# MEASURING CUSTOMER PERCEPTION AND SATISFACTION IN INTERNET BANKING, SCALE DEVELOPMENT AND VALIDATION

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## ABSTRACT

Application of technology in various service sectors is providing convenience in product delivery, access, increased productivity and performance. Public sector banks in India have implemented Internet banking so that their customers can avail retail banking services anytime and anywhere. However, it is also necessary for the service providers to know what customers perceive about their services. In this research paper a scale has been developed to measure perceived service of Internet banking. Further it has been judged whether perceived service is affecting customer satisfaction. Data from 499 customers of 5 leading public sector banks have been collected and analysed. Privacy has been found to be the most important factor in determining how customers will perceive the Internet banking service. Customers have shown a high preference for timely availability of the banking website also. Interestingly, customer satisfaction has been found to be affected by perceived services positively and significantly. The study identifies the areas where banking service providers should focus on to have more satisfied customers and to attract more customers towards Internet banking.

**Keywords :** *perceived service, customer satisfaction, Internet banking*

## INTRODUCTION

Constructive uses of new technologies have always contributed positively towards improving standards of human life and the economy of a country. In today's business environment, organizations are well aware that to be competitive, they need to be highly responsive to the growing expectations of their customers. The proliferation and rapid advances in technology-based systems, especially those related to the Internet, are leading to fundamental changes in

how companies interact with customers (Ibrahim et al, 2006; Bauer et al., 2005; Parasuraman and Zinkhan, 2002). Application of technology is providing convenience in product delivery, access, increased productivity and performance. It is being used as the most powerful tool to augment the operational performance in terms of timeliness, accuracy, ease of operation etc. Technology, in particular, has been increasingly employed in service organizations to enhance customer service quality and delivery, reduce costs, and standardize core service offerings (Ibrahim et al, 2006; Lee and Lin, 2005; Bauer et al, 2005; Gounaris et al, 2005). Customers are frequently on move nowadays and expect a certain level of quality of service regardless of where and how they accessing the service. Many companies in the financial services sector have been quick to implement Internet capabilities, and electronic service is becoming a viable option for interaction between financial service providers and their customers (Rotchanakitumnuai, S and Speece, M 2003).

The challenging business process in the financial services forced the banks to introduce alternate delivery channel to attract customers and improve customers' perception and thereby customer satisfaction. Banks implemented Internet banking to offer their customers a variety of online services with more convenience for accessing information and making transactions. Customer satisfaction and customer retention are increasingly developing into key success factors in e-banking (Bauer et al, 2005).

Satisfaction is a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) in relation to his or her expectations (Kotler 2000). The proposition of Kotler (2000) is similar to Gronroos's (1982, 1984) conceptualization of service quality that 'puts the perceived service against the expected service'. In addition to the mediated impact of perceived performance via a comparison process, a number of studies have shown a strong direct link from perceived performance to satisfaction (Anderson & Sullivan, 1993; Oliver, 1993, 1994; Patterson, 1993).

This article, proposes to develop a scale to measure perceived service of Internet banking and to find the relationship between perceived service and customer satisfaction.


## LITERATURE REVIEW

While defining Internet banking De Young (2001) states with the exception of cash withdrawals, Internet banking gives customers access to almost any type of banking transaction at the click of a mouse. Pikkarainen, Pikkarainen, Karjaluoto, and Pahnila (2004) defines Internet banking as an 'Internet portal, through which customers can use different kinds of banking services ranging from bill payment to making investments'. The use of the

Internet as a new alternative channel for the distribution of financial services has become a competitive necessity instead of just a way to achieve competitive advantage with the advent of globalization and fiercer competition (Flavián, Torres, & Guinalíu, 2004; Gan, Clemes, Limsombunchai, & Weng, 2006). All banks using the Internet as an additional channel or a bank using only the Internet as delivery channel are now on equal footing to offer their banking services on the Internet and to compete for customers around the world. As Karjaluoto, Mattila, and Pento (2002) put it 'this could be the reason why the Internet is widely seen as the most important delivery channel in the era'.

Various research works have been carried out on electronic service (e-service) quality and customer satisfaction. Some researches relating e-service quality and customer satisfaction can also be found in Indian context.

Garvin (1987) introduced "aesthetics" as a quality dimension that addresses the consumer's subjective evaluation of how a product looks, feels, sounds, tastes or smells.

Zeithaml, Parasuraman, and Malhotra (2000) analysed web site features at the perceptual attribute level and categorized them into 11 e-SQ dimensions :

Reliability: Correct technical functioning of the site and the accuracy of service promises (having items in stock, delivering what is ordered, delivering when promised), billing, and product information.

Responsiveness: Quick response and the ability to get help if there is a problem or question.

Access: Ability to get on the site quickly and to reach the company when needed.

Flexibility: Choice of ways to pay, ship, buy, search for, and return items.

Ease of navigation: Site contains functions that help customers find what they need without difficulty, has good search functionality, and allows the customer to maneuver easily and quickly back and forth through the pages.

Efficiency: Site is simple to use, structured properly, and requires a minimum of information to be input by the customer.

Assurance/trust: Confidence the customer feels in dealing with the site and is due to the reputation of the site and the products or services it sells, as well as clear and truthful information presented.

Security/privacy: Degree to which the customer believes the site is safe from intrusion and personal information is protected.

Price knowledge: Extent to which the customer can determine shipping price, total price, and comparative prices during the shopping process.

Site aesthetics: Appearance of the site.

Customization/personalization: How much and how easily the site can be tailored to individual customers' preferences, histories, and ways of shopping

Loiacono, Watson, and Goodhue (2000) created WebQual, a scale for rating web sites on 12 dimensions: informational fit to task, interaction, trust, response time, design, intuitiveness, visual appeal, innovativeness, flow-emotional appeal, integrated communication, business processes, and substitutability. However, this scale's primary purpose is to generate information for Web site designers rather than to measure service quality as experienced by customers.

Using an online survey, Szymanski and Hise (2000) studied the role that customer perceptions of online convenience, merchandising (product offerings and product information), site design, and financial security play in e-satisfaction assessments. This study did not include aspects of customer service or fulfillment; rather, it dealt only with aspects of the web site. Furthermore, it measured satisfaction rather than service quality.

Yoo and Donthu (2001) developed a nine-item SITEQUAL scale for measuring site quality on four dimensions: ease of use, aesthetic design, processing speed, and security. As in the case of Barnes and Vidgen's (2002) WebQual scale, data for developing and testing SITEQUAL were gathered from convenience samples. Specifically, students enrolled in marketing classes were asked to visit and interact with three Internet shopping sites of their own choice and then evaluate each site. Like WebQual, SITEQUAL does not capture all aspects of the purchasing process and therefore does not constitute a comprehensive assessment of a site's service quality.

Wang and Huarng (2002) identified nine service quality factors that affect e-satisfaction through content analysis of online customer comments in their research. The identified factors are : (i) website design, (ii) competitive price of the product, (iii) merchandise availability, (iv) merchandise condition, (v) on-time delivery, (vi) merchandise return policy, (vii) customer support, (viii) e-mail confirmation on customer order and (ix) promotion activities. On the basis of these nine factors.

Wang (2003) assessed e-service quality via e-satisfaction in e-commerce globalization. The conclusion reached was e-service quality and e-satisfaction are the critical components in globalization of e-commerce. The study based on certain e-tailors of United States revealed a relatively low level of e-service quality.

Barnes and Vidgen (2002) developed a completely different scale to measure an organization's e-commerce offering, which they also call WebQual. This scale provides an index of a site's quality (customer perceptions weighted by importance) and has five factors:

usability, design, information, trust, and empathy. The scale is designed to be answered without a respondent needing to complete the purchasing process and is therefore a transaction-specific assessment of a site rather than a comprehensive evaluation of the service quality of a site.

Wolfinbarger and Gilly (2003) used online and offline focus groups, a sorting task, and an online-customer-panel survey to develop a 14-item scale called eTailQ. The scale contains four factors: Web site design (involving some attributes associated with design as well as an item dealing with personalization and another dealing with product selection), reliability/fulfillment (involving accurate representation of the product, on-time delivery, and accurate orders), privacy/security (feeling safe and trusting of the site), and customer service (combining interest in solving problems, willingness of personnel to help, and prompt answers to inquiries). Although two of their dimensions—security/privacy and reliability/fulfillment— show strong face validity and are highly descriptive of the items they represent, the other two dimensions appear less internally consistent and distinct. Web site design, for example, embraces aspects of in-depth information, level of personalization, selection, and speed of completing transactions. The factor called customer service contains items relating to the company's willingness to respond to customer needs, the company's interest in solving problems, and the promptness with which inquiries are answered. These dimensions, as well as other items that might be relevant to customer assessment of service quality on Web sites, need to be tested further.

On the basis of a comprehensive review and synthesis of the extant literature on e-SQ, in 2002 Zeithaml, Parasuraman, and Malhotra detailed five broad sets of criteria as relevant to e-SQ perceptions: (a) information availability and content, (b) ease of use or usability, (c) privacy/security, (d) graphic style, and (e) reliability/fulfillment. Availability and depth of information appear to be important because when users can control the content, order, and duration of product-relevant information, their ability to integrate, remember, and thereby use information improves (Ariely 2000). Ease of use appears relevant because Internet-based transactions are complex and intimidating to many customers. Privacy (the protection of personal information) and security (the protection of users from the risk of fraud and financial loss) have been shown empirically to have a strong impact on attitude toward use of online financial services (e.g., Montoya-Weiss et al. 2003). Graphic style—which embodies such issues as color, layout, print size and type, number of photographs and graphics, and animation—has also been shown to affect customer perceptions of online shopping (Hoffman and Novak 1996; Hoque and Lohse 1999; Schlosser and Kanfer 1999). Finally,

reliability/fulfillment has been cited as an important facet of e-SQ (Palmer, Bailey, and Faraj 1999; Wolfinbarger and Gilly 2003). In fact, Wolfinbarger and Gilly (2003) found that reliability/ fulfillment ratings were the strongest predictor of customer satisfaction and quality, and the second strongest predictor of intentions to repurchase at a site.

Based on the explorative study by Zeithaml et al. (2002), Parasuraman et al. (2005) provide the most comprehensive work on e-service quality. They empirically test a multiple item scale (E-S-QUAL) for assessing service quality of online shopping providers. Their findings correspond to the insights of their explorative study: two different scales are necessary to measure electronic service quality. The E-S-QUAL scale addresses core service quality aspects and consists of four quality dimensions (efficiency, fulfillment, system availability and privacy). Additionally, the E-RecS-QUAL scale is proposed to be relevant when customers face "nonroutine encounters" during the online-shopping process which are related to service recovery like product returns, dealing with problems, etc. (Parasuraman et al., 2005). This latter scale is composed of three quality dimensions (responsiveness, compensation and contact).

The literatures on e-service quality and customer satisfaction suggest : a) service quality and satisfaction has different construct though they are highly related concept. b) Researches regarding service quality and satisfaction constructs specific to Internet banking only is scares while many researches can be found in the domain of online retailing, general e-service etc. and c) Service quality determines customer satisfaction.

Depending on the findings of literature review and as per the objectives of the research two different constructs has been built : perceived service and customer satisfaction. To represent the full range of evaluative criteria of Internet banking service quality 9 dimensions have been identified which are "system availability", "site aesthetics", "ease of use", "technical performance", "reliability", "privacy", "trust ", "responsiveness" and "customization".

## METHODOLOGY

### Selection of the Banks

Almost all of the public sector banks in India have launched their Internet banking services, but very few of them have been able to attract customers towards this comparatively new banking channel. To get a more accurate idea about the prevailing service practices of Internet banking, the Indian public sector banks which have a high volume and value of RTGS and

NEFT transactions were chosen for this study. Five such selected PSBs are - State Bank of India, Punjab National Bank, Bank of Baroda, Union Bank of India and Bank of India. Selection of the banks has been done on the data provided in the official website of Reserve Bank of India (www.rbi.org.in).

*Questionnaire*

Items representing various facets of the 9 service dimensions were selected on the basis of the literature review. It resulted in the generation of 39 items approximately 4 items per dimension. Each item was recast into question to measure perceived service.

A questionnaire was designed for the Internet banking users to understand their perception level. The questionnaire had three sections : Section A : about the specific bank's performance on Internet bank services, Section B : about respondent's satisfaction by availing services offered by Internet banking, Section C : background of the respondent. As per the requirement of the study and to avoid ambiguity in analysis all the questions were framed positively. A five-point scale ranging from "Strongly Agree" (5) to "Strongly Disagree" (1), were used.

To have equality in measurement scale each customer rated the overall satisfaction of the corresponding bank on a 5-point Likert scale. The satisfaction construct was made up of 4 variables which measure the overall satisfaction of the customers of Internet banking. The associated questions were : Your overall satisfaction level with your bank's Internet banking services, Your overall satisfaction level with informational part of your bank's Internet banking services, Your overall satisfaction level with transactional part of your bank's Internet banking services, After using of the Internet banking your satisfaction has improved very much.

## ANALYSIS AND FINDINGS

*Test running of the questionnaire and generation of scale items*

Data for initial 39-item instrument were gathered from a sample of 100 respondents in the city of Jaipur. The sample was judicially divided among male and female and included people of different age group, education level, income level and service categories. Screened and qualified respondents self-administered the questionnaire consisting of a 39 statements. This stage focused on: (1) fixing the instrument by retaining only those questions capable of discriminating well across respondents having differing quality perceptions about the bank in

several categories, and (2) examining the dimensionality of the scale by establishing the reliabilities of its components.

A reliability analysis was conducted by grouping the items according to the 9 a priori conceptual dimensions from which they were derived. Item total correlation for each of the parameter in each of these nine predetermined dimensions found to be quite high. Therefore after pilot survey no refinement in the scale was required. The values of coefficient alpha ranged from 0.837 to 0.961 across the 9 dimensions and there were no suggestion that deletion of certain items from each dimension would improve the alpha values. So, no items were deleted.

Table 1: Reliability coefficients for the Indian PSBs' Internet perceived service dimensions (in the pilot survey with 100 respondents)

| Dimensions | No of items | P |
|---|---|---|
| System Availability | 4 | .889 |
| Site Aesthetics | 3 | .837 |
| Ease of Use | 5 | .884 |
| Technical Performance | 4 | .927 |
| Reliability | 4 | .909 |
| Privacy | 7 | .872 |
| Trust | 4 | .879 |
| Responsiveness | 4 | .903 |
| Customization | 4 | .894 |

The nine-factor solution was subjected to orthogonal rotation using Principal Axis Factoring. The rotated factor loading matrix of the test sample is shown in the table 2. This matrix is showing a stable pattern thereby confirming the factor structure.

Table 2: Factor loading matrix following orthogonal (varimax) rotation of 9 factor solutions

for P scores

| | | | | Factor loadings | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Items | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
| **System Availability** | | | | | | | | | |
| PAV1 | | | | | | | .830 | | |
| PAV2 | | | | | | | .800 | | |
| PAV3 | | | | | | | .880 | | |
| PAV4 | | | | | | | .870 | | |
| **Site Aesthetics** | | | | | | | | | |
| PSA1 | | | | | | | | | .900 |
| PSA2 | | | | | | | | | .810 |
| PSA3 | | | | | | | | | .830 |
| **Ease of Use** | | | | | | | | | |
| PEU1 | | .870 | | | | | | | |
| PEU2 | | .860 | | | | | | | |
| PEU3 | | .810 | | | | | | | |
| PEU4 | | .760 | | | | | | | |
| PEU5 | | .780 | | | | | | | |
| **Technical Performance** | | | | | | | | | |
| PTP1 | | | .830 | | | | | | |
| PTP2 | | | .890 | | | | | | |
| PTP3 | | | .930 | | | | | | |
| PTP4 | | | .920 | | | | | | |
| **Reliability** | | | | | | | | | |
| PRE1 | | | | | .890 | | | | |
| PRE2 | | | | | .920 | | | | |
| PRE3 | | | | | .920 | | | | |
| PRE4 | | | | | .780 | | | | |
| **Privacy** | | | | | | | | | |
| PPR1 | .860 | | | | | | | | |
| PPR2 | .800 | | | | | | | | |
| PPR3 | .800 | | | | | | | | |
| PPR4 | .680 | | | | | | | | |
| PPR5 | .750 | | | | | | | | |
| PPR6 | .720 | | | | | | | | |
| PPR7 | .770 | | | | | | | | |
| **Trust** | | | | | | | | | |
| PTR1 | | | | .840 | | | | | |
| PTR2 | | | | .840 | | | | | |
| PTR3 | | | | .850 | | | | | |
| PTR4 | | | | .810 | | | | | |

| | | | | Factor loadings | | | | |
| Items | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Responsiveness** | | | | | | | | | |
| PRS1 | | | | | | | | .930 | |
| PRS2 | | | | | | | | .910 | |
| PRS3 | | | | | | | | .830 | |
| PRS4 | | | | | | | | .790 | |
| **Customization** | | | | | | | | | |
| PCS1 | | | | | | | .880 | | |
| PCS2 | | | | | | | .870 | | |
| PCS3 | | | | | | | .880 | | |
| PCS4 | | | | | | | .820 | | |

The factor loading matrix for the expectation items in table 2 suggests a nine factor structure with loadings equally distributed on all 9 identified factors. Also for each of the factors the variables has the highest loading on that single factor only. The minimum loading found is .680.

## FINAL SURVEY AND SCALE VALIDATION WITH NEW DATA

It was decided that the study will be carried out in four major metro cities of India as these places reflect a composite nature of population. This was done following the concept of quota sampling method. To decide the sample to be taken for each of the five pre-selected public sector banks and within four metro cities, number of ATM outlets of the banks in four metro cities has been collected. The assumption was ATM users are the prospective user of Internet banking as for Internet banking the customer should hold an ATM card of the respective bank. Percentage has been worked out to find out the ranking of the banks in terms of no. of ATM outlets in these five banks and four cities. The banks were not willing to share the list of Internet banking users due to security reason therefore this method was applied to select the customers. A total of 499 questionnaires were used for the final analysis.

The data was subjected to 2nd order confirmatory factor analysis using AMOS 19 to test the model fit and unidimensionality of scale items.

*Item reliability*

33 items whose $R^2$ values were equal or above 0.450 with were retained and 6 which were below this level were deleted. The model was run again for re-estimation and the final values are shown in table 3.

Table 3 : Standard regression weights of the P scores after removal of 6 identified items

| | Item | Regression weights | R square value (item reliability) |
|---|---|---|---|
| 1 | PAV1 | 0.700 | 0.490 |
| 2 | PAV3 | 0.688 | 0.473 |
| 3 | PAV4 | 0.752 | 0.566 |
| 4 | PSA1 | 0.681 | 0.464 |
| 5 | PSA2 | 0.773 | 0.598 |
| 6 | PEU1 | 0.705 | 0.497 |
| 7 | PEU2 | 0.836 | 0.699 |
| 8 | PEU3 | 0.811 | 0.658 |
| 9 | PEU4 | 0.794 | 0.630 |
| 10 | PEU5 | 0.817 | 0.667 |
| 11 | PTP1 | 0.738 | 0.545 |
| 12 | PTP2 | 0.676 | 0.457 |
| 13 | PTP3 | 0.717 | 0.514 |
| 14 | PTP4 | 0.695 | 0.483 |
| 15 | PRE1 | 0.791 | 0.626 |
| 16 | PRE2 | 0.787 | 0.619 |
| 17 | PRE3 | 0.798 | 0.637 |
| 18 | PRE4 | 0.717 | 0.514 |
| 19 | PPR1 | 0.756 | 0.572 |
| 20 | PPR2 | 0.731 | 0.534 |
| 21 | PPR3 | 0.752 | 0.566 |
| 22 | PPR4 | 0.715 | 0.511 |
| 23 | PPR5 | 0.784 | 0.615 |
| 24 | PPR7 | 0.757 | 0.573 |

| 25 | PTR1 | 0.751 | 0.564 |
| 26 | PTR2 | 0.703 | 0.494 |
| 27 | PTR3 | 0.693 | 0.480 |
| 28 | PTR4 | 0.700 | 0.490 |
| 29 | PRS1 | 0.655 | 0.429 |
| 30 | PRS3 | 0.793 | 0.629 |
| 31 | PCS1 | 0.682 | 0.465 |
| 32 | PCS2 | 0.683 | 0.466 |
| 33 | PCS4 | 0.709 | 0.503 |

*Convergent validity*

To analyse the convergent validity the factor loadings and the average variance extracted were examined. Most of the indicators have loading from 0.6 to 0.9 which is in line with Bagozzi and Yi (1988). With this the average variance extracted was more than 0.5 (except one case) which is acceptable.

In this research the average variance explained by each construct of perceived service has been shown in table 4

Table 4 : Average variance extracted and composite reliability of perceived service construct

|  | AVE | Composite reliability |
| --- | --- | --- |
| **System Availability** | 0.509 | 0.756 |
| **Site Aesthetics** | 0.530 | 0.692 |
| **Ease of Use** | 0.630 | 0.894 |
| **Technical Performance** | 0.499 | 0.799 |
| **Reliability** | 0.598 | 0.856 |
| **Privacy** | 0.561 | 0.884 |
| **Trust** | 0.507 | 0.804 |
| **Responsiveness** | 0.528 | 0.689 |

| | | |
|---|---|---|
| **Customization** | 0.478 | 0.733 |

*Assessing the model fit*

The measurement model for perceived service confirms an acceptable model fit of data with chi-square=718.031, and degree of freedom = 486, CMIN/DF = 1.477 ; GFI (Goodness of fit )=0.919, AGFI (Average Goodness of fit)=0.907, CFI (Comparative Fit Index)= 0.968; NFI(Normed Fit Index)=0.908; RFI(Relative Fit Index)=0.901; TLI(Tucker-Lewis Index)=0.966; RMSEA(root mean square error of approximation)= 0.031 which shows unidemensionality of the factors.

*Discriminant validity*

Table 5 shows the AVE exceeds the squared correlations with the all the factors of perceived service thereby assuring discriminant validity of the nine constructs of perceived service.

Table 5 : Inter construct squared correlation of the perceived service construct

| Construct | | | Inter construct squared correlation |
|---|---|---|---|
| PAV | <--> | PSA | 0.356 |
| PAV | <--> | PEU | 0.267 |
| PAV | <--> | PTP | 0.283 |
| PAV | <--> | PRE | 0.223 |
| PAV | <--> | PPR | 0.413 |
| PAV | <--> | PTR | 0.360 |
| PAV | <--> | PRS | 0.291 |
| PAV | <--> | PCS | 0.326 |
| PSA | <--> | PEU | 0.203 |
| PSA | <--> | PTP | 0.190 |
| PSA | <--> | PRE | 0.108 |
| PSA | <--> | PPR | 0.216 |
| PSA | <--> | PTR | 0.295 |
| PSA | <--> | PRS | 0.198 |
| PSA | <--> | PCS | 0.191 |
| PEU | <--> | PTP | 0.165 |
| PEU | <--> | PRE | 0.218 |
| PEU | <--> | PPR | 0.209 |
| PEU | <--> | PTR | 0.162 |
| PEU | <--> | PRS | 0.168 |
| PEU | <--> | PCS | 0.156 |
| PTP | <--> | PRE | 0.154 |
| PTP | <--> | PPR | 0.262 |
| PTP | <--> | PTR | 0.187 |
| PTP | <--> | PRS | 0.175 |

| Construct | | | Inter construct squared correlation |
|---|---|---|---|
| PTP | <--> | PCS | 0.156 |
| PRE | <--> | PPR | 0.309 |
| PRE | <--> | PTR | 0.127 |
| PRE | <--> | PRS | 0.309 |
| PRE | <--> | PCS | 0.225 |
| PPR | <--> | PTR | 0.384 |
| PPR | <--> | PRS | 0.437 |
| PPR | <--> | PCS | 0.384 |
| PTR | <--> | PRS | 0.358 |
| PTR | <--> | PCS | 0.194 |
| PRS | <--> | PCS | 0.406 |
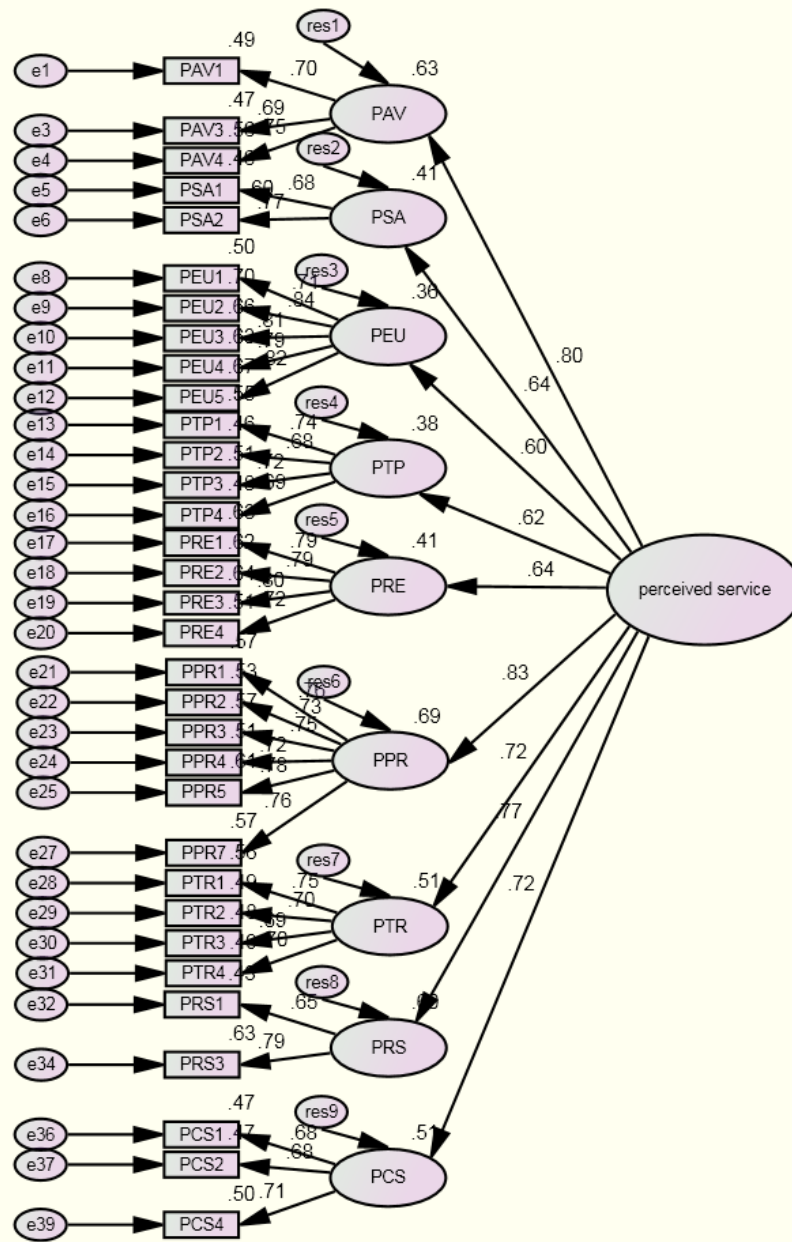
Figure 1: Perceived service construct

Customer satisfaction construct

In the satisfaction construct there are four items measuring the overall satisfaction level of the customers of Internet banking in a 9-point Likert scale. The satisfaction data was subjected to 1st order confirmatory factor analysis to test the model fit and unidimensionality of satisfaction scale item.

To check the individual item reliability within the satisfaction construct again $R^2$ values have been checked. The values of $R^2$ for the items measuring the satisfaction of the customers of Internet banking is shown in the table 13.

Table 6 : Standard regression weights of the satisfaction items

| Item | Regression weights | R square value (item reliability) |
|------|--------------------|------------------------------------|
| SAT1 | 0.738 | 0.545 |
| SAT2 | 0.800 | 0.640 |
| SAT3 | 0.733 | 0.537 |
| SAT4 | 0.699 | 0.489 |

In this construct the indicators have loading greater than 0.7 which is again in line with Bagozzi and Yi (1988). With this the average variance extracted is more than 0.5 (0.578) which is acceptable.

The measurement model for satisfaction confirms an acceptable model fit of data with chi-square=3.21 , and degree of freedom = 2, CMIN/DF = 1.609; GFI (Goodness of fit )=0.997, AGFI (Average Goodness of fit)=0.984 , CFI (Comparative Fit Index)= 0.998; NFI(Normed Fit Index)=0.996 ; RFI(Relative Fit Index)=0.987 ; TLI(Tucker-Lewis Index)=0.995 ; RMSEA(root mean square error of approximation)= 0.035

*The model*

A structural equation modeling technique was used to find the relationship between perceived service and satisfaction. The AMOS 19 program was employed for this purpose. It was found that perceived service of Internet banking has a direct impact on the customer satisfaction.

7 fit indexes which are commonly used in the literature ($x^2$/d.f, GFI, AGFI, NNFI, CFI, RMSR, RMSEA) were employed to test model fit. As the values in Table 7 reveal, the fit indexes of

the model are included in the values which are acknowledged in the literature.

Table 7 : Summary statistics of model fit

| Fit indexes | Recommended Value | Observed Value |
|---|---|---|
| Chi-square/ degrees of freedom | <=3.0 | 1.430 |
| GFI (Goodness of fit ) | >=0.90 | .912 |
| AGFI (Average Goodness of fit) | >=0.80 | .900 |
| RMR (root mean square residual) | <=0.05 | .018 |
| CFI (Comparative Fit Index) | >=0.90 | .967 |
| NFI(Normed Fit Index) | >=0.90 | .900 |
| RFI(Relative Fit Index) | Close to 0.90 | .892 |
| TLI(Tucker-Lewis Index) | Close to 0.90 | .965 |
| RMSEA(root mean square error of approximation) | <=0.05 | .029 |

Figure 2 shows the standardized path coefficients with their respective significance level.

Figure 2 illustrates the significant structural relationships among the study variables. The direct path Perceived service → SAT is significant since the regression coefficient (β) is 0.544 with p< 0.001. The construct perceived service is composed of 9 latent factors "availability", "site aesthetics", "ease of use", "technical performance", "reliability", "privacy", "trust", "responsiveness" and "customization" which has standardized regression weight 0.790, 0.642, 0.616, 0.610, 0.650, 0.824, 0.707 0.772 and 0.717 respectively and all with p<0.001. It was observed that within the construct perceived service also all the components were contributing significantly.

The standardized regression weights of all the individual components within each of these nine components of perceived service are shown in table 8.

Table 8: Standardized Regression Weights: (Group number 1 - Default model)

| | | | Estimate |
|---|---|---|---|
| PAV | <--- | perceived service | .790 |
| PSA | <--- | perceived service | .642 |

|  | Estimate |
|---|---|
| PEU &lt;--- perceived service | .616 |
| PTP &lt;--- perceived service | .610 |
| PRE &lt;--- perceived service | .650 |
| PPR &lt;--- perceived service | .824 |
| PTR &lt;--- perceived service | .707 |
| PRS &lt;--- perceived service | .772 |
| PCS &lt;--- perceived service | .717 |
| SAT &lt;--- perceived service | .544 |
| PAV4 &lt;--- PAV | .749 |
| PAV3 &lt;--- PAV | .690 |
| PAV1 &lt;--- PAV | .701 |
| PSA2 &lt;--- PSA | .768 |
| PSA1 &lt;--- PSA | .685 |
| PEU5 &lt;--- PEU | .817 |
| PEU4 &lt;--- PEU | .794 |
| PEU3 &lt;--- PEU | .811 |
| PEU2 &lt;--- PEU | .836 |
| PEU1 &lt;--- PEU | .706 |
| PTP4 &lt;--- PTP | .694 |
| PTP3 &lt;--- PTP | .716 |
| PTP2 &lt;--- PTP | .677 |
| PTP1 &lt;--- PTP | .739 |
| PRE4 &lt;--- PRE | .717 |
| PRE3 &lt;--- PRE | .799 |
| PRE2 &lt;--- PRE | .787 |
| PRE1 &lt;--- PRE | .791 |
| PPR7 &lt;--- PPR | .757 |
| PPR5 &lt;--- PPR | .784 |
| PPR4 &lt;--- PPR | .715 |
| PPR3 &lt;--- PPR | .753 |
| PPR2 &lt;--- PPR | .730 |
| PPR1 &lt;--- PPR | .756 |
| PTR4 &lt;--- PTR | .700 |
| PTR3 &lt;--- PTR | .693 |
| PTR2 &lt;--- PTR | .701 |
| PTR1 &lt;--- PTR | .753 |
| PRS3 &lt;--- PRS | .794 |
| PRS1 &lt;--- PRS | .654 |
| PCS4 &lt;--- PCS | .713 |
| PCS2 &lt;--- PCS | .682 |
| PCS1 &lt;--- PCS | .678 |
| SAT4 &lt;--- SAT | .698 |
| SAT3 &lt;--- SAT | .730 |
| SAT2 &lt;--- SAT | .791 |
| SAT1 &lt;--- SAT | .751 |

The results showed that perceived service of Internet banking which consists of 9 individual dimensions is affecting customer satisfaction positively and significantly.
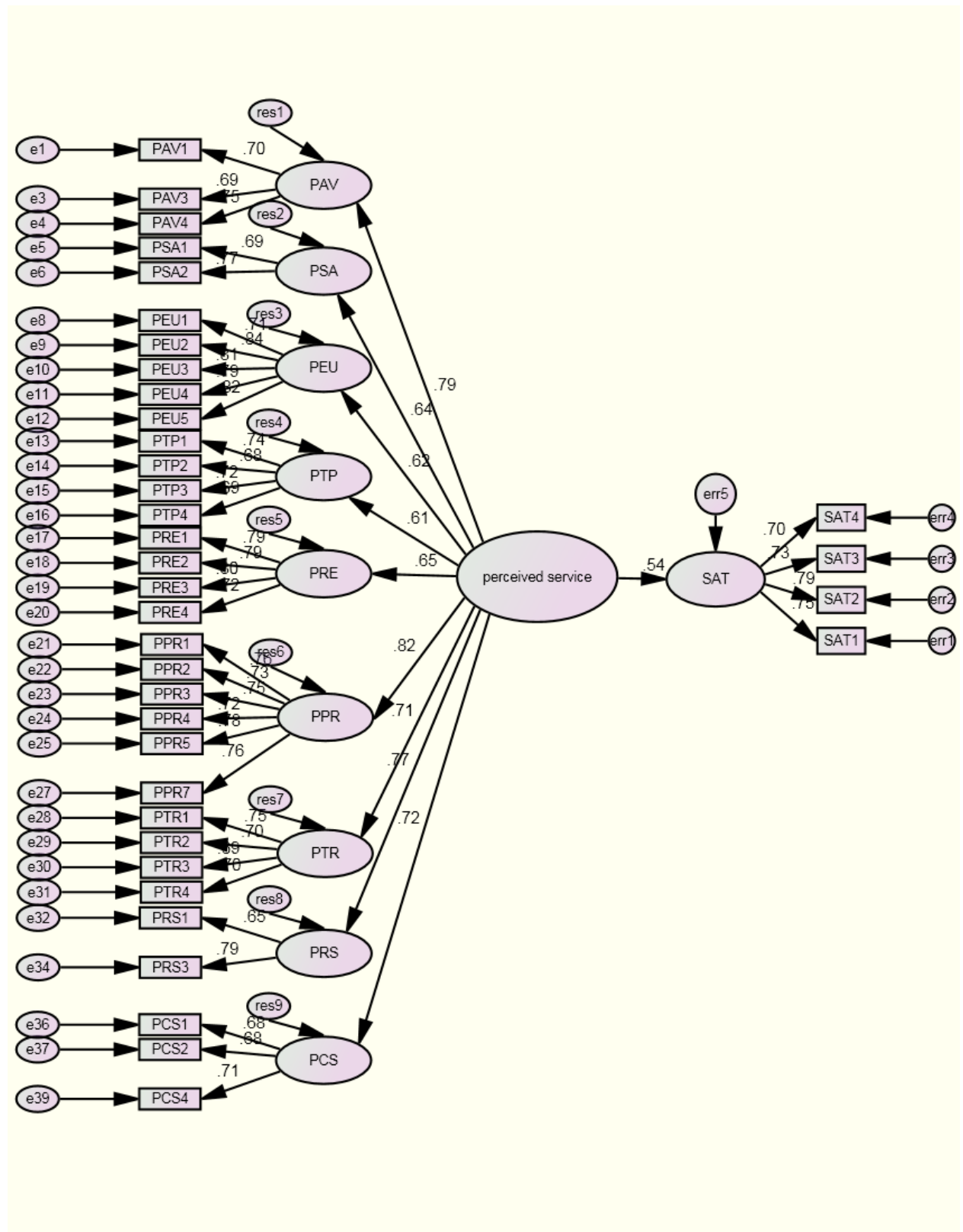


Figure 2 : The model showing perceived service of Internet banking determining customer satisfaction

## DISCUSSIONS AND IMPLICATIONS

The objective of the paper was to develop a scale to measure perceived service and to derive the relationship between perceived service and customer satisfaction in the context of Internet banking service provided by the Indian Public sector banks. There are twenty five public sector banks in India but all of them have not been successfully promoted Internet banking services. To get an accurate information regarding the quality of Internet banking services five banks have been selected that have recorded highest amount of NEFT and RTGS transactions both volumewise and valuewise. Experienced customers of these five PSBs have been questioned to have an idea about how they perceived Internet banking service. The questionnaire had two parts. The perceived service part of the questionnaire was developed on nine predefined latent constructs, which were selected from the in depth review of earlier literatures in this field. The satisfaction part of the questionnaire was containing four questions on overall satisfaction level of the customers. A test run was conducted with 100 samples and reliability testing of all the constructs was carried out. The individual parameters in nine constructs had quite high loadings and no significant cross loading was observed. Therefore no modification in the construct structure was found to be required.

In the final survey a total of 499 data collected from the customers of five selected PSBs was analysed. From 39 initial items 6 items were dropped as they had a $R^2$ value less than 0.450. In the final structure of perceived service, privacy and availability were identified as the most important dimensions. Responsiveness, customization and trust were the dimensions which had found to affect the perceived service to moderate extent. Reliability, site aesthetics, technical performance and ease of use are the constructs which has the lowest weightage in determining perceived quality of service for Internet banking. The satisfaction construct was checked for convergent validity separately.

Perceived service construct and customer satisfaction construct was joined together to check the relationship between these two. The final model fitted well within the recommended value of various fit indices. Perceived service influences the satisfaction positively and significantly.

The research implies that customer satisfaction can be enhanced by providing better services to the customers. Special care should be taken to improve the service in those constructs of perceived service which has a very high loading such as privacy and availability of the banking

website. Privacy of the personal information and financial information is one of the most challenging areas where the service providers should give more emphasis for improvement.

For this they should implement latest web security mechanisms. Banks should also have effective fraud detection and fraud control mechanism in practice.  Availability of the banking website is still major issue to the customers. Banks should improve on the network connection and load time of the banking website. Customers also perceive that banks should be responsive enough to rectify the mistakes in time and it should be done with minimum effort from customers' end. Banks should try to provide more customized service. This will also help the customers to be at ease even if they are not interacting with the bank personnel while availing retail banking services over Internet.   The results also indicate that the online shoppers have matured and the technology has also been well adopted as the customers are giving more weightage for rectification and less for technical performance and ease of use.

## LIMITATIONS AND FURTHER RESEARCH

The scale can be tested on any other sample by varying the selected banks. The banks were selected on the basis of their value and volume of RTGS transactions. No lists of Internet banking customers were available for the public sector banks. Some other PSB can have more number of Internet banking customers who are not engaged in transactions but they use the bank website for non transactional operations.

However, as the five selected banks accounted for high rate of RTGS and NEFT, therefore it may be assumed had a low incidence of problem encounters. There is thus a need to further examine the reliability and validity of the scale in the context of more diverse Internet banking websites that have a higher incidence of problem encounters and to refine the scale if necessary. The developed scale can be verified again by applying confirmatory factor analysis which will assure the explored dimensions of this research.

While developing the scale for perceived service, experiential aspects such as pleasure of using Internet banking without visiting the bank branch has not been kept within the scope of this study. This was not kept under the purview of this research because these items are customer specific and arbitrary in nature. However this leaves a scope for further study as what the customers actually want psychologically from using Internet banking may influence the perception of the service quality of Internet banking.

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