained 202 valid questionnaires for analysis.

In Germany, 263 questionnaires were received, of which 239 (90.8%) were complete. After discarding questionnaires involving plans not included in the sample criteria (pre-paid = 29; business line paid by the company = 9, others = 1), 200 questionnaires were considered valid for further analysis.

DATA ANALYSIS
Samples

In the Brazilian sample, 57% of respondents had been customers of their current carrier for more than four years and 40% spent more than R$151.00 (€65) per month on mobile telephony; 49% of respondents had never switched carriers and 53% had their current handset for less than one year; 75% of respondents were using up to two extra services. Almost all respondents (97%) claimed to have knowledge, in case of switching carriers, of the possibility of keeping the same phone number.

Demographic data indicated that 56% of the sample were women and 40% had a monthly income exceeding R$5,501.00 (€2,400.00). Over 80% of respondents reported having been educated to at least college level.

In the German sample, 48% of respondents were customers of the largest carrier in the market, 36% had been customers of the current carrier for over four years and 81% spent up to €40 per month for mobile telephony; 42% of respondents had acquired the current handset within the last year, 48% had switched carrier at least once and 84% were using up to two additional services (messaging, Internet, email, or content downloads). Among German respondents, 50.5% were men.

Although number portability has been available in the German market since 2004, 17% of respondents said they were unaware or not familiar with number portability.

Measurement Model

Confirmatory factor analysis (CFA) was conducted to test the validity, unidimensionality and reliability of the scales used in the measurement model. After fitting of the model parameters, a final measurement model with satisfactory fit indexes was obtained (RMSEA = 0.06, C.I. of 0.05 to 0.08; CFI = 0.90; IFI = 0.90; TLI = 0.89; $\chi2$ = 566.6, d.f. = 329, p <0.001, χ^2/d.f. = 1.72).

Based on the measurement model, procedures were performed to test nomological validity (analysis of the correlation matrix between constructs); convergent validity (calculation of Average Variance Extracted [AVE] for each construct); discriminant validity (comparison of the average variance extracted for each construct with shared variance [the square of correlation coefficient] between all pairs of constructs); internal consistency, unidimensionality and reliability of the scales used (analysis of alpha coefficients, composite reliability, and estimated factor loadings). The results obtained for these tests were satisfactory, indicating that the scales used in the measurement model are reliable and thereby allowing assessment of proposed relationships by estimates of the structural model.

Structural Model

To test the hypotheses and the posited relationships between constructs, the structural model (as illustrated in Figure 1) was fit to the data. The same model was estimated, both for the Brazilian and the German samples. For both, good fit indices were obtained, quite close to values recommended in the literature (Byrne 2010), thus indicating the suitability of the model to the data. Table 1 shows the calculated goodness-of-fit indexes, which are satisfactory for both samples.

Indicator	Brazilian Sample	German Sample	Recommended Value
χ2	575.9	658.9	-
G.L	338	338	-
χ2 / G.L.	1.704	1.949	< 3.0
RMSEA	0.059	0.069	0.05 to 0.08
RMR	0.109	0.120	0.08 to 0.10
TLI	0.891	0.864	> 0.90
IFI	0.904	0.880	> 0.90
CFI	0.902	0.878	> 0.90

Table 1 - Goodness of Fit

The model fitted to the data obtained from Brazilian users accounted for 76% of the explained variance for "Customer Satisfaction", 80% for Barriers to Switching and 52% for Switching Intention. The results surpass the original model of Shin and Kim (2008) for the constructs Customer Satisfaction (original model: 59.8%) and Barriers to Change (57.7%), but were below the factor Switching Intention (78%). These results suggest that, despite the satisfactory explanatory power for the first two constructs, it is likely that there are other factors that contribute to the formation of switching intention.

Better results were obtained with data from the German sample. For Customer Satisfaction, the degree of explanation was 84%, suggesting that the indicators that form the construct are able to capture most of the component attributes. For Switching Barriers, degree of explanation was 81%, well above the original model (52%). For Switching Intention, the value was 62%. Although this value is higher than the Brazilian sample (52%), it is still below the level of explanation found in the original study (78%). Similar to the Brazilian result, this figure suggests that, possibly, other indicators not included in the study must contribute to the construct.

In structural equation modeling, the significance of the estimated coefficients for the relationships present in the model indicates whether each relationship hypothesis among constructs holds true or not (Byrne 2010). For the two samples, the standardized coefficients were evaluated, as estimated by the structural model, along with their significance (Table 2).

Hypothesis	Brazilian sample			German sample		
	Coefficient Standardized	Sig.	Result	Coefficient Standardized	Sig.	Result
H1	0.76	0.001	Accepted	0.35	0.002	Accepted
H2	0.16	0.084	Rejected	0.62	0.001	Accepted
H3	0.86	0.001	Accepted	0.73	0.001	Accepted
H4	-0.74	0.001	Accepted	-0.79	0.001	Accepted
H5	-0.07	0.287	Rejected	-0.04	0.479	Rejected
H6	0.1	0.171	Rejected	0.28	0.044	Accepted

Table 2 - Estimated Standardized Coefficients, Assumptions, and Significance

Effects Observed in the Brazilian Sample

The results indicate that Consumer Satisfaction is the construct with the greatest impact on the formation of switching intention, with a total effect of -0.74, suggesting that a one point increase in Consumer Satisfaction leads to a 0.74 point decrease in switching

intention. This effect supports hypothesis H4, which suggests a direct association of consumer satisfaction with switching intention.

The construct Perceived Quality shows the second largest influence on the formation of switching intention, with an indirect effect via customer satisfaction. Considering the strong direct impact (0.76) on the formation of consumer satisfaction, there is a total effect on switching intention of -0.56, a result which indicates that increased perceived quality in turn increases customer satisfaction, thus reducing switching intention. Therefore, H1 was supported.

Hypothesis H2, relating perceived value with customer satisfaction, could not be supported, since the model failed to indicate a significant causal relation between the two constructs. The results fail to confirm a decrease in switching intention when users perceive increased service received in relation to the amount paid, or reduction in price while maintaining the same level of service.

Despite the high explanatory level of the variable switching barriers, the construct failed to show a significant relationship with switching intention, as proposed in hypothesis H5. The results indicated that, although present, switching barriers do not act directly on consumers' formation of switching intentions. Switching costs have a strong direct impact on the perception of such barriers, as evidenced by a coefficient of 0.86 for the direct causal relationship, and thus supporting hypothesis H3. Customer lock-in techniques, which, according to the literature, have an important effect in the perception of switching barriers, could not be confirmed from the results. The relationship found was not significant and therefore hypothesis H6 was ruled out.

Effects Observed in the German Sample

Regarding direct, indirect and total effects, it can be seen that, just as in the Brazilian results, customer satisfaction is the construct with the greatest influence on switching intention (-0.79). Similarly to the Brazilian model, the increase (decrease) of one point in customer satisfaction would cause the decrease (increase) of 0.79 points in switching intention. Thus, hypothesis H4 was supported by the results.

Unlike the Brazilian sample, the construct Perceived Value showed a strong indirect influence on the formation of switching intention, with a total effect of -0.49. This result seems to stem from a strong relationship that the perceived value has on consumer satisfaction (standardized coefficient = 0.62). Considering this result, hypothesis H1 was supported.

Perceived quality also showed significant influence on customer satisfaction. Although the relationship is considerably weaker than that found in the Brazilian model (estimated coefficient = 0.35), there seems to be an impact of perceived quality on the formation of customer satisfaction. There is also an indirect effect, via customer satisfaction, on switching intention (-.28). Due to the significance of the results, hypothesis H2 was supported.

Similarly to the Brazilian results, switching barriers showed no significant relationship towards the formation of switching intention. This result is at odds with studies in the literature, but was consistent in both countries. For the German model, it is the only hypothesis (H5) that was not supported. Switching barriers would be influenced both by the switching costs and by customer lock-in techniques. The results indicate a strong influence of switching costs in the formation of switching barriers (causal coefficient = 0.73). In contrast to Brazil, where no significant relationship was found between lock-in techniques and switching barriers, in the German sample, the relationship cannot be discounted (coefficient = 0.28). In light of the results, hypotheses H3 and H6 were supported.

Mediating Effect of Perceived Barriers to Switching

To test the hypothesis of a possible mediating effect of the construct perceived switching barriers in the relationship between customer satisfaction and switching intention (H7), multigroup analysis was performed, by generating two groups based on the mean of the sample (Byrne 2010). De Matos et al. (2007) used the mediation test to identify the influence of switching costs on the relationship between customer satisfaction and two components of declared loyalty. Other examples of tests of mediation using mean division of the sample can be found in Olsen (2007), Aydin, Ozer, and Arasil (2005), Yi and Jeon (2003) and Homburg and Giering (2001).

The difference between the model chi-squares should also be a chi-square distribution, according to the degrees of freedom of the difference between the free parameters of the models (Jöreskog and Sörbom 1993). Thus, the difference between the model chi-square with all paths free to vary and the model with all paths fixed (except the path object of testing as different between groups) determines whether perceived switching barriers do indeed act to mediate the relationship satisfaction/switching intention (Olsen 2007).

The results obtained when comparing groups that perceive low barriers with groups that perceive high barriers, in both countries, indicate that the difference between the chi-square values, considering the degrees of freedom, didn't show enough significance to confirm the mediating effect of switching barriers in the relationship between customer satisfaction and switching intention (Brazil: $\Delta\chi^2 = 33.165$, with $\Delta GL = 32$; and Germany: $\Delta\chi^2 = 29.659$, with $\Delta GL = 32$). Therefore, hypothesis H7 was not supported in both samples.

Figure 2 illustrates the final models, both for samples, showing the standardized estimates and their significance. Dashed lines indicate relationships that were not verified.
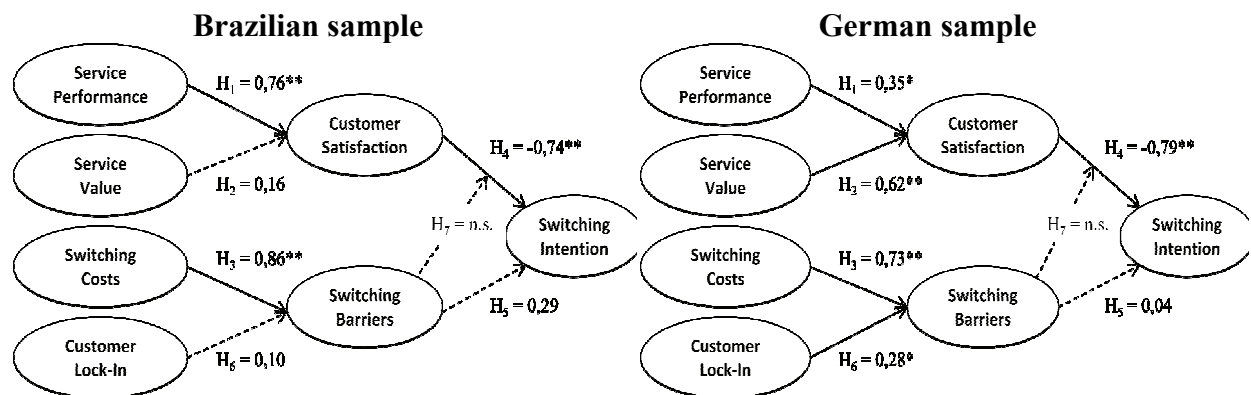

Figure 2. Estimated Coefficients (*p < .05; **p < .001; n.s. = not significant)

Differences between users from both countries' perceptions

Tests of equality of means (t-tests) were conducted to identify whether the means with respect to the constructs perceived quality, perceived values, perception of customer lock-in, cost of switching, and switching barriers (hypotheses H8, H9, H10, H11 and H12) differed between Brazilian and German samples. To this end, the means of the indicators that formed each construct to be analyzed were derived, which were then used to represent them: perceived quality was represented by the average of indicators SQ1, SQ2, SQ3, SQ4, SQ5, and SQ6, with the same procedure being followed for the other variables. The results are presented in Table 3.

Construct	Country	N	Average	t	Sig.	Hypothesis	Result
Perceived Quality	Brazil	202	3.24	-4.669	0.000	H8	Accepted
	Germany	200	3.61				
Perceived Value	Brazil	202	3.18	-3.373	0.010	H9	Accepted
	Germany	200	3.48				
Customer Lock-in	Brazil	202	2.38	1.406	0.160	H10	Rejected
	Germany	200	2.22				
Switching Costs	Brazil	202	3.04	1.562	0.119	H11	Rejected
	Germany	200	2.90				
Barriers to Switching	Brazil	202	2.80	4.965	0.000	H12	Accepted
	Germany	200	2.37				

Table 3 - t-tests

At a significance level of .05, no significant difference exists between perceptions of customer lock-in and switching costs for users in Brazil and Germany, thus hypotheses H10 and H11 are rejected.

Considering the same level of significance, there is a difference between the averages of perceived quality, perceived value, and switching barriers in the two samples, a result that supports hypotheses H8, H9 and H12.

Considering the similarity of the methods adopted for the study in both countries and the very similar goodness of fit indexes obtained, several aspects are worth noting.

The influence of perceived value on customer satisfaction was found to be strong in the German model; in the Brazilian model, however, this relationship was not significant. For Brazilian users, satisfaction seems to be primarily influenced by perceived service quality, a relationship also found in the German model, albeit with less impact.

One reason for such differences may be related to the maturity stage of the two markets. The results suggest that German users (a mature market) may perceive higher service levels than users of a market that is still maturing (Brazil). Perhaps, in mature markets, carriers have focused efforts on providing high quality services to retain customers, thereby attenuating switching intention. This effort, possibly, has resulted in the services offered becoming almost indistinguishable between the various rival carriers. The formation of satisfaction would, then, come to be more influenced by perceived value than by perception of service, a result that is consistent with the findings of Shin and Kim (2008) in the US market.

CONCLUSIONS

This study revealed that customer satisfaction seems to have an inverse relationship with switching intention, both for users in the Brazilian sample and those in the German sample, with this factor wielding the greatest total effects on intention to switch carriers. The result can be construed as evidence that in both countries, dissatisfied users are more likely to switch carriers, a finding consistent with the findings of Gerpott et al. (2001) for users in the German market.

Customer satisfaction has as antecedents the perceived value and the perceived quality of service. The results obtained for the relationships among these factors were different in the two markets. In Brazil, it seems that satisfaction is related to perceived quality of services, while perceived value does not appear to influence satisfaction. In Germany, although the two antecedents of satisfaction were relevant, perceived value appears to have greater impact than

perceived quality, converging with the findings of Turel and Serenko (2006) in relation to the Canadian market, also considered mature for some years.

For both the Brazilian and German samples, perceived quality of services has an indirect effect on switching intention, mediated by customer satisfaction. Although the effect is smaller in Germany, the result suggests that in both markets, quality is an important factor in the process of switching intention. This finding is in line with De Ruyter, Wetzels, and Bloemer (1997), in relation to the Belgian market: they also found a positive relationship between perceived quality and customer loyalty in different service industries.

The results do not allow one to say that switching barriers in the two markets influence the process of formation of switching intention, thus contradicting the findings of Shin and Kim (2008), Shin (2006) and Hu and Hwang (2006), who found inverse relationships between switching barriers and switching intention. This discrepancy may be due to the low level of explanation found for switching intention, or due to limitations of the method adopted here.

Regarding the possible mediating effect that switching barriers exert on the relationship between satisfaction and switching intention, the data are not significant, a finding that partly coincides with the findings of Lee and Feick (2001), which revealed a significant mediating relationship only for light to moderate frequency users. The effect was not apparent to users classified as heavy cell phone users. The result obtained here may be related to the sample profile, which in both countries showed average monthly spending on mobile telephony to be above the national average.

A comparison of perceptions in the two markets suggests that the German sample has a higher perception of quality of services than the Brazilian sample, which probably influences the relationship between the constructs that drive customer satisfaction, such as perceived price and perceived quality. With the maturing of the market, all carriers appear to direct their efforts to offer high quality services, standardizing offered services at high levels.

Increased competitiveness in mature markets, besides increasing the quality of services, appears to impact consumers' perception of value. The results suggest that Brazilian consumers perceive lower value than the Germans, thus it would appear that Germans would be getting better service for the price they pay than Brazilians. It should be pointed out, however, that perceived value does not mean the absolute amount paid for the service, but rather, the user's perception of the amount being paid in relation to the service being received.

The third factor with salient differences between the two markets was the perception of existing switching barriers. Number portability was introduced to stimulate increased competition among carriers. The results indicate that users in the Brazilian sample perceived greater switching barriers than did those in the German sample, which seems to agree with what is expected of regulators' efforts to increase competitiveness by reducing switching barriers (Turel and Serenko 2006). Although the porting process has now been fully implemented in Brazil, being still fairly recent, the consequences have not yet been fully understood by users.

There were no significant differences in perceptions of German and Brazilian users in relation to customer lock-in strategies, despite the difference in stages of maturity between the two markets. Despite portability being so recent in Brazil and its main objectives as yet not fully achieved, it is likely that carriers are adopting more aggressive lock-in practices, comparable to those used in mature environments, and this could explain the similarity found in users' perceptions in both countries.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

One limitation of the method concerns the sampling technique employed. Since the data were collected through a website questionnaire, which was distributed by e-mail to students in only two cities (one in each country), the external validity of the research is compromised. Self-selection of the sample has another drawback. As such, it is not possible to state that the relationships identified can be generalized to any type of consumer.

Given the complexity of the model and the number of indicators present, an even larger sample would be recommended to minimize any problems stemming from non-normality, multicollinearity and outliers.

Given the low degree of explanation obtained for switching intention, conducting a qualitative in-depth study would be useful to identify other indicators that should be part of the model but that were not considered here. Such research would improve the model, thereby enabling a more accurate identification of the relationships that form switching intention. As a complement, it would be interesting to assess the influence that socioeconomic, demographic and relational factors may have on the formation of switching intention.

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