

EVALUATION OF SERVICE QUALITY IN BANKS USING AHP: A TYPICAL CASE OF INDIAN BANKS

VIKRAM SINGH¹ & SANDEEP GROVER²

¹Associate Professor, YMCA University of Science & Technology, Faridabad, Haryana, India

²Professor, YMCA University of Science & Technology, Faridabad, Haryana, India

ABSTRACT

In this paper the aim is to develop a technique that considers competition using the analytic hierarchy process (AHP) framework to measure service quality. The present study adapted the AHP methodology to the measurement of service quality in banking, involving five steps – referred to as “analytical hierarchy process. Subsequently, the demonstration how the technique can be applied to the banks. The AHP approach described in this study thus assists management to devise and maintain a relevant, competitive plan for ongoing improvements in service quality. The framework proposed here allows management to address two main issues pertaining to its competitive advantage: establishing its performance ranking in the marketplace; and identifying the service elements that most require improvement.

KEYWORDS: Measuring Service Quality, AHP, Consumer Evaluations, Indian Banks

INTRODUCTION

The incredible growth of the Internet is changing the way corporations conduct business with consumers. The banking industry is no exception. Many banks, in India, have entered the banking industry, providing customers with financial services over the Internet. Since these banks make use of Information Technology therefore they have reduced operating and fixed costs by replacing employees and physical facilities. These cost savings have helped Internet-based banks offer lower or no service fees than traditional banks (Gerlach, 2000).

In order to sustain their competitiveness in the marketplace, a number of traditional brick-and-mortar banks have also been moving towards the Internet Banking currently offering customers online access to their accounts. In fact, major banks in the India, have offered a variety of services, such as:

- Credit cards
- Funds transfer; and
- Loans,

Through their banks & online systems. Unfortunately, although banks have focused their attention on improving their banking service quality, many of them still seem to be lagging behind their customers' ever increasing demands and expectations.

Given the fact that banks invest billions in the internet infrastructure, customer satisfaction and customer retention are increasingly developing into key success factors in banking. Most importantly, profitable banking requires a strong focus not only on the acquisition of new customers but also on the retention of existing customers, since the acquisition costs in banking exceed that of traditional business by 20-40 per cent (Reibstein, 2002; Reichheld and Schefter, 2000).

Consequently, establishing long-term customer relationships is a prerequisite for generating positive customer value on the internet.

During the last few years, these findings have led to the development of comprehensive strategy to retain the customer by offering a great variety of services in addition to traditional bank products and thereby enabling customers to gain financial advice from merely one source.

According to Jun and Cai (2001), most banks are still lagging behind their customers' quality expectations. In order to enhance customer loyalty, banks are required to put a strong emphasis on their customers' quality demands, which are steadily increasing over time due to the growing competition in the banking industry (Jun and Cai, 2001). Most importantly, loyalty has been recognized as a key path to long-term profitability. These findings hold especially true for the financial service sector, where reducing the defection rate by 5 per cent can boost profits by up to 80 per cent (Reichheld and Sasser, 1990). As far as retail banks are concerned, the introduction of e-commerce has brought a dramatic change in the way relationships with customers are built and maintained. In banking, which has traditionally been a high contact service, the lack of direct human interaction in online channels entails the use of each service element as an opportunity to reinforce or establish quality perceptions for customers (Broderick and Vachirapornpuk, 2002).

Additionally, service quality is a key determinant in differentiating service offers and building competitive advantages, since the costs of comparing alternatives are relatively low in online environments (Gronroos et al., 2000; Santos, 2003). In view of these developments, service quality is a crucial issue in internet banking.

CONCEPTUALIZING SERVICE QUALITY DIMENSIONS OF BANKING

After having briefly discussed the general banking concept, the understanding of fundamental quality demands of customers in evaluating banking is necessary. For overall banking environment it is common knowledge that quality of services and products is a key determinant of customer satisfaction and customer loyalty (Caruana, 2000; Cronin and Taylor, 1992; Kelley and Davis, 1994; Parasuraman et al., 1988). Recent empirical evidence shows that, meanwhile, this holds true also for electronic service providers. The quality of services delivered through a web site has become a more significant success factor than low prices or being the first mover in the market space (Mahajan et al., 2002; Reibstein, 2002; Shankar et al., 2003).

As banking compared to other financial services, heavily involves human interaction with customers and information systems. Therefore, in order to form a basis for the current study, two areas of literature were selected and reviewed. One was the service quality and customer satisfaction literature focused on the interpersonal service encounter. The other was the information systems quality literature concentrated on computer and networking-based impersonal interactions, with a particular emphasis on net banking. The following three broad conceptual categories related to banking service quality can be utilized to assess the overall banking service quality:

- Customer service quality
- Portal quality
- Product Service quality

Customer Service Quality

Recent studies have shown that high levels of customer service quality can exert a positive influence on customer satisfaction (Parasuraman et al., 1988; Cronin and Taylor, 1992). Unlike the manufacturing product quality that can be

readily assessed, service quality is an elusive and abstract construct that poses definition and measurement obstacles. The literature has suggested that service quality is determined by the differences between customers' expectations of service provider's performance and their evaluation of the services they received (Parasurman et al., 1985, 1988). Parasuraman et al. (1985, 1988) have conducted well-known studies to uncover key service quality attributes that significantly influence the customers' perceptions of overall service quality. They initially identified ten determinants of service quality based on a series of focus group interview sessions. These attributes were (Parasuraman et al., 1985):

- Tangibles
- Reliability
- Responsiveness
- Competency
- Courtesy
- Communication
- Credibility
- Security
- Access; and
- Understanding the customer.

Parasuraman et al. (1988) later distilled these ten dimensions into five by using a factor analysis. These five dimensions are:

- Tangibles
- Reliability
- Responsiveness
- Assurance; and
- Empathy.

Based on the five dimensions, they developed SERVQUAL, a 22-item survey instrument for measuring service quality.

The SERVQUAL instrument has been widely used to assess the service quality of various service organizations including banks (Cowling and Newman, 1995). For example, according to Cowling and Newman (1995), one bank found that, among the SERVQUAL five quality dimensions, the disparity between the customers' expectations and their perceptions was the highest for reliability, responsiveness, and empathy, and the lowest for tangibles. However, the SERVQUAL instrument has also received a lot of criticism from other researchers (Johnston, 1995). Many critics argue that a single instrument like SERVQUAL is not appropriate for measuring service quality across industries (e.g. Cronin and Taylor, 1992; Bowers et al. 1994). For example, Cronin and Taylor (1992), in their study on service quality in the banking, pest control, dry cleaning, and fast food industries, found that the five-dimension structure of the SERVQUAL scale was not confirmed in any of their samples.

In the case of the banking industry, Johnston (1995) examined, by using the critical incident technique, banking customers' perceptions about the service quality they received and found 18 service quality attributes. They are:

- Access
- Aesthetics
- Attentiveness/helpfulness
- Availability
- Care
- Cleanliness/tidiness
- Comfort
- Commitment
- Communication
- Competence
- Courtesy
- Flexibility
- Friendliness
- Functionality
- Integrity
- Reliability
- Responsiveness; and
- Security.

Further, Johnston (1995,1998) examined the effects of service quality dimensions on the customers' satisfaction or dissatisfaction, and then classified the dimensions into satisfying only, dissatisfying only, and dual factors (factors capable of either satisfying or dissatisfying customers depending on the quality level of the factors). Regarding the three classifications of service quality attributes, Johnston (1998) argued that the causes of dissatisfaction are not necessarily the obverse of the causes of satisfaction: A bank which opens and closes erratically will lead to dissatisfied customers; However, a bank which opens and shuts precisely on time does not automatically lead to delighted customers.

In addition, Lassar et al. (2000) examined the effects of service quality on customer satisfaction in banking by using two well-known measures, the SERVQJAL and the technical/functional quality. They found that the technical/functional quality dimensions clearly outperformed the SERVQUAL dimensions in explaining the variance of customer satisfaction.

Although this result does not necessarily mean that the technical/functional quality is superior to the SERVQUAL generally, Lassar et al. (2000) suggested that the technical/ functional quality-based model is better for predicting customer satisfaction when customers are actively involved or highly interested in service delivery. Bahia and Nantel (2000) also

proposed an alternative measure of perceived service quality in retail banking that comprises 31 items with six underlying key dimensions. These dimensions are:

- Effectiveness and assurance
- Access
- Price
- Tangibles
- Service Portfolio; and
- Reliability.

On the other hand, Oppewal and Vriens (2000) suggested the use of conjoint experiments to measure service quality. They developed an application for measuring retail banking service quality, which consists of 28 attributes including four service quality dimensions such as:

- Accessibility
- Competence
- Accuracy and friendliness; and
- Tangibles.

Of the four dimensions, the accuracy and friendliness dimension turned out to be the most important factor in determining banking preference, followed by competence, tangibles, and accessibility.

Portal Quality

As for Internet banking, relatively little empirical research has addressed the issue of the key underlying dimensions of Internet banking service quality. Joseph et al. (1999) investigated the influence of technology, such as the ATM, telephone, and Internet, on the delivery of banking service. Their study identified six underlying dimensions of electronic banking service quality:

- Convenience/accuracy
- Feedback/complaint management
- Efficiency
- Queue management
- Accessibility; and
- Customization.

As a consequence of the increasing importance of modern information and communication technologies for the delivery of financial services the analysis of e-banking quality issues becomes an area of growing interest to researchers and managers (Hughes, 2003; Jayawardhena, 2004). Virtually all studies dealing with the quality of electronic financial services focus on specific aspects of the quality evaluation. In literature the study presented by Gounaris and Dimitriadis (2003) is appears to be the first attempt of investigating the service quality of Internet banking portals. Based

on the SERVQUAL, the authors identify three quality dimensions, namely customer care and risk reduction benefit, information benefit and interaction facilitation. These dimensions are represented by only 14 items, a fact that has to be criticized. These indicators do not fully cover all relevant facets regarding the business activities of an Internet banking portal, which contradicts the idea of portals as holistic business models. For example, aspects like offering a broad spectrum of complementary products and services or the reliability of service delivery are not included. The following studies are focussed on specific service delivery aspects of conventional, simple banking web sites and therefore consider particular service quality dimensions.

Jayawardhena (2004) transforms the original SERVQUAL scale to the internet context and develops a battery of 21 items to assess service quality in e-banking. By means of an exploratory (EFA) and confirmatory factor analysis (CFA), these 21 items are condensed to five quality dimensions: access, web site interface, trust, attention and credibility. Although 59 per cent of the variance in overall service quality can be explained by the model, affective customer reactions to the service process are not considered. This has to be seen critical as several authors emphasize the importance of hedonic aspects of the electronic service consumption represented by the extent of fun and enjoyment provided by the portal (Dabholkar, 1996; van Riel et al., 2001).

Doll and Torkzadeh (1988) proposed five quality dimensions that influence end-user satisfaction of a internet banking portal.

- Accuracy
- Format
- Ease of use; and
- Timeliness.

The Internet-based data processing, thus, can be regarded as an extreme case in an end-user computing environment where the users of Web sites seldom have direct interaction with the operations staffs of the Web sites.

Recently, several studies on e-commerce have noted that some features of Web sites are critical to their business success. For example, D'Angelo and Little (1998) argued that factors such as navigational characteristics, visual characteristics, and practical consideration (including images, background, color, sound, video, media, and content) are important considerations in designing a Web site. Lohse and Spiller (1999) noted that online business Web sites' characteristics such as a feedback section and product lists are crucial in generating sales. Liu and Arnett (2000) considered the following four factors as major ingredients for the success of a Web site as:

- System use
- System design quality
- Information quality; and
- Playfulness,

As for Internet banking, Sathye (1999), with respect to the adoption of Internet banking by Australian consumers, found that two factors such as "difficulty in use" and "security concern" are important reasons that customers do not want to use the service. Jayawardhena and Foley (2000) suggested that the features of Internet banking Web sites, such as:

- The speed to download
- Content
- Design
- Interactivity
- Navigation; and
- Security,

are critical to enhancing customer satisfaction.

To sum up, the studies discussed above provide important insights into the dimensions and characteristics of service quality in Inter banking portals.

Product Service Quality

Previous studies have found that banking service product quality plays an important role in determining customers' perceptions of the overall banking service quality. The bank product quality is primarily associated with product variety and diverse features. Strieter et al. (1999) noted that one of the most important developments in banking is the increased emphasis on marketing a wide array of financial services.

Table 1: Critical Factors and Sub-Factors of TQM Implementation

Factors	Product Service Quality	Customer Service Quality	Portal Quality
Sub- Factors	Product variety/diverse features	<p>1. Reliability Correct service Keep service promise Accurate records Keep promise as advertised</p> <p>2. Responsiveness Prompt service Quickly solve problems Convenient service</p> <p>3. Competence Ability to solve problems Knowledge to answer questions</p> <p>4. Courtesy Address complaints friendly Consistently courteous</p> <p>5. Credibility Confidence in the bank's service Good reputation</p> <p>6. Access Availability for help ATM access Phone access E-mail access Account access when abroad</p> <p>7. Communication Clear answer Informing customer of important information Availability of status of transactions</p>	<p>1. Contents Information on products and services online Other information that customer needs</p> <p>2. Accuracy Accurate online transactions Errors in interface Errors in contents</p> <p>3. Ease of use Compatibility User friendly Easy login Speed of responses Accessibility of the Web site Functions that customers need Easy navigation</p> <p>4. Timelines Up-to-date information</p> <p>Aesthetics Attractiveness of the Web site</p> <p>6. Security Privacy Information transaction safety</p>

		<p>8. Understanding the customer Personal attention</p> <p>9. Continuous improvement Continuous improvement on online systems Continuous improvement on banking products Continuous improvement on customer services</p>	
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Dixon (1999) also argued that the key to getting more customers for the banks through the online service is not the attraction of the Internet itself but the products offered to the customers. This argument was supported by Latimore et al. (2000), who found that 87 per cent of Internet banking customers want to make a variety of financial transactions at one site (so called "one-stop shopping"), including paying their bills electronically and automatically, viewing their monthly bank statements, and purchasing stocks and insurance.

Therefore, it should be noted that since the present banking customers, with the advent of the Internet technology, can have unlimited access to financial information and enjoy a wider range of choices in selecting competitive products and financial institutions than ever before, the subtle "differentiating" quality levels (e.g. diverse features) of bank products and their timely introduction on the marketplace have become a key driving force in attracting new customers and enhancing customers' satisfaction (Mols, 1999).

The AHP model is developed considering the three major criteria, Product service quality, behavioral service quality, portal quality and sub-criteria as shown in Table 1, aims to synthesize the bank customers' judgments into an overall quality measure of each bank. Accordingly, AHP helps the management not only to identify the principal competitors, but also to assess the service performance of the banking system relative to its principal competitors. In contrast with the SERVQUAL instrument, AHP permits the management to investigate the sensitivity of the quality measure to whatever kinds of changes in customer judgment may occur.

RESEARCH QUESTIONS

On the basis of our review of the literature related to service quality of banks & portals, a number of research questions can be raised. For instance, which factors contributes more towards satisfaction of customers in banking system. What should be the facilities that a bank should made available to their customers viz, ATM's, Internet Banking, Online investment facilities. Answers to these questions should be of help to the banks that are operating in region so that the concerns of the customers can be utilized to provide the services that leads to satisfied customers.

DATA COLLECTION

A questionnaire in English was designed which incorporated the factors mentioned above. A total of 300 questionnaires were randomly distributed to those visiting a branch of a specific bank in city during last two weeks of Jan 2008. The procedure resulted in a sample of 165 completed questionnaires (55% useable response rate).

The bank chosen for the study were top two banks operating in the region, incidentally one bank is public sector bank and other is private sector. In a country like India, the situation is such males are expected to carry out dealings with the banks. Therefore the major portion of respondents are mainly males.

The questionnaire include a customer profile viz, gender, age, qualification. 73 percent respondents were found to be male and 27 percent were female. The age is varying from 21 years to 67 years. In the survey sample the respondents

were finally categorized into two groups one above 40 years and other below 40. Most of the respondents were well qualified to understand the working of banking systems.

ANALYTICAL HIERARCHY PROCESS (AHP)

Research Methodologies

Service quality evaluation is becoming a complicated practice as the number of factors and elements affecting it increase. The AHP devised by Saaty (1994) is a powerful technique in solving fuzzy and complex decision problems. The process can be used to make trade-off and determine priorities among factors and sub-factors that are critical to making sound decisions with evaluation. In order to investigate the views on the critical factors that will affect the evaluation of service quality in banks, the authors have conducted a study in banks using the AHP approach. In total, two banks are chosen one each from public & private sector. The study has gone through five phases, including: (1) structuring the problem and building the AHP model; (2) collecting data from expert interviews; and (3) determining the normalized priority weights of individual factors and sub-factors.

Phase 1: Identify the Criteria and Sub Criteria

Phase 2: Structuring a Hierarchy Mode

Considering the factors consolidated from literature, the problem of service quality evaluation in banks was decomposed into a model of hierarchical structure. The model has four levels as shown in Figure1. Level 1 states the goal of the problem (i.e. to measure the service quality). Level 2 consists of the critical factors, and Level 3 lists the sub-factors of individual critical factors. Level 4 is the desired result i.e evaluation.

Phase 3: Measuring and Collecting Data

The data collected from the survey is being utilized. Since these customers were familiar with the practices in their banks, they served as the evaluators to determine the relative weights against a given list of critical factors and sub-factors affecting the level of service quality.

Table 2: Satty's Nine Point Scale

Intensity of Importance	Definition	Explanations
1	Equal importance	Two activities contribute equally to the objective
3	Weak importance of one over other	Experience and judgment slightly favor one activity over another
5	Essential or strong important	Experience and judgment strongly favor one activity over another
7	Demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice
9	Absolute importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When compromise is needed
Reciprocals of above nonzero	If activity i has one of the above nonzero numbers assigned to it when compared with activity j then j	A reasonable assumption

A nine-point scale was employed to assign relative scores to pair-wise comparisons amongst the factors and sub-factors (see Table 2). The evaluators would assign a score to each comparison using the scale. This process continued

till all levels of the hierarchy, and eventually a series of judgment matrices for the critical factors and sub-factors was obtained.

Phase 4: Determining the Normalized Weights

The Global priority weights among factors & sub-factors were also determined by employing pair-wise comparisons and Saaty’s nine-point scale. The resulting priority weights determined the relative importance of individual factors and sub-factors, and in turn identified the points on which organizations should put their efforts throughout the process of TQM implementation.

Phase 5: Finding Solution to Problem by Dividing the Problem into Hierarchies

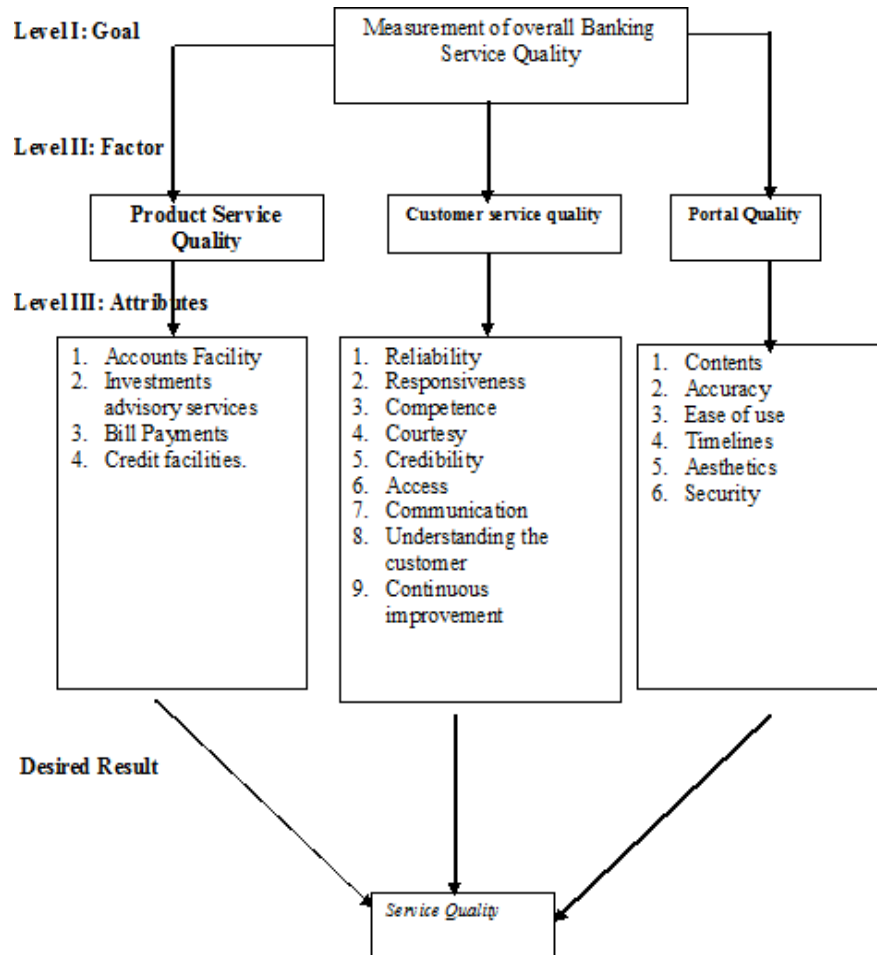


Figure 1: Decision Hierarchy for Bank Service Quality

Liberatore, 1992 suggested a five point rating scale of Outstanding (O), Good (G), and Average (A), Fair (F), Poor (P). This scale is adopted and priority weights of these scales can be determined using pairwise comparisons. Using pairwise comparison judgment matrix is generated. Liberatore found priority weights of outstanding, good, fair, average, and poor as 0.513, 0.261, 0.129, 0.063, and 0.034, respectively. The rating and weights of all criteria are shown in Table 3 & Table 4. Multiplying the global priority weights and rating and subsequently adding the resulting values we can find the score of different banks.

RESULTS & ANALYSIS

Regarding the third hierarchy level, Accounts Facility (AC) was the most important PQS sub-factor with a score of 0.0052 and its several times more than other factors Investment advisory service (IAS=0.0004), Bill Payment

(BP=0.0007), Credit Facilities (CF= 0.0009), respectively. The second critical factor was Customer Service Quality (CSQ). Under its auspices in the level three, the scores of responsiveness is 0.0180, which is most important sub-factors. Understanding the Customer (UC = 0.0011) is the Least important factors as compared to RA=0.0177; CO=0.0115; CE=0.0146;CM=0.0035; Similarly, the most important sub-factor under the Portal Quality is Security (SE= 0.0052) and have two second most important Sub- factors Content (CT= 0.0047) and Accuracy (AC=0.0047) as compared to other sub-factors Ease of Use(EU=0.0019), Timeliness (TI= 0.0028), Aesthetics (AT= 0.0018).. By examining the global weight rankings in the third level, Responsiveness (RS= 0.0180), Reliability (RA= 0.0177) and Credibility (CE= 0.0146) were the three most influential sub-factors that would be facilitate the evaluation of service quality in Bank A. Consistently, Investment advisory services, Bill payments and credit facilities have received least emphasis as commented by many consumers in the study.

Regarding the third hierarchy level, for Bank B Bill Payment (BP=0.0056) was the most important PQS sub-factor with a score of 0.0646. Its value is more than other factors Account Facility (AF=0.0052), Investment advisory service (IAS=0.0029), Credit Facilities (CF= 0.0039), respectively. The second critical factor was Customer Service Quality (CSQ). Under its auspices in the level three, the scores of Access (AS=0.0646) followed by Responsiveness is 0.0180, which is second most important sub-factors.

CE=0.0072 is the Least important factors as compared to others. Similarly, the most important sub-factor under the Portal Quality is Aesthetics (AT= 0.0272) and have two second most important Sub- factors Content (CT= 0.0385) and Accuracy (AC=0.0385), as compared to other sub-factors, Timeliness (TI= 0.0177), Ease of Use (EU=0.0144) Aesthetics (AT= 0.0018).. By examining the global weight rankings in the third level, Access (AS=0.0646) Content (CT= 0.0385) and Accuracy (AC=0.0385) were the three most influential sub-factors that would be facilitate the evaluation of service quality in Bank A .Consistently, Investment advisory services, Bill payments and credit facilities have received least emphasis as commented by many consumers in the study.

While evaluating the global weights of most of the sub-factors (Table 3 & Table 4), it was found that their rankings are different for Banks A & B except Courtesy & Investment advisory services having same ranking. The difference in ranking is varied because of the two types of consumer group for Bank A & Bank B.

For Bank A the most of the user are in the Age group more than 40 years and they consider responsiveness and reliability as the most important constituent of a banking system. The second group is consisting of user having age less than 40 years. In this group it was observed that being a younger group they prefer to use the facility of internet banking, email, ATM's etc.

In the overall ranking by the users Bank A is considered better than Bank B on three Factors chosen to evaluate the service quality.

Table 3: Application of AHP for Bank Service Quality

	Local Weight	Criteria	Local Weights	Global Weights	Bank A		Bank B	
					Rating	Score * GW= Total	Rating	Score * GW= Total
Product Service Quality(PQS)	0.057	• Accounts Facility(AF)	0.356	0.020	G	0.0052	G	0.0052
		• Investments advisory services(IAS)	0.188	0.011	P	0.0004	G	0.0029
		• Bill Payments(BP)	0.197	0.011	F	0.0007	O	0.0056
		• Credit facilities.(CF)	0.259	0.015	F	0.0009	G	0.0039
Customer Service quality(CSQ)	0.600	• Reliability(RA)	0.113	0.068	G	0.0177	G	0.0177
		• Responsiveness(RS)	0.115	0.069	G	0.0180	G	0.0180
		• Competence(CO)	0.148	0.089	A	0.0115	G	0.0232
		• Courtesy(CR)	0.077	0.046	F	0.0029	G	0.0120
		• Credibility(CE)	0.094	0.056	G	0.0146	A	0.0072
		• Access(AS)	0.210	0.126	P	0.0043	O	0.0646
		• Communication(CM)	0.093	0.056	F	0.0035	G	0.0146
		• Understanding the customer(UC)	0.054	0.032	P	0.0011	G	0.0084
		• Continuous improvement(CI)	0.096	0.058	F	0.0037	G	0.0151
Portal Quality(PQ)	0.342	• Contents(CT)	0.218	0.075	F	0.0047	O	0.0385
		• Accuracy(AC)	0.218	0.075	F	0.0047	O	0.0385
		• Ease of use(EU)	0.162	0.055	P	0.0019	G	0.0144
		• Timelines(TI)	0.132	0.045	F	0.0028	G	0.0117
		• Aesthetics(AT)	0.153	0.053	P	0.0018	O	0.0272
		• Security(SE)	0.118	0.040	A	0.0052	G	0.0052
	1.000		Total	1.000		0.1056		0.3340

Table 4: Ranking of Global Weights of Factors and Sub-Factors

	For Bank A		For Bank B	
	Ranking of Factors and Sub-Factors	Global Weights	Ranking of Factors and Sub-Factors	Global Weights
Level3	Responsiveness(RS)RS	0.0180	Access(AS)	0.0646
	Reliability(RA)RA	0.0177	Contents(CT)	0.0385
	Credibility(CE)CE	0.0146	Accuracy(AC)	0.0385
	Competence(CO)CO	0.0115	Aesthetics(AT)	0.0272
	Accounts Facility(AF)	0.0052	Competence(CO)	0.0232
	Security(SE)	0.0052	Responsiveness(RS)RS	0.018
	Contents(CT)CT	0.0047	Reliability(RA)	0.0177
	Accuracy(AC)AC	0.0047	Timelines(TI)	0.0177
	Access(AS)	0.0043	Continuous improvement(CI)	0.0151
	Continuous improvement(CI)	0.0037	Communication(CM)	0.0146
	Communication(CM)CM	0.0035	Ease of use(EU)	0.0144
	Courtesy(CR)CR	0.0029	Courtesy(CR)	0.012
	Timelines(TI)	0.0028	Understanding the customer(UC)	0.0084
	Ease of use(EU)EU	0.0019	Credibility(CE)CE	0.0072
	Aesthetics(AT)AT	0.0018	Bill Payments(BP)	0.0056
	Understanding the customer(UC)	0.0011	Accuracy(AC)	0.0052
	Credit facilities.(CF)	0.0009	Security(SE)	0.0052
	Bill Payments(BP)BP	0.0007	Credit facilities.(CF)	0.0039
	Investments advisory services(IAS)	0.0004	Investments advisory services(IAS)	0.0029

SENSITIVITY ANALYSIS

Another important aspect of the AHP is the concept of sensitivity analysis or "what if?" The sensitivity feature allows the model builder to alter the weights assigned to the objectives and observes their overall effects. The sensitivity feature provides a mechanism for helping decision makers define the range of possibilities that the organization will face. In other words, there is a possibility of changes taking place in the decision-making process, criteria, alternatives,

priorities, or scores that may render the judgments in this model requiring modifications. Nevertheless, the proposed hierarchy offers a robust framework that could model different scenarios and changes that might occur. It is an adaptive methodology for prioritization and changes, and can be considered as a modeling representation of a knowledge base.

Sensitivity analysis examines the sensitivity of the results and changes in the priorities of the criteria. This is a particularly important aspect of an AHP problem analysis, since results are based on subjective expert assessments. Sensitivity analysis can be performed from any level in the hierarchy; the software displays in a graphic form, the sensitivity of alternatives to priority changes of the criteria immediately below a user-selected node. This flexibility is very useful for fine-tuning the sensitivity analysis.

The Expert Choice software incorporates a methodology that allows use of the original judgments to facilitate any changes. It allows the user to vary the priorities of the alternatives, sub-criteria and criteria. Any variations will affect the priorities of all the other elements in the AHP model. The evaluation and choice module provides five different graphical modes for performing sensitivity analysis, namely: performance, dynamic, gradient, two-dimensional plot, and differences. Each of these graphical modes provides a different viewpoint to a sensitivity analysis.

Under any of these five modes, the user can easily manipulate criterion priorities and immediately see the impact of the changes (as reflected in the ranking of alternatives). A decision maker can easily use the mouse to change any of the weights of the criteria and observe the corresponding changes in the weights of the alternatives and their graphical display. This feature makes it possible and easy to perform several "what-if" analyses once the model is created and tested.

Since they are all interrelated, the resultant changes can be observed in these elements. Figure 2, 6 are graphical representations of this analysis. There are several sensitivity analysis procedures available. The "dynamic sensitivity" is used to dynamically change the priorities of the objectives to determine how these changes affect the priorities of the alternative choices.

By dragging the objective's priorities back and forth in the left column, the priorities of the alternatives will change in the right column. If a decision maker thinks an objective might be more or less important than originally indicated, the decision maker can drag that objective's bar to the right or left to increase or decrease the objective's priority and see the impact on alternatives.

AHP and Sensitivity Analysis

They provide a visual representation of the percentage of importance of each criterion in each alternative. This kind of analysis could be carried out on any node in the hierarchy. The Figures 2-6 represent the sensitivity analysis for the three main categories of Product service quality, Customer service quality and Portal quality

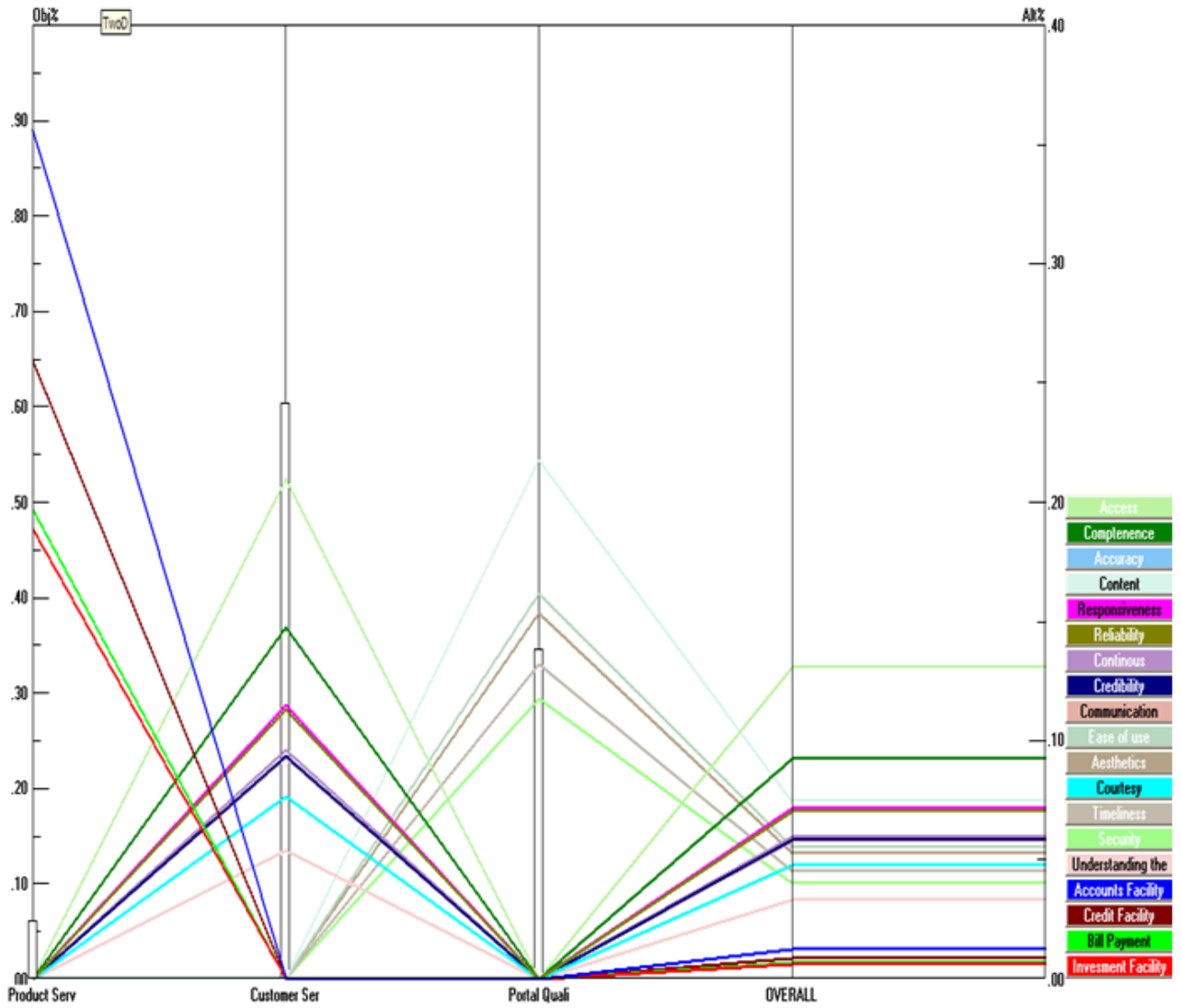


Figure 2: Performance Sensitivity Analyses with Respect to Goal

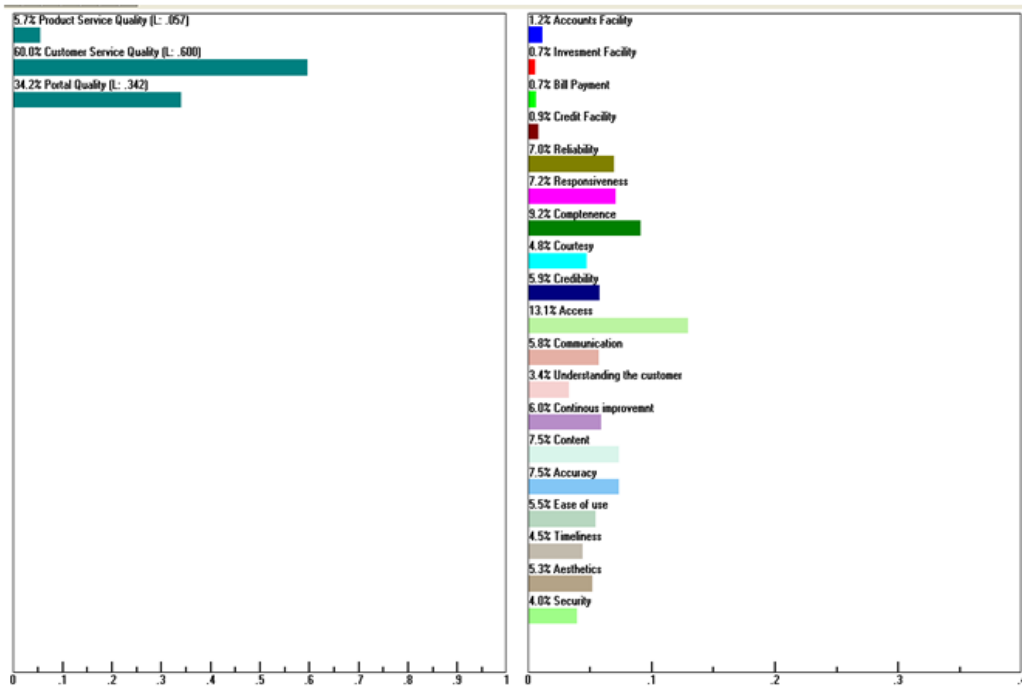


Figure 3: Dynamic Sensitivity Analyses with Respect to Goal

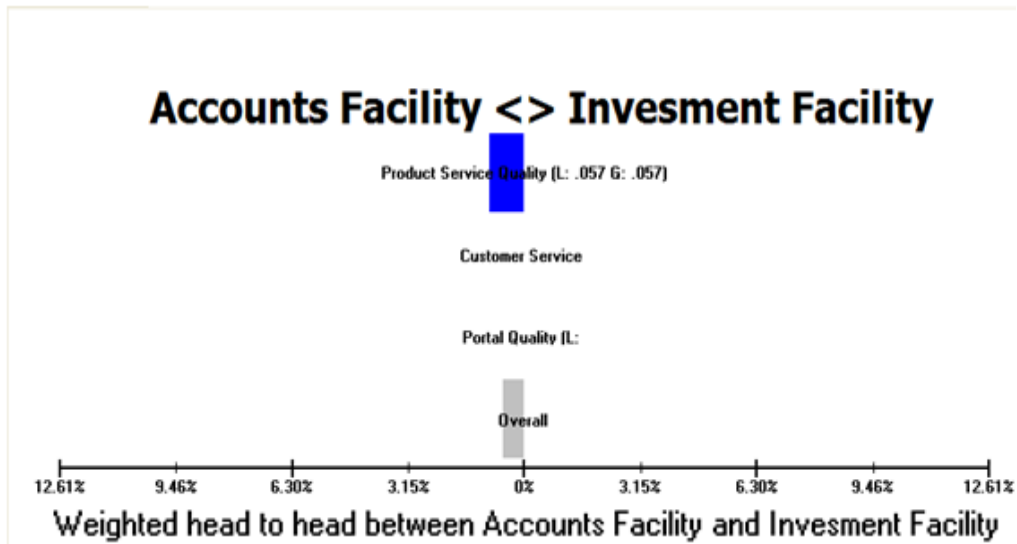


Figure 4: Weighted Head to Head between Sub-Factors

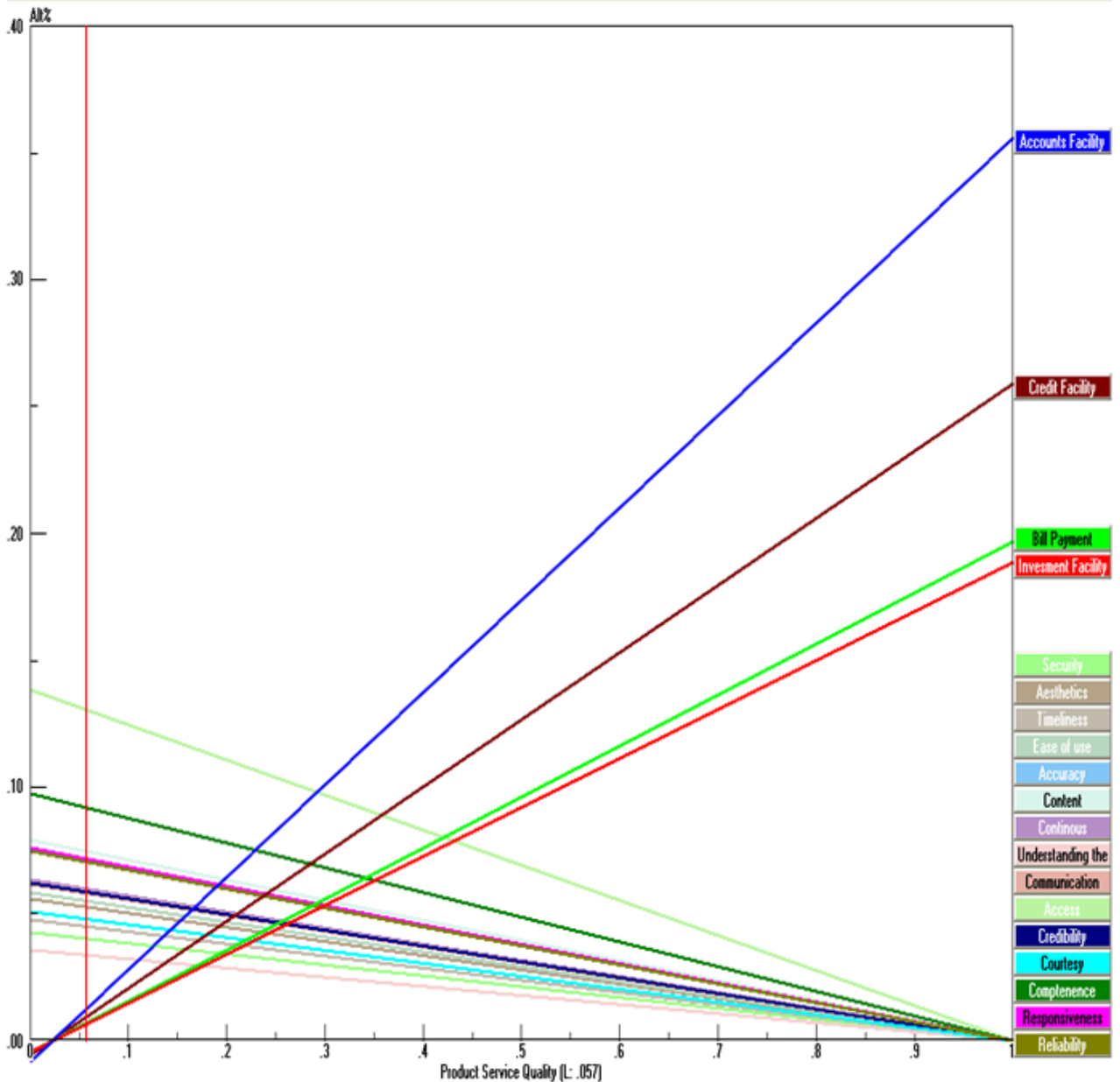


Figure 5: Gradient Sensitivity Analyses with Respect to Goal

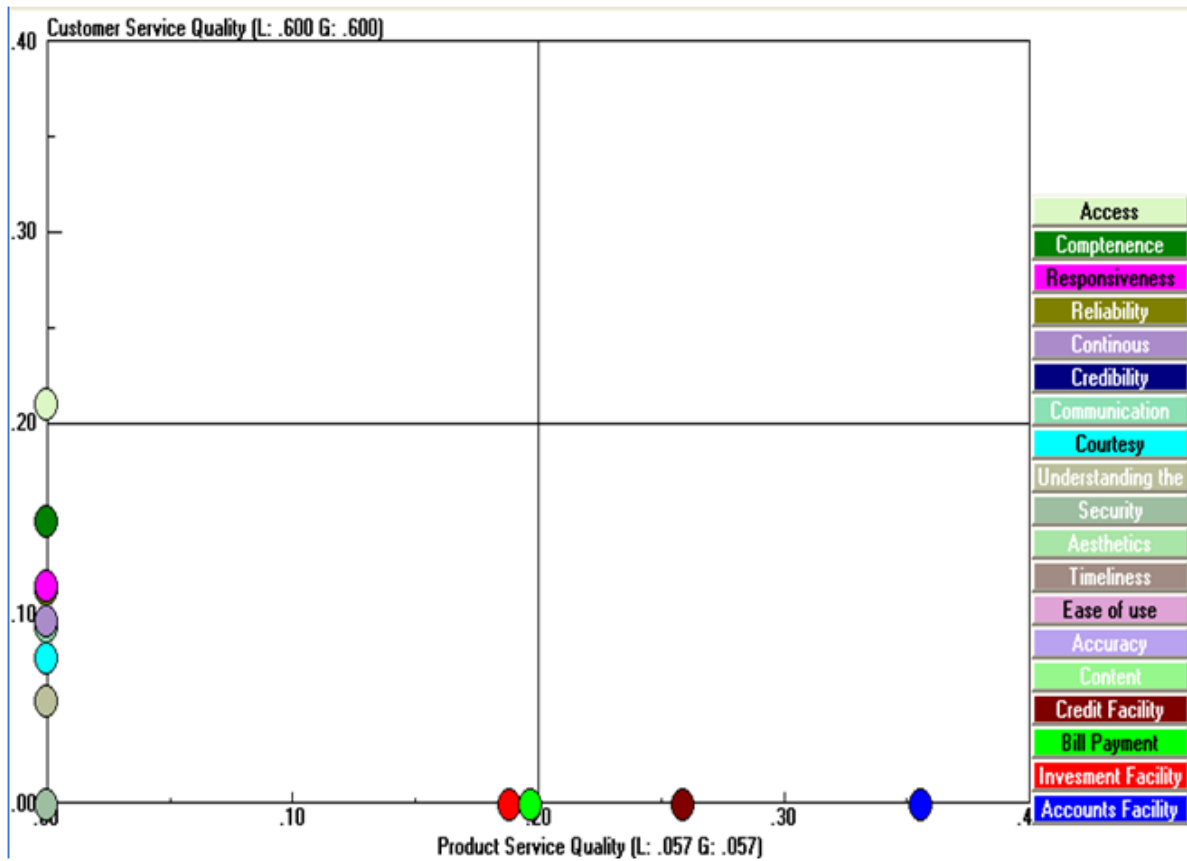


Figure 6: 2-D Sensitivity Analyses with Respect to Goal

The "performance sensitivity" analysis shows how the alternatives were prioritized relative to other alternatives with respect to each objective as well as overall. The "gradient sensitivity" analysis shows the alternative's priorities with respect to one objective at a time. The "head-to-head sensitivity" analysis shows how two alternatives compared to one another against the objectives in a decision. The "two-dimensional (2D plot) sensitivity" analysis shows the alternative's priorities with respect to two objectives at a time. After performing these detailed sensitivity analyses, the model builder can recommend their final decision to the customer.

CONCLUDING REMARKS

The structured approach offered by the AHP allows different individuals to participate equally in the decision-making process. The analytical process can provide a critical link of developing trust and true group participation. The AHP allows diverse viewpoints to be considered and integrated. The important thing is that all participants have input to, and ownership of, the final evaluation.

Measuring service quality, no matter what the nature of the awards is, can be a complex, multi-faceted, judgmental process, and requires the participation of consumers in most cases. It is important that the decision-making process is rational, consistent, and defensible. The AHP may offer an opportunity to integrate all these issues to provide a true mechanism that offers objectivity and understanding.

The AHP incorporates qualitative factors & quantitative issues that cannot be quantified in a point scoring system; they will be ranked more suitably by the AHP. When evaluating a bank, some criteria are quantitative (No of ATM's, Phone, Email), and others are qualitative (such as the Responsiveness, Reliability). In AHP, the criteria are specified in the decision hierarchy and are not restricted in any way. One criterion can also be divided into sub-criteria.

The requirement to construct a decision hierarchy provides the additional advantage of diminishing the chance that an important criterion will be forgotten.

The AHP provides a realistic description of the consumer problem. The measurement of service quality is characterized by multiple goals, sub-goals, and priority weights. AHP provides the opportunity to deal with all of these aspects by incorporating them in the decision hierarchy. AHP assumes that all criteria are independent, which precludes interactions between the criteria. AHP assumes that a decision maker can compare two banks on a specific criterion without considering the other criteria.

Although AHP presumes that the phases are executed sequentially, the decision maker can return to a previous phase in order to make some changes. Because of the flexibility of the method it is not necessary to repeat all judgments when a change is made. Changes in the model, such as the addition of an alternative or criterion, have only a limited impact on other parts of the model.

Measuring service quality of banks involves many factors; therefore, decision makers should be able to state differences in the relative importance of the criteria. AHP includes criteria at one or more levels in the decision hierarchy. All elements in a certain level have to be compared pairwise in order to calculate the importance of the criteria. In this way, it is very easy to assign different values to the importance of different criteria.

Sensitivity analyses and what-if analyses show the consequences of changes in, for example, the importance of factors. Confidence in the outcome of the analysis will increase if small changes in the relative importance of factors do not have much impact on the overall priority rating. When the AHP analysis has been completed it is rather easy to determine the consequences of changes in the judgments on the overall priorities.

A method is only a useful support tool if it is easy to understand. The comprehensibility of AHP is increased by both the construction of the decision hierarchy and the subsequent pairwise comparisons.

The AHP method is easy to use without elaborate training. As explained, AHP analysis can be divided into distinct phases. These phases require decision makers to think in a structured way. They have to define the problem in terms of goals, criteria (sub-criteria) and alternatives. Next, AHP requires them to make every possible pairwise comparison on a certain level. This enables the computation of the consistency ratio. Finally, using an AHP model is quite easy provided that an AHP software package is available.

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APPENDICES

Appendix I

A Survey of Customers of Visiting the Bank

This is a survey of your personal expectations of a Institute Library. We are attempting to find out How satisfied are you with the services and facilities provide by your bank.

Please circle the number which indicates *HOW IMPORTANT* each of the following points is to you. If you don't use a service, just leave that line unmarked.

Bank in which Customer is Registered Public Sector/Private Sector

Name: Age: Sex: Male/Female

I. How Satisfied are you with the Banking Services Product Quality Provided?	Not Important			Very Important			
	1	2	3	4	5	6	7
1. Checking accounts.	1	2	3	4	5	6	7
2. Call money accounts.	1	2	3	4	5	6	7
3. Time deposit accounts.	1	2	3	4	5	6	7
4. Investments advisory services.	1	2	3	4	5	6	7
5. Bill Payments	1	2	3	4	5	6	7
6. Credit facilities.	1	2	3	4	5	6	7
7. Letter of credit collections.	1	2	3	4	5	6	7
II. How Satisfied are you with the Customers Service Quality?							
1. Reliability Performing the service correct at the first time Providing the service at the time the service was promised Is the Records are accurate Promises are kept as advertised.	1	2		4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
2. Responsiveness Promptness of service Problem solving time Convenience of service	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
3. Competence Ability to solve problem Knowledge to answer questions	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
4. Courtesy Address complaints friendly Consistently courteous	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
5. Credibility Confidence in the bank's service Good reputation	1	2	3	4	5	6	7
	1	2	3	4	5	6	7

6. Access Availability of personnel for help ATM access Phone access E-mail access Account access when abroad	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
7. Communication Clear answer Informing customer of important information Availability of status of transactions	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
8. Understanding the customer Personal attention	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
9. Continuous improvement Continuous improvement on online systems Continuous improvement on banking products Continuous improvement on customer services	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
III. Based on your Experience, how would you Rate the Bank's Portal Quality?							
1. Contents Information on products and services online Other information that customer needs	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
2. Accuracy Accurate online transactions Errors in interface Errors in contents	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
3. Ease of use Compatibility User friendly Easy login Speed of responses Accessibility of the Web site Functions that customers need /Easy navigation	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
4. Timelines Up-to-date information	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
5. Aesthetics Attractiveness of the Web site	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
6. Security Privacy Information transaction safety	1	2	3	4	5	6	7
	1	2	3	4	5	6	7

