Chapter 3
Research Methodology

Contents

3.1 Rationale of the Study

The literature review revealed that the majority of studies focused on measuring the service quality of services in general, with only a few studies focusing explicitly on measuring the service quality of banks. As there has been a spike in users of online banking services in recent years, this study tried to develop an index to quantify the service quality of those services.

3.2 Statement of the Problem

Mavri & Loannou (2006), in their paper, mentioned that there is a need for new statistical approaches for analyzing and improving data regarding online banking services. This indicates that there is a need to develop an instrument to measure the service quality of banks. However, there do exist scales of measurement of offline banking transactions. Bahia & Nantel, (2000) in their paper suggested a scale for the measurement of perceived service quality in retail banking. In a research paper by Abdullah et al., (2011) the researchers formulated an index with the help of three dimensions- systemization, responsiveness, and reliable communication. The study found that the dimensions of responsiveness (the willingness and readiness to assist consumers and give timely service) and reliable communication (the demand to communicate and perform services reliably and dependably) were found to have a high factor loading. There, however, exists certain differences between the service delivery attributes of online and offline banking. Certain dimensions like tangibility which is one of the major dimensions used by many authors while measuring service quality of offline services might not be that effective while measuring online banking services.

Despite shared characteristics between e-banking and traditional banking service quality dimensions, many traditional service quality attributes were found to be redundant due to the remote form of the online encounter (Loonam & O'Loughlin, 2008).

Despite the absence of physical and geographical limits connected with internet banking, the quality of service provided may be the most important factor in attracting and retaining consumers (Liao and Cheung, 2002). One of the important characteristics of service is intangibility, as it cannot be seen or felt. This creates a sense of doubt about the service's outcomes, prompting the customer to seek confirmation of its excellence. This

characteristic was studied in all the previous studies under which variables like – cleanliness of facilities, decoration of facilities, and efficacious work environment were studied by Bahia & Nantel, (2000), and some other tangible factors like – employees have neat and professional appearances, the behavior of the employees, etc were studied by Abdullah, et al. (2010). However, in the case of online banking services, this characteristic of service cannot be attained with these variables due to the absence of human interaction. Through the above literature study, it was observed that more and more bank consumers are using online banking services after the event of demonetization (Sridhar, The Business Line, Money and Banking, 2018), and due to the current pandemic where people are forced to maintain social distancing and where it was reported that currency notes have the potential to act a medium of transmission of the Covid-19 virus, there is a very high possibility that the shift from offline transaction to the online transaction will increase in the coming time.

Most of the indexes previously formed aimed at measuring the service quality of offline banking transactions (Avkiran, 1994; Bahia & Nantel, 2000). There exist many differences between the banking service delivery of offline and online banking for which the same index that is used to measure offline banking services cannot be used for online banking services. Parasuraman et al., (2005) developed the E-S-QUAL model to measure online service quality, however, it was criticized to be generic by Conolly et al., (2010).

Tiwari et al., (2017), in their paper, pointed out that there is a need for a greater in-depth investigation to understand the effects of service quality of online banking services on consumers more effectively. The researchers however used E-S-Qual to measure the service quality of online banking services. The use of E-S-Qual as a measurement of service quality among different industries was, however, questioned by researchers Yaya et al., (2017), in their study where they concluded that one of the causes of instability in a number of dimensions of E-S-QUAL, when used in a specific industry is the generic nature of the scale.

Ho & Lin, (2009), attempted to construct an index for assessing internet banking service quality, based on the services available on the official websites. The other forms of online banking services were overlooked in this study.

The increase in the use of digital transactions after demonetization was stated in a report published by RBI (Reserve Bank of India, Department of Payment and Settlement Systems, 2020). Due to pandemic the bank consumers were encouraged to use online banking services more than before. This necessitates the urgency to study the variables which play a major role in online bank service delivery and also to develop an assessment scale to measure the online bank service quality of banks. While conventional service quality indicators provide a value for the quality level at a specific reference period, index numbers allow for the quantitative measurement of the variation in service quality over time in percentage points. An index number's principal purpose is to give a value that may be used to compare magnitudes such as service quality (Ona J et al., 2015).

3.3 Research Gap:

This study acknowledges the following gaps:

i. Many indexes are developed to measure customer satisfaction, performance satisfaction, and also to measure service quality. For measuring service quality the most recognised model was the SERVQUAL model. However, it's dimensionality was questioned by a number of researchers like Brown & Koenig, 1993 & Jabnoun et al., 2003.

ii. Few studies have been established where researchers have attempted to develop a banking service quality measurement index (Bahia & Nantel, 2000; (Abdullah, Suhaimi, Saban, & Hamali, 2011). However, these indexes don't consider the attributes of online banking. Studies were identified where the E-S-QUAL scale by Parasuraman et al., 2005 was widely used to measure service quality of bank's online services (Zavareh, Ariff, Jusoh, Zaukuan, & Bahari, 2012; Ariff, Yun, Zakuan, & Juosh, 2012; Herington & Weaven, 2009). However, the E-S-QUAL model used to measure service quality is not industry-specific and doesn't take into consideration the special characteristics a bank possesses as compared to other online service industries (Connolly et al., 2010). The use of E-S-QUAL as a measurement of service quality among different industries was also questioned by researchers Yaya, et al., (2017) in their study where they concluded that one of the causes of instability in a number of dimensions of E-S-QUAL, when used in a specific industry is the generic nature of the scale.

iii. Given the lack of physical and geographical constraints associated with internet banking, attracting and retaining consumers may be largely determined by the quality of service delivered (Liao and Cheung, 2002). An attempt was made by Ho and Lin, (2009) to develop an index for measuring service quality of internet banking, but the other mediums of online banking were ignored in this study and only the quality of website services were focused in this study.

iv. Avkiran, 1994 in his study has mentioned that to measure the service quality of banks the customer base can be segmented following customer needs by attaching socio-economic items. Mann & Sahni, 2018 in their study studied the significance of perceived usefulness of internet banking and the demographic variable age, while the other segments of the population were not incorporated in the study. Gupta & Bansal, 2011 in their research attempted to analyse the effect of demographic variables like- age, occupation, education qualification, and income group on customer perceptions of internet banking service quality offered by banks in India. The socio-economic factor exposure to internet was not included which was found to be an important socio-economic factor along with income and education by researchers Siyal et al. (2006) in their study. In a study by Choudhury & Bhattacharjee (2015), the researchers attempted to study the adoption of e-banking among salaried employees of Assam only but the other sections of the population of Assam were not assessed in this study.

3.4 Objectives of the study:

Based on the research gap identified in this study the following research objectives are formulated:

i. To determine the factors of service quality of online banking services.
This objective refers to identifying the factors of service quality for online banking services. This will help us to identify the dimensions which are perceived to be important by the consumers belonging to various segments of society.

ii. To develop an index to measure the service quality of online banking services.
Objective ii. focuses on developing an index specific to measuring the service quality of online banking services. An index is proposed to be developed through this study.

3.5 Scope of the Study

3.5.1 Geographical Scope:

The research was carried out bearing in mind the challenges that have arisen as a result of India's status as a developing economy. In this country, there are concerns about the quality of online banking services. The primary data collection method, on the other hand, can only be carried out in the state of Assam. The geographical scope of the study is confined to the state of Assam. The total population in the state of Assam is 3.12 Cr as per the census 2011. As per the Department of Telecommunication, the total number of internet subscriptions in Assam is 9.81 million.

3.5.2 Academic Scope:

The scope of this study is confined to the development of an index for assessing the degree of service offered by online banking services. This will aid in categorising the quality of service performance of public and private sector commercial banks' online banking services

3.6 Period of the Study

The study is based on primary data collected from bank consumers. Field data was collected during 2021-2022.

3.7 Limitations of the Study

Every study has its own set of limitations, which limit the study's accuracy to some level. The following are the study's limitations:

i. The study took a quantitative method, which allowed it to capture the respondents' limited experiences.
ii. The data for this study were collected between the year, 2021 and 2022, therefore, any breakthroughs or introduction of new services by a bank after this time are not considered in this study.
iii. The geographical coverage of the study was limited to three districts of Assam – Kamrup (M), Jorhat, and Dibrugarh.

3.8 Research Design

The research work is empirical in nature. Primary data was collected from bank consumers with the help of a questionnaire. For preparing the questionnaire a Delphi survey was conducted, where the respondents were branch managers and deputy managers of the selected banks of the study. Data was collected from three districts of Assam and a total of 730 responses were collected for the study.

3.8.1 Instrument development process

The pre-investigation survey was done in the district of Kamrup (M). Three rounds of the Delphi technique were conducted and separate structured questionnaires were designed for each of the rounds. This was done to verify the variables which were identified through a literature review.

3.8.2 Sampling Process

3.8.2.1 Sample Population:

The study is conducted in the state of Assam (India). The population for the study is bank account holders of all the selected banks. In a report published by RBI which assessed the progress of digitization from cash to electronic, it was reported that there has been an increase in the number of deposit accounts by the end of March 2019. These include all commercial bank deposit accounts. Thus, the bank account holders of commercial banks are taken for the study.

The Human Development Report (2014) ranked the districts of Assam based on various factors that impact overall human development. These factors are – the standard of living which is measured by the Gross National Income, education level, and health. As education level and income level are the socio-economic factors taken into consideration for this study, the ranking of the districts as per the Human Development Index, 2014 is taken into consideration while selecting the districts.

The top three districts as per this index are – Kamrup Metropolitan, Dibrugarh, and Jorhat.

Table 3.1: HDI value of the districts

Name of the District	**Human Development Index, 2014**
Kamrup(M)	0.69
Dibrugarh	0.54
Jorhat	0.53

Table 3.2: Population of the three selected districts

Name of the District	**Population**
Kamrup (M)	1,253,938
Dibrugarh	1,326,335
Jorhat	1,092,256

3.8.2.2 Sampling Technique:

For choosing the samples of the consumers of the banks, judgment sampling was used. Judgement sampling is a non-probability sampling strategy used in research in which the researcher selects people or elements for inclusion in a study based on their own judgement. Unlike probability sampling methods, judgement sampling does not use random selection and instead selects a sample based on the researcher's subjective judgement. Judgment Sampling was used in terms of selecting only those consumers who use online banking platforms to conduct their banking transactions.

3.8.2.3 Sample Size:

Firstly, similar studies conducted by different researchers in the previous years have considered the following sample sizes. According to Nunnaly & Bernstein, (1978), as cited by Bahia and Nantel (2000), mentioned that a sample of 300 respondents is sufficient to test measurement scales. Bahia and Nantel in their study used a sample of 360 consumers. Parasuraman et al., (2005) in their study used a sample size of 549 respondents. Abdullah et al., (2011) in their study used a sample size of 1519. Researcher Roscoe (1969), provided a certain “rule of thumb” for determining sample size for behavioral research. According

to him, a sample size of more than 30 and less than 500 is appropriate for the studies. Johnson et al., (2001) in their study, took a sample of 902 respondents from the banking industry. Garson (2008), said that a rule of 10 must be followed while selecting the samples, wherein, for every item in the instrument there must be 10 cases present. As the number of items in the study are 38 this amounts to 380 (38x10) respondents for this study.

Secondly, based on the data provided by Krejice & Morgan (1970), for population size, the sample size at a 95% confidence level and a 3.5% margin of error should be at least 384 for a population of 10,000,000 or more. Since the population of Assam is within the range, it is recommended to take a minimum size of 384 into consideration.

Further, Cochran (1977) developed a formula for the calculation of sample size in case of large populations, which is –

$$n = \frac{z^2 pq}{e^2}$$

where,

n = sample size

z= critical value of the standard normal distribution for a given confidence interval

p = p is the estimated proportion of an attribute that is present in the population

q = 1- p

e = margin of error or proportion of sampling error

According to Cochran's formula, in the case of selecting a sample size for an unknown and large population, the confidence interval is set at 95% i.e. 5% margin of error, and assuming the maximum variability, which is equal to 50% (p-0.5). For the purpose of the study, a 3.5% margin of error is taken, thus the calculation for the required sample size is–

z = 1.96 (critical value at 95% confidence level)

p = 0.5

q = 1 – 0.5 = 0.5

e = 0.035

So,

$$n = \frac{(1.96)^2\ (0.5)(0.5)}{(0.035)^2} = 784$$

Thus, it can be seen that based on literature review and the above formulas, a sample size in the range of 384 to 784 is acceptable.

For this study primary data would be collected from the districts of Assam, to get more representative sample of the population a comparatively larger sample size is taken. A sample size of 784 was initially taken up for the study but after discarding several entries based on the incomplete nature of the questionnaires, 730 responses were considered for analysis.

The proposed sample size (784) was divided proportionately in the ratio of population distribution among the selected districts i.e. 1,253,938: 1,326,335: 1,092,256. The proposed sample size per district are-

Table 3.3: Distribution of sample to be taken from the three districts

Name of the District	**Proposed Sample Size**	**Actual Sample Size**
Kamrup (M)	268	261
Dibrugarh	283	265
Jorhat	233	204
Total	**784**	**730**

For this study, the common commercial banks available in the selected districts were taken. The respondents were selected based on judement sampling from the selected districts. The respondents are evenly dispersed among public and private sector banks in each district so that a comparison of the perceptions of service quality of online services

by public and private bank consumers may be made. The selected banks from the districts are given in Table 3.4.

Table 3.4: Selected Banks for the study

Public Bank	Private Bank
Bank of Baroda	Axis Bank
Bank of India	HDFC Bank
Bank of Maharashtra	ICICI Bank
Canara Bank	IndusInd Bank
Central Bank of India	IDBI Bank
Dena Bank	
Indian Bank	
Indian Overseas Bank	
Punjab National Bank	
State Bank of India	
UCO Bank	
Union Bank of India	

3.9 Pilot Survey

With the help of the Delphi study, the variables were finalized. A questionnaire was framed with these variables and a pilot study was conducted. The respondents were asked to rate the statements on a scale of 1-10 (1 indicating the lowest degree of agreement and 10 indicating the highest degree of agreement). Additionally, questions were included for gathering the demographic data of the respondents. The respondents for the study were selected based on the judgment sampling technique. Those bank consumers who use their respective bank websites/apps were selected for this study. At first, the consumers who visited the bank branches were approached directly. Resistance was felt by a few consumers as they were scared of bank fraud possibilities. One major problem which was faced is that most of the consumers who visited the bank branches were not using the bank's online portal. New consumers were then approached outside the ATM of the respective bank assuming that there is a higher possibility of tracking the targeted

respondents i.e. bank consumers who use online banking portals among the consumers visiting the ATM. Data was collected from the consumers of 10 banks out of which 3 banks were private banks and the remaining 7 banks were nationalized banks. A total of 86 responses were collected out of which 2 questionnaires were not completely filled out by the consumers.

Cronbach's alpha was used to measure the reliability of the data collected from the pilot study. Cronbach's alpha is the most common measure of internal consistency or reliability. It measures how closely related a set of items are as a group. It is considered to be a measure of scale reliability. The total reliability statistics derived was 0.976 indicating high internal reliability among all the scales. Considering the reliability test results all the items of the questionnaire (Annexure I) were kept for the final survey.

3.10 Statistical Methods Used for Analysis:

The data collected from the survey was entered and analysed using IBM Statistical Packages for Social Sciences (SPSS) and IBM Analysis of Moment Structure (AMOS). To achieve the objectives of the study two statistical techniques were used Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). These two statistical techniques have been discussed below:

3.10.1 Exploratory Factor Analysis:

Exploratory Factor Analysis (EFA) is a statistical technique used for identifying and analysing the underlying structure or dimensions (factors) that explain patterns of correlations among a set of variables. It is extensively used in psychology, sociology, economics, and other social sciences. The basic purpose of EFA is to reduce data dimensionality by collecting and reflecting shared variance among variables with a reduced number of factors. The items of the questionnaire relating to service quality, were subjected to factor analysis, using the principle component analysis extraction method which was followed by a varimax rotation.

3.10.2 Confirmatory Factor Analysis:

The very first step of verifying the factors that are formed by the Exploratory Factor Analysis is to conduct a Confirmatory Factor Analysis (CFA). Confirmatory factor

analysis (CFA) is a technique used to analyse the efficacy of measurement models where the number of factors and their direct relationship is specified. The factors identified through EFA are then subjected to CFA, to test the model fit of the factors. This is done using Analysis of a Moment Structure (AMOS).

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