Managing Service Quality

Customer satisfaction using QFD: an e-banking case

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Quality, Quality function deployment, Customer satisfaction, Strategic management, Banking

Abstract
Research on service quality and customer satisfaction has become significant in the service industries. This study develops a case study that considers both external and internal service management issues and subsequent service innovations based on the framework of quality function deployment (QFD). The application of the customer window quadrant (CWQ) and the action plan matrix in the analysis of customer and service elements constitute a different approach for QFD. Some benefits and disadvantages of the QFD process are discussed as compared to extant service quality and customer paradigms. Finally, suggestions and directions are offered for future applications, with particular interest in the e-bank service management issues.

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Introduction
During the last 5 years, the Internet has brought about fundamental changes in the rules of operation of the banking industry (Gunasekaran and Love, 1999). Specifically, the industry has moved rapidly to exploit the new communication/transaction channels offered by the Internet to improve their front-end Internet applications. As a result, the number of e-banking Web sites has increased rapidly (Aladwani, 2001).

Currently, there are more than 11,250 e-banking sites located worldwide. In Spain alone, for example, more than 170 online banking sites are available. The vast majority of banks with Internet services are based in the USA while in Europe the largest numbers of e-banking Web sites are based in Spain, Germany, UK, Italy and France.

This paper presents an analysis of the considerations used in the introduction of e-banking in the National Bank of Spain (NBS), using quality function deployment (QFD) as the link to customer requirements. The authors begin with a review of strategy development and deployment in the NBS. They then discuss the identification of customer requirements and deployment of service quality. The research objectives are twofold, namely:
(1) to develop a methodology for the e-banking industry using quality as the baseline for the analysis of customer requirements and internal and external services; and
(2) to define a customer-focused improvement strategy based on the critical service elements identified by quality analyses.

Service quality in e-banking

Today, many financial services organizations are endeavoring to become customer focused. A key component of improved customer focus is the implementation of tools that allow development of better relations between banks and their customers (customer-bank relationship).

Across all service industries, service quality remains a critical issue as businesses strive to maintain a comparative advantage in the marketplace (Kandampully and Duddy, 1999). Because financial services, particularly banks, compete in the marketplace with generally undifferentiated products, service quality becomes the primary competitive weapon (Stafford, 1996; Kim et al., 1998). Easingwood and Storey (1993) report that total quality is the most important factor in the success of new financial services. Likewise, Bennett and Higgins (1988) believe that
a competitive edge in banking originates almost exclusively from service quality. In general, it is conceded that banks that excel in quality service have a distinct marketing edge because improved levels of service quality relate to higher revenues, increased cross-sell ratios, higher customer retention (Bennett and Higgins, 1988), and an expanded market share (Bowen and Hedges, 1993). As discussed above, providing quality service and products to customers is essential for success and survival in today’s competitive banking environment (Wang et al., 2003). Quality products and services enhance a bank’s reputation, improve its customer retention, attract new customers, and increases its financial performance and profitability (Julian and Ramaseshan, 1994; Zeithaml et al., 1996). Despite its importance to the banking industry, limited research has been conducted that considers customer requirements and service elements together—even though considerable research has been done on service quality (Bolton and Drew, 1991; Parasuraman et al., 1988, 1991) and product quality (Garvin, 1988), considered separately. It is our intent to show practitioners and researchers how QFD can be used as a planning process that links together customer requirements and service elements in the e-banking industry.

According to Ravi et al. (2001) there exist two prevalent Internet models in the banking industry, namely, e-banks and e-branches. An e-bank is a banking institution that exists only on the Internet. This structure allows a bank to exist without paper records, without geographical limitations, and without the need for opening and closing hours around the world. The e-branch bank, on the other hand, is a traditional brick-and-mortar bank that offers Internet banking to its customers. Although e-banks are gradually increasing their user base, analysts believe that, initially at least, customers are more likely to try e-branch services than e-bank services (Ravi et al., 2001).

This paper focuses on the e-branch bank as characterized by the Spanish National Bank (SNB). Specifically, it seeks to contribute to a better understanding of customer-bank relationships by applying the techniques of QFD.

Quality function deployment
QFD is a systematic process used by cross-functional teams to identify and resolve the issues involved in providing products, processes, services, and strategies that enhance customer satisfaction (González et al., 2003). Akao (1990) defines QFD as a method for defining design qualities that are in keeping with customer expectations and then translating the customer requirements into design targets and critical quality assurance points that can be used throughout the production/service development phase González (2001) states that QFD has two fundamental purposes to improve

1. the communication of customer requirements throughout the organization, and
2. the completeness of specifications and to make them traceable directly to customer requirements and needs.

Several publications illustrate different service area applications of QFD (Table I). Benefits which arise from these and other reported QFD applications include fewer design and service costs, fewer and earlier design changes, reduced product development time, fewer start-up problems, better company performance, improved service quality, and, above all, increased customer satisfaction (Franceschini and Rossetto, 1995; Kim et al., 1998).

However, the researchers found a lack of engineering tools that could add reliability and efficiency of the translation of the customer requirements into the service elements of an organization, mainly in the banking industry. It is our contribution to the literature to show the innovative use of engineering tools as input to QFD and how QFD can be used to improve both internal and external services in the banking industry.

General methodology
We used a survey of the regular users of the normal services of the bank to obtain the information for the study. In general, the survey was conducted among regular users of the SNB in Madrid, Spain—those who were selected randomly from the bank’s customer records. The questionnaire was structured into three sections (general information, customer requirements, and benchmarking questions). A total of 4,000 surveys were sent by regular mail. Of these 4,000 surveys, 824 were returned (20.6 response rate). Forty-seven percent of the respondents were female and 53 percent male; average respondent age was 27.2 years. Eighty-five percent of the respondents use Internet financial services. The questionnaire was validated using a sample of 5 percent (200 users).

The conventional four-phased, manufacturing-based QFD methodology (Hauser and Clausing, 1988) was modified slightly so that it could be applied to the banking industry. Specifically, the four-phased methodology was transformed into
Table 1 QFD applications and contributions

<table>
<thead>
<tr>
<th>Author</th>
<th>Application</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miyoung and Haemoon (1998)</td>
<td>Customer satisfaction in the hospitality industry</td>
<td>Some benefits and disadvantages of QFD process are discussed as compared to extant service quality and customer satisfaction paradigms</td>
</tr>
<tr>
<td>Trappey and Trappey (1996)</td>
<td>An approach for retail services</td>
<td>The objective of this research is to provide an approach in service industry using QFD as a basis line</td>
</tr>
<tr>
<td>Stuart and Tax (1996)</td>
<td>QFD as planning services</td>
<td>Illustrates the potential for service environment to help prevent service failures, using QFD as planning tool</td>
</tr>
<tr>
<td>Tang et al. (2002)</td>
<td>QFD and the financial considerations</td>
<td>Introduce several new concepts of planning and cost control</td>
</tr>
<tr>
<td>Pun et al. (2000)</td>
<td>Discusses the QSD processes, and addresses how service organizations identify customers’ needs</td>
<td>Combine the QFD and the hoshin kanri techniques</td>
</tr>
<tr>
<td>Peters (1999)</td>
<td>Presents an analysis of quality service field and the application of TQM tools for improving the performance of the service</td>
<td>The importance of the customer satisfaction and the applicability of TQM tools in the service arena</td>
</tr>
<tr>
<td></td>
<td>Presents a simple methodology for managing service quality that takes into joint consideration of what customers expect to receive and what the service provider can offer</td>
<td>A new quality assessment tool, labeled customer service provider relationship (CSM) matrix is introduced</td>
</tr>
<tr>
<td>González et al. (2003)</td>
<td>Applied an approach in school furniture using the customer expectations coming from students evaluations</td>
<td>Shows an example of how to achieve customer satisfaction using the four QFD matrices</td>
</tr>
</tbody>
</table>

A three-phased action-based methodology.
Conventional terminology also had to be modified to apply the methodology to the service industry. Figure 1 shows the modified three-phase model. These “phases” include:

1. **Planning matrix.** This phase is known as the “House of Quality”. Activities in this phase center on understanding the customers in the banking business and include the following: identifying the customers, identifying customer requirements and their importance, analyzing customer requirements (what’s), identifying current methods and processes (how’s), ranking service elements, establishing correlations between customer and service elements, developing and analyzing the house of quality (HOQ).

2. **Critical parts matrix.** This phase corresponds to parts planning of manufacturing-based QFD and links the service elements identified in Phase I to service operations.

3. **Action plans matrix.** In this phase, an action plan is developed based on the information obtained in the previous two phases. The following sections explain in detail as how the above phases were developed.

### Phase I

**Understanding the customers in the banking business**

Banking relationships, i.e. the relations between banks and their customers, form a rich and complex phenomenon whose structural, dynamic and organizational aspects are often ignored in the literature. Most studies stress only on the operative and administrative issues while others look at the relationships between banks and their customers as a simple additional variable in the overall bank marketing mix.

In banking, however, as in any other business, successful profit performance starts with fundamentals. The best approach is to define the customers’ needs, expectations, and suggestions (voice of the customer) and incorporate them into the design of a robust plan of action that will fulfill...
both the customers’ requirements and business goals.

Identifying the customers
Strategically, the ability to identify and retain the most profitable customers obtains increasing importance as all banks approach identical information and analysis plateaus. Finding ways to keep profitable customers loyal becomes of paramount importance as does the need to continually search for ways to improve the profitability of these customers.

Fortunately, in the case of banks, it may be possible to reduce some of the costs associated with servicing customers. Surprisingly, some customers appreciate having more control over their interactions with their service providers. Often, they delight in doing much of the work involved thus reducing the provider’s workload in providing required services. In contrast, however, highly profitable customers demand higher levels of personalized service, but may be willing to pay for these services, particularly if they are rationally targeted toward their needs so that they have an appreciation for the true value added by such personalized services.

Companies must continually examine their current methods of adding value and whether radically new ways of adding value may soon be available. Even if they undermine current revenue models, companies must consider implementation of new technologies that provide optimum services to their best customers at lower prices. If they fail to do this for their best customers, they will be stolen away. Computer based technology allows companies to identify high-value customers with much greater ease. Failure to identify such customers and provide them with superior service puts organizations at significant strategic disadvantage.

Identifying customer requirements and importance
The approach starts with the voice of the customer, which is translated into the house of quality as customer requirements. Customer requirements are determined by means of surveys of regular users of the normal services of the bank and personal interviews. Several TQM tools such as the affinity diagram and the relation diagrams are then used to group and summarize the variables. Statistical analyses, such as dynamic analysis and factor analysis, are performed to classify and rank these customer requirements. Through these processes, individual customer requirements are grouped into common customer requirement categories. However, further data reduction is normally needed.

If these customer-identified requirements are largely met, providers can count on good acceptance assuming that an attractive price structure is offered compared to other competitors. Electronic access to services should always be cheaper than other distribution channels, but it should be the incentive to use added value services that induce customers to conduct electronically based bank
transactions. As obvious as these requirements may seem, they have been ignored frequently with the result that many individual and joint attempts to utilize new Internet services have been mothballed owing to insufficient user acceptance.

From the survey and personal follow-up interviews, we gathered about 535 customer requirements. Because all of these requirements could not be included in the planning matrix, we used several TQM tools such as the affinity diagram and the relation diagrams to group and summarize the variables. Next, we performed different statistical analyses, such as dynamic analysis and factor analysis, to classify and rank these customer requirements. In the Appendix, Table A1, we can see a middle step of the classification process, since we showed how the 535 customer requirements were grouped into 14 customer requirements. However, further data reduction is needed, as we will see in the final house of quality. A definition of each customer requirement is provided to have a better understanding of the needs.

Using the customer window quadrant (CWQ), customer requirements were summarized as shown in Figure 2. The CWQ is an analytical quality tool designed to group and classify customer requirements based on the level of importance and satisfaction (Intel Corporation, 1997). There are four quadrants whose characteristics and guidelines are described as follows.

1. **Quadrant A.** Customer wants it and does not get it. High importance/low satisfaction. The critical quadrant. All customer requirements placed here require immediate action. Set-up an action plan to move the critical ones to Quadrant B as soon as possible.

2. **Quadrant B.** Customer wants it and gets it. High importance/high satisfaction. It is the most desired quadrant. All important and critical customer requirements should be here and stay here. Improve and monitor all quality characteristics placed here.

3. **Quadrant C.** Customer does not want it and gets it anyway. Low importance/high satisfaction. An action should be taken if the customer requirement being given here is expensive or represents any other type of risk to the organization. If the quality characteristic placed here is eliminated or reduced, perhaps the customer will not notice it.

4. **Quadrant D.** Customer does not want it and does not get it. Low importance/low satisfaction. The quadrant with lowest importance and focus for now. Do not take

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**Figure 2 The CWQ**

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\begin{figure}
\centering
\includegraphics[width=\textwidth]{cwq.png}
\caption{The CWQ}
\end{figure}
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any action yet unless indicated by a change in market, service strategy or customer requirements.

The results of the application of the CWQ showed the following clustering based on customer weighting as described in the process-planning matrix mentioned above, namely:

- **Quadrant A.** Five customer requirements were placed here (Figure 2). An action plan should be set-up to describe how to move these customer requirements to Quadrant B.
- **Quadrant B.** Ten customer requirements were placed here (Figure 2). A special plan should be defined to maintain, improve and monitor these customer requirements.

In addition, approximately 45 customer requirements were classified under Quadrants D and C; however, only those considered as critical were shown on Quadrants A and B.

**Analyzing the customer requirements (what’s)**

Using dynamic analysis, a level of importance was assigned to each requirement (González and Eckelman, 1999). In this section of the product planning stage, the number of complaints, the different goals (targets), and the evaluations of the different competitors were considered. This matrix shows a comparison of the capability of our bank to satisfy customer requirements with that of other banks that provide similar services. Other information is summarized in the house of quality such as the sales point (the areas in which the company has the ability to sell the product, based on how well each customer requirement is met), the improvement ratio (which relates the goal or target to the current performance measure in a specific requirement), and the overall importance (a computed value relating the importance to customer, the improvement ratio, and the sales point). All of this information aids in determining what kind of actions must be taken to improve our bank’s customer ratings in the different customer requirements. In Figure 3, it can be seen that there is a difference between the importance assigned by the customer (importance of the what’s) and the importance assigned after the final evaluation i.e. after analyzing different criteria in the matrix (overall importance). For instance, machine availability, user-friendly human interface, and security are the factors rated highest in importance by the customers. When we combine the importance assigned by the customer, the improvement ratio, and the sales point, the highest factors in the overall importance are machine availability and user-friendly human interface. In this case, the sales point for all requirements is one; therefore, it does not make any difference.

The difference is determined by the importance of the what’s and the improvement ratio.

In the case of security, the improvement ratio is less than the other two highly rated requirements, namely, machine availability and user-friendly human interface. This means that the bank must dedicate more efforts in those two areas than in security since the difference between the future desired value and the current value is not as high as in the other two requirements. Based on overall importance, machine availability and the user-friendly human interface are the most critical customer requirements. These are followed by openness and service schedule.

One of the main reasons for using QFD is to develop services that will excite customers and motivate them to use the services. Figure 3 shows the perception of service requirements among SNB and two of the most important competitors in the Spanish marketplace. According to Figure 3, the SNB does not have any sales point at this time, in comparison with its competitors. Also, Figure 3 shows that future SNB service requires an increment of improved performance in all customer requirements because the two competitors have better results.

As discussed earlier, by determining the improvement factor, the goals and the general strategy for responding to each customer requirement can be designed. The improvement factor in all cases is greater than one; therefore, corrective actions must be taken in all of the customer requirements to achieve and maintain the level of satisfaction and importance demanded by the SNB customers. Identification of the sale points will allow the Marketing Department to design and launch a marketing strategy that will highlight these points as strengths and order-winners.

**Identifying current methods and processes or service elements (how’s)**

Customer requirements must first be translated into specific activities within the current methods and processes of the organization where current methods and processes refer to how the bank meets the requirements of its customers. Unfortunately, customer requirements are not often stated in terms of the organization’s current processes and methods. Therefore, we translated customer requirements (called what’s in the QFD language) into service elements (called the how’s in the QFD language). The service elements are placed at the top of the house of quality. In order to determine the how’s, we asked the question, “This is what the customer requires; how can we do it and measure it in our process?” The Appendix, Table AII, lists the final service elements selected through this process. In the critical matrix, these
service elements are divided in two sections, operational and customer service.

**Ranking service elements**

The trade-offs, located in the “Roof” of the HOQ, indicate the synergistic or detrimental impacts of changes in the design measures. They are used to identify critical compromises in the design. Because these compromises are almost always necessary, they should be examined as part of the QFD effort in order to minimize design change expenses. Figure 4 shows the relationships among the service elements.

**Establishing correlations between the customer and the service elements**

An analysis of customer requirements in the SNB was developed to assess the relationship among customer requirements and service elements. From Figure 5, it can be seen that there is the evidence of a strong relationship coming from the customer requirement called “Comfort” and from the service elements: marketing campaign, phone support service and personalization. This means that if the customers are looking for more comfort when they use the online service of the SNB, then satisfying the service elements mentioned above (marketing campaign, phone support service and personalization) will satisfy part of the customer comfort requirements.

**Developing and analyzing the HOQ**

The HOQ matrix depicts all the information about the customer requirements, and the service elements and provides information that is useful in determining what service properties are important in meeting the demands of the customers. As can be seen in Figure 5, the SNB needs to enhance all customer requirements because in all cases, the customer evaluations are under average and behind the competitors (performance gap).

The HOQ also provides information about the evaluation of the service elements (how’s). The following how’s were found to be the most important and need to be considered on the final action plans: marketing campaign (179.4), security warranty (142.0) and personalization (152.8). Moreover, the HOQ shows that
improvements are needed in the following customer requirements: openness, security, service schedule and multi-branch capability. These customer requirements received the lowest evaluations in the comparative analysis and need to be addressed to satisfy customer expectations.

**Phase II**

*Developing the critical part matrix*

As can be seen in Figure 6, the critical parts for each service element are divided in two sections: operational and customer service. Several indicators are shown in this matrix, for example, importance of service attribute and target values are two indicators which help determine what the bank needs to do in order to incorporate various elements into the services it provides. In addition, the part matrix shows competitive information about the position of SNB with respect to two other banks in Spain. In general, the competitors show a better performance in each of the service elements (performance gap) common to the banks in customer requirements.

Some interesting conclusions can be drawn from the critical matrix. For example, the following service elements are considered to be of vital importance: marketing campaign, security warranty and personalization. Also in the operational part, 1,800 phone service, customer service and customer feedback are considered as most critical in this matrix. Thus, special efforts must be taken in these critical areas, to satisfy the customer requirements shown in the HOQ matrix (Figure 5).

**Phase III**

*Developing action plans*

This study of the SNB indicates that three major action plans should be implemented to satisfy the customer requirements, namely:

1. Investment in new information technology including equipment, software and professional personnel;
Figure 6 Critical part matrix

(2) increased customer involvement through frequent contacts and feedback, phone interviews, surveys, etc.; and
(3) creation of continuous improvement teams that evaluate customer requirements and the competitors' performance (benchmarking).

A summary of recommended actions to be taken in the SNB are given in Table II coupled with selected project management issues recommended for further information and follow-up.

Conclusions and recommendations

Spanish banks have been focusing their resources on a defensive strategy that is aimed largely at keeping customers from jumping to online banks. However, this new venture would offer their Spanish-speaking customers throughout the world an online alternative.

Results of this paper indicate that project managers and quality improvement managers could benefit from the QFD methodology and tools to link customer requirements to the internal procedures of the firm in order to satisfy and exceed customer requirements. To accomplish this, a methodology of analysis is needed in the banking industry based QFD as a baseline for the analysis of customer requirements. The products of such analyses include:

(1) customer-based improvement strategies based on the service elements identified using QFD as the analytical quality tool; and
(2) action plans for different requirements that demand managerial attention and follow-up.

Future research can benefit upon this research by:

(1) expanding the scope from banking to other type of industries in order to analyze the applicability of the proposed tools; and
(2) applying the same methodology to other banking industries for developing a model for customer-oriented banking structures.
<table>
<thead>
<tr>
<th>Action plans</th>
<th>Current</th>
<th>Target</th>
<th>Performance gap</th>
<th>Boundary conditions</th>
<th>Ease</th>
<th>Cost</th>
<th>Likely success</th>
<th>Risk</th>
<th>Slide effects</th>
<th>Deliverable</th>
<th>Indicator</th>
<th>Measured By</th>
<th>Resources needed</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT improvements</td>
<td>3.5</td>
<td>4.5</td>
<td>1.0</td>
<td>0</td>
<td>M</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>Increase bank services</td>
<td>Update system</td>
<td>Per cent reduction in customer complaints using IT systems. Average time of system downtime</td>
<td>Follow-up survey</td>
<td>Information technology, professional personnel</td>
<td>A</td>
</tr>
<tr>
<td>1-800 phone service</td>
<td>3.0</td>
<td>4.5</td>
<td>1.5</td>
<td>CS</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Lost customers</td>
<td>New customers</td>
<td>Per cent increase in market Number of new customers Average time of Response</td>
<td>Phone survey</td>
<td>Information customer center</td>
<td>B</td>
</tr>
<tr>
<td>Updated security systems</td>
<td>3.4</td>
<td>5.0</td>
<td>1.6</td>
<td>O</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>Increase confidence</td>
<td>New customers</td>
<td>Per cent reduction in customer complaints Number of system breakdowns</td>
<td>External audit</td>
<td>Information technology, professional personnel</td>
<td>A</td>
</tr>
<tr>
<td>Evaluation teams</td>
<td>3.0</td>
<td>4.5</td>
<td>1.5</td>
<td>O</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>Bad service</td>
<td>Update system</td>
<td>Per cent reduction in customer complaints Per cent of new customers Per cent reduction in cycle time Number new projects</td>
<td>Evaluation form by INTERNET</td>
<td>Training in quality and customer service</td>
<td>C</td>
</tr>
<tr>
<td>Customer feedback</td>
<td>3.5</td>
<td>5.0</td>
<td>1.5</td>
<td>CS</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Increase confidence</td>
<td>New customers</td>
<td>Per cent increase in customer involvement Per cent increase in customer satisfaction</td>
<td>Evaluation form by Internet</td>
<td>Training in quality and customer service</td>
<td>B</td>
</tr>
<tr>
<td>Monitoring customer expectations</td>
<td>3.1</td>
<td>4.5</td>
<td>1.4</td>
<td>CS</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>Increase confidence</td>
<td>Update system</td>
<td>Per cent reduction in customer complaints Number of customer Expectations moved to Quadrant B in CWQ</td>
<td>Phone survey</td>
<td>Training in quality and customer service</td>
<td>C</td>
</tr>
<tr>
<td>Reduce op. costs</td>
<td>3.5</td>
<td>4.5</td>
<td>1.0</td>
<td>CS</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>none</td>
<td>New customers</td>
<td>Per cent reduction in operation costs while keeping customer satisfaction high</td>
<td>Quality cost Analysis tool</td>
<td>Information technology, professional personnel</td>
<td>B</td>
</tr>
</tbody>
</table>

Notes: O: operational, CS: customer service, H: high, M: medium, L: low; A: Plan A: involves an investment in new information technology including equipment, software and professional personnel, B: Plan B: increase the customer involvement by frequent contacts and feedback, phone interviews, surveys, etc., and C: Plan C: creation of continuous improvement team that evaluate permanently the customer requirements and the competitors performance.
References


Further reading


Donald, C.S. and Ronfeld, P.I. (1993), Guidelines for Laboratory Quality Auditing, Marcel Dekker, Milwaukee, WI.


## Appendix

### Table A1: Customer expectations summary

<table>
<thead>
<tr>
<th>Process planning matrix</th>
<th>Customer's needs</th>
<th>Description</th>
<th>Related variables</th>
<th>Customer weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Machines availability</td>
<td>A relevant factor for customers, which forces to think in the design of Web pages that contain the user's perspective and not only &quot;sites&quot; displaying technological innovations with high esthetic quality</td>
<td>67</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>(2) Availability and convenient service</td>
<td>The Internet has the advantage to allow its utilization anywhere in the world, however, in the banking services this aspect is not enough to achieve customer satisfaction since it requires the existence of contact points that bring additional support to customers with the biggest geographical coverage possible</td>
<td>45</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>(3) User-friendly human interface</td>
<td>The man-machine interface is of primary importance for being able to efficiently navigate and maintain an overview within the large variety of services. If the user cannot efficiently obtain the services desired or if he does not know how they work, potential benefits will be eliminated or reduced for the user as well as for the provider</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4) Openness</td>
<td>The information service must be broadly accessible. Openness also reflects in the end-user's possibilities to easily integrate financial information into other application he uses on his client station</td>
<td>43</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>(5) Special services</td>
<td>According to the typical Internet banking user profile, it has been observed that they usually possess several account types and they appreciate a lot of possibility to make transactions among their accounts very often</td>
<td>42</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>(6) Saving costs</td>
<td>The importance given to the field of commissions takes us to consider the relative convenience of generating additional costs for the different services and the necessity to insist on the real cost that present/display the transactions through Internet</td>
<td>41</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>(7) Saving time</td>
<td>This particular customer requirement calls the attention toward the development of optimum products in terms of efficiency. This characteristic must be incorporated in this business segment</td>
<td>41</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>(8) Information updated/real time</td>
<td>This factor is sometimes forgotten and it highlights the importance of keeping updated account balances, business appraisals, stock market quotes, and additional studies. By ignoring this factor, it may cause important customer inconvenience and dissatisfaction</td>
<td>38</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>(9) Security</td>
<td>An appropriate security is considered to be a basic condition for electronic commerce, whereas the requests lie usually higher compared to the comparable traditional services</td>
<td>38</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>(10) Service schedule</td>
<td>This requirement shows the importance for the customer to be able to access permanently to his/her financial resources or support services from the bank. It should be kept in mind that even tough a 24 h or Internet service are inseparable terms, this it does not turn out that way, because it requires the development of process that support the structure and the transactions in the network. It is necessary to consider these aspects in the design of our product/service.</td>
<td>36</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>(11) Multi-branch capability</td>
<td>The end-user must be able to obtain the functionally equal information services of different providers in the same or very similar way. From the end-user's point of view, this is an important prerequisite for transparent offers and easy to use services</td>
<td>34</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>(12) Comfort</td>
<td>Understanding like so the possibility of enjoying a service without complications, reasonable, faster that avoids fatigue and misfortunes to the user</td>
<td>32</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>(13) Integration in open e-mail systems</td>
<td>This is an important requirement particularly concerning the full and seamless support of all of the basic three phases of electronic market transaction which are information, negotiation/contracting and execution</td>
<td>31</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>(14) Greater revenue</td>
<td>The lower importance given to this factor by the customer takes us to consider the fact that this is not a factor that will define the product use, but we need to work hard to offer competitive return of investments coupled with a deep comfort, covering and reliability of the service. The latter will allow us to realize that more than a performance measure, we sell a new service and a new contact channel with the customer</td>
<td>25</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>(15) Standardization</td>
<td>Using standard message formats and protocols is a necessity for guaranteeing comprehensive and versatile information services</td>
<td>24</td>
<td>4.3</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Technical requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation of orders/actions</td>
<td>It consists in implementing an automatic system that sends e-mails to the customer confirming the movement just made. With this system it transmits security to the customer in terms that his/her order has been processed and a number is given to do any type of consulting or claim.</td>
</tr>
<tr>
<td>Marketing campaign</td>
<td>Owing to the huge lack of knowledge about the Internet banking, it is proposed to launch an informative campaign informing the customer about the improvements made after the QFD process and explaining about the handling, services, etc.</td>
</tr>
<tr>
<td>Increase the number of banking</td>
<td>Allowing to make more types of transactions to customers which will benefit in terms of comfort, service quality</td>
</tr>
<tr>
<td>Increase profitability</td>
<td>Whether by reducing the commissions in the operations or by offering better conditions in deposits by Internet. However, this proposal is opposite to all others. Since it supposes an increase in costs. The other aspect to be considered is the cannibalization effect in the window service</td>
</tr>
<tr>
<td>Security warranty</td>
<td>To give security and confidentiality to the operations and to contract insurance against fraud on the banking operations by Internet. In addition to offer a 24 h phone line to report errors, problems, frauds, stolen money, etc.</td>
</tr>
<tr>
<td>Phone support service</td>
<td>This service will complement the Internet service, it will provide confidence to the customer by knowing that in case of mistake, doubts about the handling or questions about the Web page configuration, s/he has an available service by phone which is supported by qualified personnel</td>
</tr>
<tr>
<td>Updating data system</td>
<td>It will be in charge to keep updated the stock market information, news, reports, etc. In order to do this, links will be established in real time with the bank information systems that will allow to appraise the portfolio, daily interests calculations, loan application status, etc.</td>
</tr>
<tr>
<td>Optimized Web design</td>
<td>The Web page should be simple in design to accelerate the unloading knowing that the vast majority of users use RTB connections. Therefore, it should be avoided to include images or files in formats that make the navigation difficult. With a friendly and simple design yet complete, will improve the navigation saving time to the customer and ease the Web utilization</td>
</tr>
<tr>
<td>Personalization</td>
<td>One of the advantages that a virtual setting displays, it is the great capacity of personalization capacity and this features is not being utilized by any bank. Therefore, it is proposed to desing the Web page in such a way that it shows first, to the users the most utilized services, and then adding other menus for the rest. On the other hand, it will be allowed to the users to configure the bank Web the way they like it to ease the utilization, increasing the comfort and speed</td>
</tr>
<tr>
<td>Added value contents</td>
<td>Through agreements with consulting firms and other companies, it is proposed to include free reports to the customers that can be useful in the Web. These reports can be personalized according to the topics or common interests</td>
</tr>
</tbody>
</table>