

# Bringing Marketing methods to Interaction Design: a study of Internet banking

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## Abstract

*The widespread commercial use of the Internet has brought user interface design to a huge, open and diversified environment where customers have more control over the interaction process. In this context, improved methods are required to provide a deeper understanding of customer interaction requirements for Internet service provision, in order to feed design with insightful directions for working in this environment. This paper presents the methodology used in a study of customer interaction requirements for Internet service provision in a multi-channel Portuguese bank, using a multidisciplinary approach that brings Marketing methods into the requirements elicitation process of HCI. This study involved a qualitative stage with in-depth and focus group interviews, followed by a quantitative stage with two large scale surveys of bank customers. The results of the study show that Marketing brings a useful complement to the existing HCI methods in the requirements elicitation and design stages. In particular, Marketing methods are especially useful to address large and diversified sets of potential users, in uncontrolled environments such as the Internet, where the customer interaction experience is crucial to the adoption and success of interfaces.*

## Keywords

*Experience requirements, multi-platform interaction design, Marketing methods, Services Marketing*

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## 1. INTRODUCTION

The widespread commercial use of the Internet has brought user interface design to a huge, open and diversified environment where customers have more control over the interaction process [Patrício03a]. In this context, the success of new interfaces increasingly depends on providing the interaction experience that customers want, in order to convince them to use the new services. Therefore, improved methods are needed to provide a deeper understanding of the factors driving customer decisions to adopt Internet interfaces, in order to feed design with insightful directions for working in this new environment.

As Internet interface design involves a computer mediated interaction as well as the provision of a service, the methods of both HCI and Marketing are useful in gaining a deeper perspective of customer requirements. This paper discusses and presents the methodology used in the study of customer interaction requirements of a Portuguese multi-platform bank that provides services through high-street bank branches (BB), Internet banking (IB), telephone banking (TB) and Automatic Teller Machines (ATM). This study brings together the methods of both HCI and Services Marketing in requirements elicitation and interaction design. The results obtained so far indi-

cate that HCI and Services Marketing have complementary perspectives of web interaction for service provision.

## 2. JOINING THE PERSPECTIVES OF HCI AND SERVICES MARKETING

Human-computer interaction has deeply changed in the last decades, driven by both technology developments and more human usage of interaction systems. The advent of the Internet and its opening to commercial use in the 90's, radically changed the interaction environment. Internet systems are now designed to provide services for a wide and diversified set of potential users, in a non controlled environment.

On the other hand, in the Internet service environment, the interaction is part of the overall service, and is increasingly integrated in a multi-platform offering. As such, the web interface is but one alternative form of interaction between customer and service provider, complementing more than substituting person to person or telephone channels.

In this situation, there is an increased need for accurate methods of requirements gathering for wide and diverse groups of customers, which analyze the interface in the context of overall service provision. HCI and Services Marketing have strong complementarities, in terms of the

concepts used and the methods applied, as shown in Table 1.

Table 1: Joining the perspectives of Interaction Design and Marketing

Interaction Design	Services Marketing
Web interaction	Internet service provision
User requirements	Quality and satisfaction attributes
User profiles	Customer segments
Use cases and task analysis	Service specific needs
Predominance of objective measures of user requirements	Predominance of attitude and perceptual measures of customer needs
Expert reviews, usability testing	Interviews, focus groups and surveys

Source: Patrício et al. (2003), Addressing Marketing Requirements in User-Interface Design for Multiple Platforms, in *Proceedings of DSV-IS 2003 – the Tenth Workshop on the Design, Specification and Verification of Interactive Systems*, LNCS – Lecture Notes in Computer Science, Vol. 2884, 2003, p. 334.

The HCI field has produced several measures of interface usability, which can be applied through a set of techniques, such as expert reviews, user testing, interviews, surveys, or user observation [Preece02]. These studies have provided guidelines on the most important usability goals, such as time to learn, speed of performance, rate of errors, and user retention [Shneiderman98]; simplicity, clarity of function, and visibility [Norman98], [Nielsen00], [Raskin00]. These methods are extensively used in HCI, as they are especially adequate to elicit requirements and evaluate interfaces. However, in the Internet service environment it becomes difficult to generalize the conclusions from these studies with small samples of users to large sets of diverse customers.

In the Marketing field, service quality, measured in terms of customer perceptions, has been extensively studied. Service quality has been identified as a key determinant of the intention to use a service, whether it is provided through personal or computer interaction. The studies on e-service quality have identified several dimensions of customer evaluations, such as efficiency, fulfillment, reliability and privacy (e-SERVQUAL [Zeithaml02]); ease of use, usefulness, entertainment and complementary relationship with other channels (WebQual [Loiacono00]). These studies can provide important insights to interaction design, as quality is conceptualized as the gap between customer requirements and e-service performance perceived by customers. As such, these measures can be used prior to development, as a tool to identify design directions, and also as a follow-up tool, in order to detect major gaps between requirements and design that need further improvement.

The development of scales to measure attitudes such as perceived quality requires extensive work to define an appropriate research design, to collect sufficient data and

to analyze the data rigorously. In order to assure the quality of the results obtained, Churchill [Churchill02] suggests that the development of attitude measurement scales should start with a sound theoretical basis to define the research design and the concepts being study. Then, in order to elicit the most exhaustive sample of questions that may be relevant for the analysis, qualitative methods of data collection and analysis can be used. These methods may involve in-depth and focus group interviews aimed at eliciting all potential factors that are relevant for the analysis. In the case of requirements elicitation and interface evaluation, those factors should be all relevant items used by customers in evaluating the interface and defining interaction requirements.

Although qualitative studies provide a deeper understanding of customer usage processes, they usually do not allow the generalizability of the results, due to the lack of sample representativeness. The qualitative stage can therefore be used as an exploratory study that serves as the basis for questionnaire design in the quantitative stage. Each potential factor identified in the qualitative analysis gives rise to a question that customers answer in a scale, measuring a variable in the quantitative model. With this methodology, the researcher reasonably assures that all relevant items were included in the analysis.

By administering the questionnaire to a representative sample of customers, the quantitative study can then provide more generalizable results and test the validity of the measure. After the scale is tested, data statistical analysis can then provide more robust results, identifying important dimensions of requirements and interface evaluation. This process was used in the development of the most tested and used service quality measures such as SERVQUAL and e-SERVQUAL. These measures are used to assess general service quality levels, but are also important instruments to identify improvements needed in the service.

The analysis of previous studies and methods used in HCI and Marketing indicate that they have complementary perspectives on Internet service design. Marketing can contribute with robust methods to elicit customer requirements in complex and diverse environments. HCI has a crucial role in adapting existing Marketing measures to the new technology mediated service environment, in order to provide more concrete insights to the interaction requirements and interface design processes.

### 3. THE RESEARCH DESIGN

With the objective of gaining a more complete understanding of customer interaction requirements in a multi-platform service environment, the study focused on a Portuguese multi-channel bank, providing services through Internet banking (IB), high-street bank branches (BB), telephone banking (TB) and Automatic Teller Machines (ATM). As shown in Figure 1, the research started with the problem identification and the understanding of the bank's business model, involving several meetings and interviews with bank managers. This stage was followed by a qualitative study consisting of in-depth and

focus group interviews with customers and bank personnel, and a quantitative stage involving two large scale surveys. This article presents the methodology used in the first three stages of the research project. These studies allowed the identification of customer interaction requirements for the different service platforms and will be further used to develop and test a prototype of an improved Internet banking service.

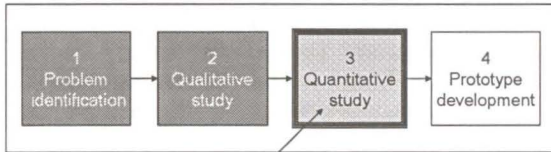


Figure 1: Stages of the research project

The research design involved different methods and approaches, in order to triangulate the results. Triangulation is a well known method of capturing and analyzing data through different perspectives, in order to reinforce the construct validity of the results [Yin04].

This study used three types of triangulation as described by [Patton87]. First, data triangulation was obtained through the collection of data from multiple sources. In order to have a diversified perspective of interaction needs, the study involved interviews with both bank personnel and bank customers with diversified socio-demographic characteristics in three Portuguese cities.

Second, the research was designed and the data was analyzed through different theoretical perspectives (theory triangulation). In particular, the complementary perspectives of both HCI and Services Marketing were important to understand the technological and service provision sides of the interaction.

Finally, the study used both qualitative and quantitative methods (methodological triangulation). The results of the qualitative analysis allowed a deeper understanding of customer usage of technology mediated services, and were also used as a starting point for the design of a survey questionnaire. The administration of the survey to a representative sample of the population in the quantitative study allowed the generalizability of the results to the overall population of customers.

#### 4. THE QUALITATIVE STAGE

The qualitative stage of the study involved focus group and in-depth interviews, and was a first step to understand customer evaluations and usage of Internet service in the context of a multi-channel offering. The bank under study already collected data on customer socio-demographics and usage patterns of IB and TB, but a deeper understanding was needed of what was behind these behaviors in terms of customer evaluations and attitudes.

#### Sample design and procedures

From the data collection and analysis made by the bank, it was already known that IB users had a higher percentage of men, were younger, had a higher education level, higher professional status, and a stronger relationship with the bank. The financial operations most used in the IB channel were information gathering and transactions of current account, credit cards, stock, and mutual funds investments. Although small in number, stock investors were the most intensive users of the IB channel.

The above information provided a valuable basis for sample design. Using the information on usage patterns of customers, four groups were selected: regular users of IB, stock trade IB users; IB non-users and IB ex-users. Following this first stratification, the interviews were further spread by 3 Portuguese cities. The overall objective was to cover a diversified set of customers who could enrich data collection and analysis, according to the theoretical relevance of cases [Strauss98]

In this study, 4 focus groups and 14 in-depth interviews were conducted with 36 bank customers. All customers used ATMs, and 5 of them used TB regularly. The sample of respondents ranged from 21 to 77 years, had more men (75%) than women (25%), and had 55% of college graduates.

In order to better understand the context of channel usage, and to triangulate the information collected from customers, in-depth interviews and one focus group were also made with bank staff. These interviews aimed at capturing a complementary perspective of customers' usage of different service platforms. As such, the study involved 3 in-depth interviews with the directors of each service channel (IB, TB and BB), and 1 focus group with 10 front-stage employees who have direct contact with customers, spread across the 3 different channels.

#### Interviewing procedures and data analysis

Four different service delivery systems were studied: Internet Banking (IB), Bank Branches (BB), Telephone Banking (TB), and Automatic Teller Machines (ATM). The issues covered were as follows:

1. Please tell me what do you think about the different bank channels you know?
2. When you need to access your bank, how do you decide which channel to use?
  - a. Influence of personal characteristics,
  - b. Influence of financial operations;
  - c. Customer evaluations of different service channels.

The interviews with bank staff followed the same structure as customer interviews, but they focused on the bank's perspective of customer attitudes and behavior. If the interviews with channel directors provided a strategic view of the different service platforms, the focus group with front-stage employees provided an interesting per-

spective of customer reactions and usage of new service channels.

In-depth interviews were tape-recorded, focus groups were video-recorded, and all interviews were literally transcribed. Data analysis was supported with NUD\*IST ([www.qsr.com.au/products/n6.html](http://www.qsr.com.au/products/n6.html)), which allowed a better organization and structuring of the process of coding and categorization, as well as the cross analysis of different categories, to assess interrelationships between concepts [Strauss98].

Data analysis was structured in terms of the factors influencing positively and negatively the usage of each service platform, as shown in Figure 2. This approach followed previous research, which has found that customers have both positive and negative attitudes towards technology usage [Parasuraman00].

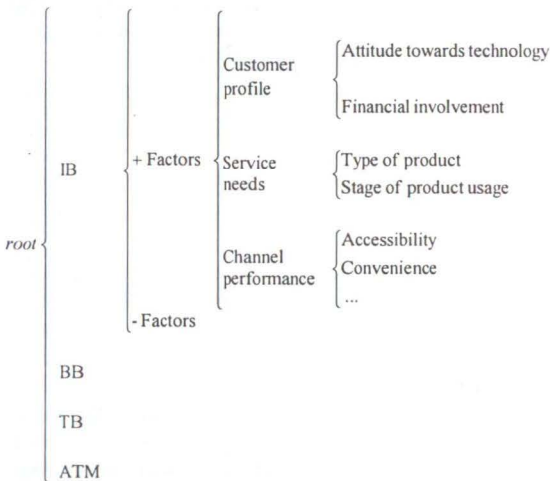


Figure 2: Structure of categories resulting from data analysis

Source: Patrício et al. (2003)b: "Improving satisfaction with bank service offerings: measuring the contribution of each delivery channel", *Managing Service Quality* 13(6), 2003, p. 475.

### Qualitative study results

The qualitative analysis aimed at better understanding the process of customer channel choice, as well as eliciting potential factors driving or inhibiting the usage of Internet banking, which could be used for the identification of interface requirements [Patrício03a]. These results allowed the identification of the following factors influencing channel choice and usage, as shown in Figure 3:

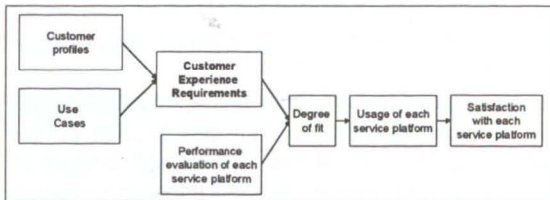


Figure 3: Modeling the determinants of overall channel usage in a multi-platform service setting

1. Customer profiles and experience requirements. More specifically, it was found that customer technology readiness, and the intensity of financial services usage both were drivers of IB patronage. Using these variables, four customer profiles were defined, according to specific customer characteristics and interaction needs.
  - a. Technology non-users - customers who do not adopt IB because of lack of technology readiness. These customers worry about security and loss of privacy, depersonalization, discomfort and lack of knowledge about new technologies.
  - b. Lack of involvement non-users – customers who are still non-users of IB because of lack of financial involvement with the bank. This segment had a high percentage of undergraduate students, who are technology ready but do not have enough relationship with the bank to feel the need to use IB.
  - c. Regular users – customers who use IB for regular bank operations, such as current account transactions. These customers value the efficiency side of IB.
  - d. Stock trade users – intensive users of IB who use it especially for stock market transactions. These customers also value the efficiency side of the IB interaction, but are more demanding in terms of functionalities, information and back-office response.

2. Essential use cases or type of financial operation and experience requirements. It was found that simple, well known routine financial operations such as current account transactions were generally undertaken in the IB, but for complex, important operations such as mortgage loans, customers preferred the personal contact of the bank branch.
3. Performance evaluation of the different channels. If customer profiles and use case characteristics influenced customer interaction requirements, the results of the qualitative study also showed that the process of channel choice was also influenced by customer evaluation of channel performance in satisfying those requirements.

The qualitative study allowed a first approach to understanding customer usage of IB in the context of a multi-platform service provision. However, due to the exploratory nature of the methods used, the results could not be generalized to the overall population of bank customers.

## 5. THE QUANTITATIVE STAGE

### Questionnaire design

Although not generalizable, the qualitative results provided a sound basis for questionnaire design, as they increased the probability of inclusion of the most relevant

influence factors. Each dimension of the model of analysis was transposed to a section of the questionnaire: customer profile, use case characteristics, interaction requirements, channel performance evaluation and channel usage and satisfaction. For the different dimensions, each potential influence factor was translated into one question, representing one variable or indicator in the model.

As the questionnaire resulting from this process was considered too large to be administered, it was decided to split it into two surveys. The first survey was administered through telephone and aimed at understanding customer general usage of the different service platforms. This questionnaire used a 0 to 10 scale, where customers were asked to agree or disagree with statements related to the different dimensions under study: customer profiles in terms of attitudes towards technology, type of usage of financial services, general requirements of interaction, performance evaluation, and usage and satisfaction with the different channels. In order to analyze all bank customers, the survey was targeted to a stratified random sample of both users and non-users of IB, and was administered through telephone interviews, as this was the only way to reach both groups.

The second survey was administered through e-mail and focused on customer usage of IB for 12 specific financial operations or use cases. The questionnaire addressed user profiles, essential use case (EUC) characteristics in terms of the type of decision process, experience requirements for the specific operation, IB performance evaluation, and IB usage and satisfaction for the specific use case. The essential use cases ranged from current account information gathering, mutual funds investments, to evaluation of mortgage loan alternatives. The aim was to create a diversified set of EUC in terms of risk, complexity frequency of usage, importance to customer, so the study could analyze how use case characteristics influenced customer experience requirements and usage of the different service platforms in a continuum. As this survey aimed at understanding IB usage for specific financial operations, it was directed to IB users only, and the e-mail administration was in this case feasible.

### Survey pretests

The first versions of the questionnaires had 106 questions for the telephone survey and 65 questions for the Internet survey. In order to ensure the quality of the results, these questionnaires were subject to several pretests, as advised by [Dillman00]. First, the questionnaires were analyzed by experts in both areas of Marketing and HCI, as well as by key personnel in the Bank. Second, a small pretest was made with 20 customers for each questionnaire, in order to evaluate their cognitive and motivational qualities. All the telephone interviews were monitored, and interviews were made with telephone operators, focusing on the qualitative evaluation of the questionnaire [Canel88].

The result of this first pretest was the rewording of several questions in order to make them as simple as possi-

ble, and the elimination of potentially problematic questions. The web survey was also changed in order to increase the clarity of the layout and navigation.

After this stage, a pilot study was made, with 212 telephone interviews, and 293 e-mail responses. The data collected in this pilot test was subjected to statistical analysis, in order to detect problems of lack of variability and scale construction, and to eliminate statistically non-relevant questions in a purification process [Churchill02]. The final questionnaires had a total of 92 (telephone) and 57 (e-mail) questions.

The pilot test data analysis allowed the identification of the main dimensions of customer interaction requirements. The telephone survey provided quantitative data on customer experience requirements for the overall interaction with the bank, independently of the platform that was used. Factor analysis identified four main groups or dimensions of customer global interaction requirements [Patrício04]: trust, efficacy, efficiency and personal contact.

The results of the e-mail survey also brought important insights into the relationships between use case characteristics and interaction requirements, corroborating the qualitative results. Use case perceived complexity and risk was positively correlated with the need to have personal contact, while routine and frequency of the financial operation increased the importance given to efficiency as a contact requirement.

### Survey administration and results

After the pre-test, two large scale surveys were undertaken with 2147 telephone interviews and 1800 e-mail respondents. These surveys allowed the generalization of the findings to the overall bank population, and were used to assess the reliability and validity of the measurement models.

This research provided a better understanding of the factors influencing customer usage of IB in the context of multi-platform service provision. The robustness of the results thus obtained was substantially increased by the careful research design, following a sequence of steps to ensure that the model included the most relevant factors and was meaningful in explaining this process.

### 6. CONCLUSION

The widespread use of Internet for service provision has increased the complexity of interaction design environment. Interfaces are now developed for huge and diverse sets of potential users, in uncontrolled environments. This is the case of Internet banking, but this environment can also be found in other services such as other retail industries using the Internet for commercial purposes or e-government.

In this new setting, traditional HCI methods such as usability testing and expert reviews continue to be critical for interface success, but may not be enough to capture the diversity of user profiles and usage patterns of com-

plex environments, in order to provide the information needed for interaction design. In this context, the rigorous and well tested Marketing methods may be a very useful complement in capturing customer interaction requirements, as this context is close to traditional Marketing environments of service provision.

These methods involve a huge effort in terms of time, data and therefore financial resources. It is recognized that their benefits may not compensate their costs for small interaction design projects targeted to homogenous populations of users in a relatively controlled work environment. However, if many smaller interaction design projects do not justify the development of these instruments from scratch, they can nevertheless benefit from applying well tested questionnaires with small adaptations. Several scales have been developed to evaluate e-service quality and satisfaction, and they can be re-applied to similar contexts. But in this case, it is important that the interaction designers have an informed assessment of the development process of the instruments they are using, in order to assure the quality of the results produced.

Marketing methods may provide extremely useful information when designing interfaces for a huge and diverse set of potential users, for whom the interaction experience is critical for interface adoption and patronage. Although costly and time consuming, these methods are well tested and provide a robust way to assure the quality of the results obtained. On the other hand, HCI has developed well tested methods to provide concrete guidelines about users' goals and requirements, which have been successfully used in interaction design. Therefore, future research joining HCI and Marketing perspectives seems worthy in order to develop methods which are able cope with complex environments in rigorous ways, but at the same time providing the concrete guidelines needed by interaction designers.

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