

Development of Structure Equation Modeling (SEM) to Study Relationship between E-Banking Service Merits and Problems of E-Banking Services

¹Alok Kumar and ²Prof Somesh Kumar Shukla

¹Research Scholar, Commerce Faculty, Lucknow University

²Professor, Department of Commerce, Lucknow University

ARTICLE DETAILS

Article History

Published Online: 15 September 2020

Keywords

SEM, Indicators, Model fit.

*Corresponding Author

Email: [alok.230292\[at\]gmail.com](mailto:alok.230292[at]gmail.com)

ABSTRACT

In the present era of digitalization and computerization in the banking sector, presently banks (both private sector and public sectors banks) are offering and preferring e-banking services for their customers. In Indian economy banking system is the single largest system for monetary transaction using variety of e-channels like debit card, credit card, ATM, internet banking and mobile banking etc. It is therefore empirical to investigate the dimensions of the e-banking services (herein after referred as e-banking service merits) and its cause and effect relationship with underlying problems in e-banking services.

The purpose of this research paper is to identify e-banking service merits role in problems with e-banking service with reference to selected nationalized and private banks in Lucknow district from customer's perspective

As for as e-banking service merits roles in problems of e-banking services is concerned, it has been observed (based on Structured equation modeling for regression model using AMOS 16.0 software) that increase in reliability, empathy, assurance and security measures has reduced the problems in e-banking services whereas increase in responsiveness and convenience measures has increased the problems in e-banking services in Lucknow district region.

1. Introduction

In a liberalized and competitive environment, therefore, only those banks would be effective in delivering goods, which provide excellent service quality. Almost, all the banks perform same functions. Therefore, the customer takes into account the relative efficiency while choosing a particular bank. Moreover, banks carry on business with public money and, therefore, customers expect better service from them. Now-a-days, with the continuous competition increase, service quality has become a popular area of academic investigation and has recognized as a key factor in keeping competitive advantage and sustaining satisfying relationships with customers. The total service quality as customers' perception of difference between the expected service and the perceived service. Service quality becomes the main tool for competing in this marketplace.

2. Objectives of Research

The purpose of this research paper is to identify the role of e-banking service merits in problems with e-banking service with reference to selected nationalized and private banks in Lucknow district from customer's perspective.

Tools used: SEM to identify roles of e-banking service merits in problems with e-banking service.

Software used: For SEM AMOS 16.0 has been used.

Research design: Descriptive research from sample survey of 300 bank customers using e-banking services based on proper sampling plan as outlined in following paragraphs.

3. Sampling plan / Sample Design

1. Sample size:

To arrive at sample online sample size calculator has been used (URL: <https://www.surveymonkey.com/mp/sample-size-calculator/>). Based on it, a sample size of 284 has been identified and therefore considering literature review and experts opinion a sample size of 300 respondents were chosen for primary data collection for this research paper.

2. Sample Area:

The Sample area for the proposed study was Lucknow represented through various zones.

3. Sampling Techniques:

It was difficult to track customers using e-banking services due to confidentiality of bank's customer database, the random sampling technique was adopted for choosing respondents

4. Sampling unit:

The sampling units were the customers using e-banking services in Lucknow region.

5. Sampling Instruments:

Structured questionnaire in google form was used to collect the data due to pandemic of covid-19 and subsequent national lockdown.

Sampling Instrument development:: 34 questions related to e-banking services have been asked on 5-point Likert scale– Please refer to Annexure (Questionnaire) for detailed questions and 10 questions were asked related to problems in e-banking services on 5 point rating scale (1 for

highest and 5 for lowest) – Please refer to Annexure (Questionnaire) for detailed questions.

Research Process:

- Demographic profile of respondents
- Structured Equation Modeling (SEM)
- Regression weights

Gender	Frequency	Percent
Male	175	58.3
Female	125	41.7
Total	300	100.0

Age Group	Frequency	Percent
Under 20	48	16.0
20-40 years	168	56.0
40-60 years	84	28.0
Total	300	100.0

Employment status	Frequency	Percent
Practicing Professional	32	10.7
Agriculture	35	11.7
Businessman	52	17.3
Salaried	121	40.3
Non-working/Pensioner	60	20.0
Total	300	100.0

Educational background	Frequency	Percent
Up to intermediate	63	21.0
Graduate	125	41.7
Postgraduate / Professional	112	37.3
Total	300	100.0

Yearly income	Frequency	Percent
Below 2.5 lakhs	133	44.3
2.5-5 lakhs	64	21.3
5-10 lakhs	90	30.0
10-20 lakhs	13	4.3
Total	300	100.0

Category of your bank	Frequency	Percent
Nationalized	136	45.3
Private	20	6.7
Both	144	48.0
Total	300	100.0

Source: Primary data collected through structured questionnaire

5. Discussion

- **Gender:** Approx. 58 % of e-banking customers were male followed by female customers comprising 42%.
- **Age Profile:** Majority of e-banking customers were under the age group of (20-40) years (56%) followed by 26% who were under the age group of (40-60) years. Only 16% e-banking customers were under the age group of under 20 years.
- **Employment status:** The above graph shows 40 % respondents (e-banking customers) are salaried class. Other respondents were from business, agriculture, professional or non-working.
- **Education status:** 42% respondents were University graduates followed by 37% who were postgraduate or professionals. Only 21 % respondents have education up to intermediate level only.
- **Income group:** 44% respondents were under the income group below 2.5 lakh followed by 30 % who were under the income group (5-10) lakh whereas

- Model fit indicators

4. Summary of demographic profile of respondents

The below mentioned is the summary of demographic profile of customers using e-banking services who were surveyed for primary data collection.

- **Category of Bank:** 45% respondents have nationalized banks whereas only 7 % have accounts only with private banks with 48% respondents have account in both categories of banks.

6. Test of Relationship: Structured Equation model (SEM)

Analysis

To identify cause and effect relationship using **Structured Equation model (SEM)** capabilities of AMOS 16.0 is used as under.

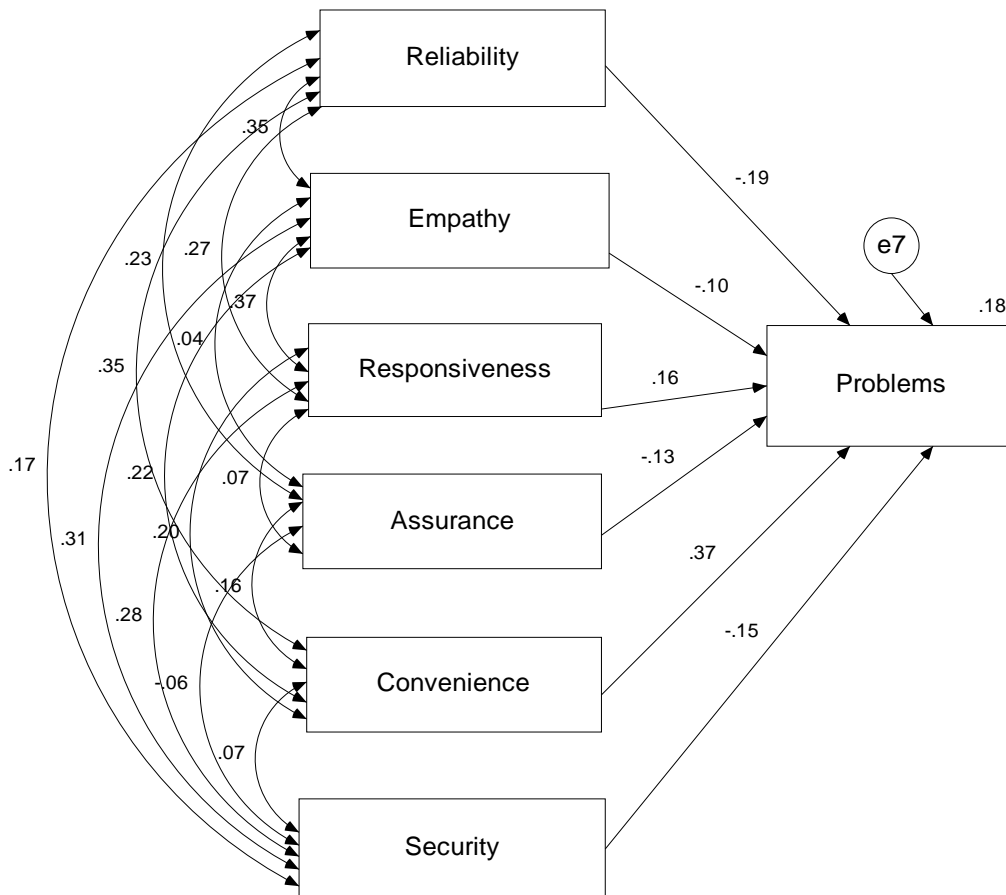
The dependent factor for the said model is Average rating of problems in e-banking services rated on a scale of 1 to 5 (1 being highest and 5 being lowest). (refer to annexure for questionnaire on rating of e-banking problems). Thus, the dependent variable i.e. Problems in e-banking services is

measured through average ranking of observed variables on problems in e-banking services

The independent factors chosen for SEM model are the factors extracted through exploratory factor analysis using capabilities of SPSS 20.0 based on principal component method with eigen value greater than 1 having satisfactory reliability Cronbach Alpha close to 0.7, which is good

indicator(Referred by same author, titled “Development of an E-banking service merits In Lucknow district from customer’s perspective”).

The extracted Dimensions / Factors extracted viz. Reliability, Empathy, Responsiveness, Assurance, Convenience, and Security are used as independent variables in the following model.



Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Table-4
Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
Problems	<---	Reliability	-.109	.034	-3.176	.001	
Problems	<---	Empathy	-.062	.037	-1.693	.090	
Problems	<---	Responsiveness	.083	.029	2.826	.005	
Problems	<---	Assurance	-.083	.034	-2.440	.015	
Problems	<---	Convenience	.187	.029	6.466	***	
Problems	<---	Security	-.109	.042	-2.624	.009	

Table-5
Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
Problems	<---	Reliability	-.191
Problems	<---	Empathy	-.102
Problems	<---	Responsiveness	.164
Problems	<---	Assurance	-.132
Problems	<---	Convenience	.367
Problems	<---	Security	-.148

Table-6
Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
Problems	.181

Table-7
Model Fit Summary
RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.000	1.000		
Saturated model	.000	1.000		
Independence model	.077	.783	.710	.587

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	1.000		1.000		1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

7. Discussion

On the basis of the results shown in the Regression weights Table -4, only Five dimensions of e-banking service merits i.e. Reliability, Responsiveness, Assurance, convenience and Security are significant as p-value < 0.05 means they influence e-banking service problems significantly. Only one Dimension i.e. empathy has p-value = 0.090 > 0.05 and therefore insignificant in influencing e-banking service problems. However, based on Standardized Regression Weights Table -5, We can interpret significant cause and effect relationship between e-banking service merits and average ratings in problems as under:(Please refer to table - 5)

1. One-point increase in change in standard deviation of Reliability will decrease Average problems rating by 0.191 times change in standard deviation which concludes that reliability and Problems rating have inverse relationship with each other.
 2. One-point increase in change in standard deviation of Responsiveness will increase Average problems rating by 0.164 times change in standard deviation which concludes that responsiveness and Problems rating have direct relationship with each other.
 3. One-point increase in change in standard deviation of Assurance will decrease Average problems rating by 0.132 times change in standard deviation which concludes that Assurance and Problems rating have inverse relationship with each other.
 4. One-point increase in change in standard deviation of Convenience will increase Average problems rating by 0.367 times change in standard deviation which concludes that Convenience and Problems rating have direct relationship with each other.
 5. One-point increase in change in standard deviation of Security will decrease Average problems rating by 0.148 times change in standard deviation which concludes that Security and Problems rating have inverse relationship with each other.
- The Squared Multiple Correlations suggests that the overall influence of above-mentioned e-banking service merits over problems in e-banking services contribute 18.1%. (Please refer to table – 6)

➤ The Conceptual model of the study was assessed using the SEM capabilities of AMOS. Based on model fit summary (refer to table -7) it was found that the structural model fits the data well as the fit statistics were close to recommended values. The GFI, NFI (1.0) and CFI (1.0) values were as per the recommended value (more than 0.9), indicating a good fit.

8. Conclusions and suggestions

Based on the research process and subsequent data analysis using appropriate tools and techniques following conclusions have been drawn to fulfill research objectives.

1. The cause and effect relationship developed through Structured Equation Modelling (SEM) identified the influence of e-banking service merits (i.e. Independent variables) viz. Reliability, Empathy, Responsiveness, Assurance, Convenience, and Security over Problems in e-banking services (i.e. Dependent variable) with the result that only 5 dimensions of e-banking service merits of Reliability, Responsiveness, Assurance, convenience and Security are significant in influencing dependent variable i.e. Problems in e-banking services.
2. E-banking service merits like Reliability, Empathy, Assurance, and Security have negative but varying degree relationship with problems in e-banking services whereas E-banking service merits like Responsiveness and Convenience have positive relationship with problems in e-banking services. The fitness of model suggested absolute fit model based on recommended values of indicators like GFI, NFI and CFI.
3. Though the overall influence of independent variables extracted in this research over dependent variable i.e. problems in e-banking services is not very high and is only 18.1 % but this is very much important as rectifying problems by correcting e-banking service merits shall be a great help for the e-banking business.
4. This research paper also concludes that the problems in e-banking services are by and large subjective in

nature. The e-banking service merits has little control over it.

The only suggestion to banks shall be as e-banking service merits (dimensions) and problems in e-banking services will always go hand in hand and therefore continuous

evaluation in identifying their relationship will be needed to improve services and rectifying problems depending upon their degree of relationship. This will certainly improve e-banking business.

References

- [1] Al-Somali, S, Gholami, R and Clegg, B., "An Investigation into the Acceptance of Online Banking in Saudi Arabia," *Technovation*, vol. 29, pp. 130-141, 2009.
- [2] Bauer, H, Hammers chmidt, M and Falk, T., "Estimating the Quality of E-Banking Portals," *International Journal of Bank Marketing*, vol. 23, no. 2, pp. 153-175, 2005.
- [3] Bauer, KJ., "Saw Risk and Internet Banking," 2002.
- [4] Belkhamza, Z and Wafa, S., "The Effect of Perceived Risk on the Intention to Use E-business: The Case of Algeria," *Journal of Internet Banking and Commerce*, vol. 14, no. 1. 2009.
- [5] Kang, Kim and Taun (1993) "Motivational Factors of Mall Shoppers – Effects of Ethnicity and Age" *Journal of Shopping Center Research*, Vol. 3(1), pp.7-31
- [6] A insworth, A. (2006). *Ghost Chasing": Demystifying Latent Variables and SEM*, University of California, Los Angeles.
- [7] Barbara M.Byrne(2012): *Structural Equation Modeling with Mplus*, Routledge Press
- [8] Sinukula , J.M. and Lowtor, L (1987), "Positioning in the Financial Service Industry: A Look at the Decomposing of Image," in Jon. M. Hawes and George B Glisan, eds., *Development in Marketing Science*, Vol. 10 (Akron, OH, Academy of Marketing Science, 1987): pp.439-42.
- [9] Aaker, J.L. (1997), "Dimensions of Brand Personality," *Journal of Marketing Research*, Vol. 34 (3), pp.347-356.
- [10] Kline, R.B.(1998).*Principles and Practice of Structural Equation Modeling*. New York: The Guilford Press.
- [11] Loehlin,J.& Beaujean,A.(2017).*An introduction to factor, path, and structural equation analysis*, Fifth edition, Taylor and Francis Group, New York.
- [12] Sudano, J.& Perzynski, A. (2013). *Applied Structural Equation Modeling for Dummies*, by Dummies, Indiana University, Bloomington.