Does Digitization of Banking Sector Help Achieve Value Maximization & Better Performance? An Analysis of Scheduled Commercial Banks of India

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Abstract - This paper aims to analyze impact of digitalization of Indian scheduled commercial banks on value maximization and determine the extent to which the banks' performance and growth are influenced by digitization. The study consists 21 public sector and 16 private sector scheduled commercial banks of India. Panel Regression analysis has been applied to determine the acceptance of hypothesis. For our study, we have taken 8 variables, namely NEFT, RTGS, Credit Cards, Debit Cards, as independent variables, and Net Worth, Total Deposits, Total Advance, EPS, as independent variables. The time period under study ranges from 2012-13 to 2016-17. It was inferred from the study that digitalization in banks, measured by NEFT, RTGS, Credit Cards and Debit Cards, have a significant impact on its value maximization, Performance and growth.

Index Terms: Digitalization, Scheduled Commercial Banks, Value Maximization, Performance & Growth.

I. INTRODUCTION

Banking is essentially a service industry. The rapid growth of service industry has tended to lower the efficiencystandards. Banking business is no exception.

Today, digitalisation has been an emerging effective delivery channel for a scheduled commercial bank. With the increase in the users of technology across globe, digitalised banking has been more efficient and convenient channel. Banking nowadays is not restricted to the boundaries of bank branches. It has widened its scope with additional facilities like, delivery channels, e-banking etc, with regards to customers' expectations and requirements. Technological advancements has its own specific advantage with respect to convenience, improved services and reduced cost of transactions. Digitalised banking has become most popular and convenient delivery channel in the banking network. It enables the customers to perform basic banking transaction through their PCs, laptops, internet etc irrespective of their bank's location anywhere in the globe.

Another reason for increased usage and exponential potential of digitalised banking becoming more popular is their increasing familiarity with technology, which is gradually exploding to populations mainly at developed and developing cities. Digitalised banking will continue to grow as the customers are becoming more familiar and more comfortable with technology enabled transaction operations in view of its advantage.

II. LITERATURE REVIEW

Mookerji (1998) in his paper explored the popularity of i-banking in India. The study found that i-banking is becoming popular very fast. Nevertheless, it is till date in its evolutionary stage. They expected development of more sophisticated and competitive i-banking in India in their near future.

Joseph et al. (1999) in their paper titled, "Service Quality in Banking sector: The Impact of Technology on Service Delivery", examined the role of technology in influencing transactions or service quality. They analysed a sample of 440 e-banking customers for this purpose. The results indicated presence of some perceptual problems with respect to e-banking.

Web Mols (1999) in the paper titled, "The Internet and the banks' strategic distribution channel decisions acknowledged internet banking as a Marketing Association. It discussed 4 distribution channel strategies and identified a dual strategy, along with their advantages and disadvantages.

Hasan (2002) found that online banking has come out as a significant strategy for banks in attracting and retaining customers. As per the study, 75% of Italian banks have adopted internet banking during 1993-2000. The study also found higher likelihood of adopting active internet banking in banks with high off-balance-sheet activities, past performance and high networking.

Shaifali Garg (2016) in the paper titled, " Digitisation – A study with reference to customer satisfaction towards e-banking", analysed e-banking with the help of statistical tools such as t & f test, Annova, correlation, etc. The study inferred more satisfaction of customers with the digitalised services of banks. It was also found that the customers accept the charges levied for such services.

Santiago Carbo – Valverde (2017) in his paper namely, "The impact of digitalisation on banking and financial stability", discussed about the impact of digitalisation on activities of banks and the various challenges imposed by it on financial stability. The study mainly inferred an opportunity of reduced marginal costs and increased productivity in financial services due to digitalisation.

III. SCOPE OF THE STUDY

The studies of digitalization lead to promote digitalbanking which extends to the enhancement in value and improvement in performance& growth in using the various digitalized services of the banks. The study indicates how digitalisation of banking sector helps the banks achieve value maximisation and better performance with growth.

IV. OBJECTIVES OF STUDY

The main objectives of the study are stated as follows:

- To study impact of digitalisation of Scheduled Commercial Banks on its value maximisation.
- To examine the influence of digitalisation of Scheduled Commercial Banks on the performance and growth of banking sector.

V. RESEARCH METHODOLOGY

Area of the study:

The study will be focused on the determination of impact of digitalization on Value maximization and Performance & growth of both Public sector & Private sector, Indian Scheduled Commercial banks.

Sources of data:

For this research work, the data has been collected from secondary sources. The required data has been collected from the RBI database and sample banks' annual reports and other secondary sources.

Sample Design:

For our study, we have taken 21 public-sector & 16 private-sector Indian Scheduled Commercial banks, to analyze impact of digitalization on Banking performance, growth and value maximization

Sample Period:

We have taken 2012-13 (Post-Digitalization) till 2016-17 study period of the sample Indian Scheduled Commercial Banks for the analysis of the objective of our study.

Variables:

- Dependent Variables – Total Deposit
  Total Advance
  Net worth
  EPS
- Independent Variable – NEFT
  RTGS
  Debit Card
  Credit Card

Measurement of variables:

The dependent variables in this study areTotal Deposit, Total Advance, Net worth and EPS. Total deposit has been taken from banks annual report which consists of customer deposits with banks and bank deposit with other banks. Total advance is measured by total loans provided by banks to customers and other banks. Net worth and EPS have been taken as proxy of shareholders value maximization. Net worth is measured by adding share capital with reserve and surplus. EPS is calculated by dividing total profit available to shareholders with outstanding equity shares.

NEFT, RTGS, Debit Card and Credit Card are selected as independent variables which has been measured by their value of transaction that takes place from time to time.

Statistical tools & techniques:

We shall be developing panel data with 3 models, namely, Pooled-OLS model, Fixed-Effect model, & Random-Effect model.

We have selected 21 Public sector Scheduled Commercial Banks and 16 Private sector Scheduled Commercial Banks of India as per RBI Database and its availability.

We have considered 8 variables such as NEFT, RTGS, Credit Cards, Debit Cards, Net Worth, Earning per Share, Total Deposits and Total Advances of those banks for the period from the beginning of effective digitization i.e., 2012-13 to 2016-17. The aim of our study is to check the relationship between Net Worth, Total Deposits, Total Advances and EPS individually with the explanatory variables of digitization, namely, NEFT, RTGS, Credit Cards and Debit Cards.

The data has been collected from 2012-13 to 2016-17 for 21 Public SCBs i.e., 105 observations and for 16 Private SCBs for that period i.e., 80 observations.

Pooled-OLS model

In this model, all the observations are pooled together and the regression analysis is done, thereby ignoring the cross-sectional and time-series nature of the data. However, this model does not differentiate various sample banks under study. In other words, it combines all the sample companies and denies heterogeneity and individuality that may be present in the different sample banks.

Fixed-Effect model

The Fixed-effect model allows the sample companies to have its own intercepts and hence gives scope for heterogeneity or individuality among the banks under study. As the name suggests, this model is time invariant, in the sense that the intercepts may differ across the sample banks, but they don't vary over time period.

Random-Effect model

Under this model, all the banks are considered having a common mean of the intercepts.

In order to decide upon which model of panel regression analysis to apply to our data, Hausman test can be applied and the best suited model to be accepted can be determined.

Regression model:

$$Ye = \beta 0 + \beta 1 NEFT + \beta 2 RTGS + \beta 3 \text{ Debit Card} + \beta 4 \text{ Credit Card}$$

Where, Ye = Net Worth, EPS, Total Deposits, Total Advances

$\beta 0$ = constant or intercept

$\beta 1$, $\beta 2$, $\beta 3$ = slopes of independent variables

Hypotheses:

- H_0^1: Net worth is not influenced by NEFT, RTGS, Debit-Card & Credit-Card.
- H_0^2: EPS is not associated with NEFT, RTGS, Debit-Card & Credit-Card.
- H_0^3: There is no relationship between NEFT, RTGS, Debit Card and Credit Card with Total Deposits.
- H_0^4: Total Advances is not impacted by NEFT, RTGS, Debit Card and Credit Card with Total Deposits.

VI. DATA ANALYSIS, RESULTS& DISCUSSIONS

A. Objective-1:

i. NET WORTH

Table – 1: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: NWRE
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.337838	4	0.0532

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NEFT	-0.184993	-0.296604	0.003598	0.0628
RTGS	0.017390	0.027195	0.000066	0.2292
DEBIT_CARDS	0.663459	2.399951	0.859444	0.0611
CREDIT_CARDS	-13.689804	-20.368817	14.031729	0.0746

Source: Self Compiled

Hausman test is applied to choose the suitable Panel regression model. As per the test result, our null hypothesis that Random-effect model is appropriate is accepted. Hence, Random-effect model is more suitable to run the test with our data concerned.

Table -2: Random Effect Model Test (Net Worth)

Dependent Variable: NETWORTH
Method: Panel EGLS (Cross-section random effects)
Date: 10/29/18 Time: 15:46
Sample: 2013 2017
Periods included: 5
Cross-sections included: 21
Total panel (balanced) observations: 105
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23852.62	10956.15	2.177098	0.0318
NEFT	-0.296604	0.071739	-4.134506	0.0001
RTGS	0.027195	0.018031	1.508277	0.1346
DEBIT_CARDS	2.399951	0.845314	2.839124	0.0055
CREDIT_CARDS	-20.36882	5.886981	-3.459977	0.0008

Effects Specification	S.D.	Rho
Cross-section random	45297.81	0.9825
Idiosyncratic random	6046.265	0.0175

Weighted Statistics

R-squared	0.539176	Mean dependent var	2014.901
Adjusted R-squared	0.520743	S.D. dependent var	8963.859
S.E. of regression	6205.537	Sum squared resid	3.85E+09
F-statistic	29.25061	Durbin-Watson stat	1.165796
Prob(F-statistic)	0.000000		

Source: Self Compiled

The R-Squared of relationship as per the test is 53.91%. It means other factors remaining constant, the total deposits of the banks are determined to the extent of 53.91% by the 4 explanatory variables of digitization taken for our study.

Debit cards, Credit cards & NEFT are significant variables because the P value is less than the accepted p-value of 0.05. However, the p-value of RTGS being 0.13 is not significant variable w.r.t Net Worth.

Net Worth = 23852.62 - 0.30NEFT + 0.03 RTGS + 2.40 Debit Card – 20.37 Credit Card

In the above equation, value of β_0 (i.e. 23852.61) means the sample banks would have a positive Net Worth of 23852.62, irrespective of the various variables. The slopes measure the degree of impact of Independent variables under study on Net Worth. The result shows the slope for NEFT is -0.30%, RTGS is 0.03%, Debit card 2.40%, and for Credit card is-20.37%. It means a percentage change in the explanatory variables causes above mentioned respective %age change in the Net Worth of banks.

P value of the test is 0.000 which is less than accepted norm of 0.05 at 5% significance. Thus, our null hypothesis which says, "Net Worth is not influenced by NEFT, RTGS, Debit Card and Credit Card" could not be accepted. Hence, it shows that Net Worth is significantly influenced by the explanatory independent variables of digitization.

ii. EARNINGS PER SHARE (EPS)

Table – 3: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: EPSRE
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.016356	4	0.0264

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NEFT	0.000941	0.001595	0.000000	0.0452
RTGS	0.000110	-0.000067	0.000000	0.0191
DEBIT_CARDS	0.009031	-0.000916	0.000024	0.0412
CREDIT_CARDS	-0.105937	-0.045702	0.000501	0.0071

Source: Self Compiled

On analysis of the Hausman test result, there is no sufficient evidence to accept our null hypothesis that Random-effect model is appropriate. So, the table above supports acceptance of Fixed-effect model as more appropriate model to run the test on concerned data.

Table -4: Fixed Effect Model Test (EPS)

Dependent Variable: EPS
Method: Panel Least Squares
Date: 10/29/18 Time: 16:24
Sample: 2013 2017
Periods included: 5
Cross-sections included: 21
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-86.21072	27.04252	-3.187969	0.0020
NEFT	0.000941	0.000366	2.568917	0.0121
RTGS	0.000110	7.75E-05	1.423835	0.1584
DEBIT_CARDS	0.009031	0.004912	1.838471	0.0697
CREDIT_CARDS	-0.105937	0.027320	-3.877686	0.0002

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.776525	Mean dependent var	17.48905
Adjusted R-squared	0.709483	S.D. dependent var	43.92033
S.E. of regression	23.67289	Akaike info criterion	9.370795
Sum squared resid	44832.46	Schwarz criterion	10.00269
Log likelihood	-466.9667	Hannan-Quinn criter.	9.626851
F-statistic	11.58261	Durbin-Watson stat	2.280332
Prob(F-statistic)	0.000000		

Source: Self Compiled

The r^2 measures the extent to which the dependent variable is determined by the explanatory variables under study. From the above table it is found that r^2 is 77.65%, which infers that EPS is determined to the extent of 77.65% by the explanatory variables under study.

Also, the probability value at 5% significance level is 0.000, within the limit of 0.05. Thus, the null hypothesis that EPS is not associated with NEFT, RTGS, Debit Card and Credit Card is rejected. Hence, it shows that there is a significant impact of the independent variables onEPS.

EPS = -86.21+0.00NEFT + 0.00 RTGS + 0.01 Debit Card–0.10 Credit Card

Again, β_0 represents the value of EPS irrespective of other determinants. Here, β_0 is computed to be -86.21, that is to say the EPS of sample banks would be negative to the extent of 86.21, keeping other variables constant. Also, the slope measuring the impact of explanatory variables on EPS here for NEFT, RTGS and Debit card is nil or negligible towards EPS. Credit card inversely affects the EPS by 0.10%.

As per study result, with respect to NEFT, RTGS, Debit card and credit card, the p-value is 0.01, 0.15, 0.07 and 0.00, respectively, which 5% significance level is less than accepted norm of 0.05, except for RTGS and Debit card. In other words, RTGS and Debit Card doesnot individually have significant impact on the EPS of Banks.

B. Objective-2:

i. TOTAL DEPOSITS

Table – 5: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	28.619599	4	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NEFT	0.550186	0.912466	0.057408	0.1305
RTGS	0.073860	0.062666	0.001730	0.7878
DEBIT_CARDS	23.330179	18.850249	13.704660	0.2262
CREDIT_CARDS	-53.931356	-47.037606	229.170770	0.6488

Source: Self Compiled

Fixed effect model is appropriate as the null hypothesis cannot be accepted as per the above test result. Hence, Fixed-effect model is the appropriate model to run the test.

Table -6: Fixed Effect Model Test (Total Deposits)

Dependent Variable: DEPOSITS
Method: Panel Least Squares
Date: 10/31/18 Time: 08:11
Sample: 2013 2017
Periods included: 5
Cross-sections included: 21
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	135784.0	22697.61	5.982303	0.0000
NEFT	0.550186	0.307301	1.790381	0.0772
RTGS	0.073860	0.065030	1.135778	0.2594
DEBIT_CARDS	23.33018	4.122868	5.658726	0.0000
CREDIT_CARDS	-53.93136	22.93028	-2.351972	0.0211

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.997168	Mean dependent var	314095.0
Adjusted R-squared	0.996319	S.D. dependent var	327471.1
S.E. of regression	19869.38	Akaike info criterion	22.83600
Sum squared resid	3.16E+10	Schwarz criterion	23.46790
Log likelihood	-1173.890	Hannan-Quinn criter.	23.09206
F-statistic	1173.730	Durbin-Watson stat	1.635685
Prob(F-statistic)	0.000000		

Source: Self Compiled

The R-Squared of the relationship as per the test is 99.71%. It means other factors remaining constant, the total deposits of the banks are determined to the extent of 99.71% by the 4 explanatory variables taken for our study.

Debit cards and credit cards are significant variables because the P value is less than the rule of thumb 0.05. However, NEFT & RTGS are not significant variables w.r.t Deposits as there probability value is more than the accepted value of 0.05.

Total Deposits = 135784+0.55NEFT + 0.07 RTGS +23.33 Debit Card – 53.93 Credit Card

The value of β_0 in the above table is 135784. It says that keeping other factors constant, there would be a positive Total Deposit of sample banks of 135784. The slopes, on the other hand, measures the degree of influence on the Total Deposit by the explanatory variables. In above test result, NEFT gives a positive impact of 0.55%, which means a unit variation in NEFT would cause 0.55% variation in Total Deposits. RTGS reflects a positive influence of 0.07% on Total Deposits. Debit card also contributes positively to total deposits by 23.33%. However, Credit card leads to inverse contribution by 53.93% towards total deposits.

P value of the test is less than the limit of 0.05 at 5% significance level i.e., 0.000. So, our null hypothesis i.e., There is no relationship between NEFT, RTGS, Debit Card and Credit Card with Total Deposits.is rejected. Hence, it shows that there is statistically significant relationship of the independent variables on total deposits.

ii. TOTAL ADVANCES

Table – 7: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.742706	4	0.0053

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
RTGS	0.164498	0.127278	0.005125	0.6031
NEFT	-0.316134	0.073338	0.133363	0.2862
DEBIT_CARDS	21.087335	16.792204	31.784822	0.4462
CREDIT_CARDS	-58.610483	-51.000109	542.398316	0.7438

Source: Self Compiled

To identify the panel regression model to be used for our study, Hausman test is run on the data. According to the results, there is no sufficient evidence to accept our null hypothesis that Random-effect model is appropriate. Hence, it can be inferred that Fixed-effect model is more suitable for the data concerned.

Table -8: Fixed Effect Model Test (Total Advances)

Dependent Variable: ADVANCES
Method: Panel Least Squares
Date: 10/31/18 Time: 08:19
Sample: 2013 2017
Periods included: 5
Cross-sections included: 21
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	81167.51	33127.70	2.450140	0.0165
NEFT	-0.316134	0.448513	-0.704849	0.4830
RTGS	0.164498	0.094913	1.733152	0.0869
DEBIT_CARDS	21.08733	6.017423	3.504380	0.0008
CREDIT_CARDS	-58.61048	33.46728	-1.751277	0.0837

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.991283	Mean dependent var	240841.6
Adjusted R-squared	0.988669	S.D. dependent var	272428.0
S.E. of regression	28999.83	Akaike info criterion	23.59222
Sum squared resid	6.73E+10	Schwarz criterion	24.22412
Log likelihood	-1213.592	Hannan-Quinn criter.	23.84828
F-statistic	379.0816	Durbin-Watson stat	1.418356
Prob(F-statistic)	0.000000		

Source: Self Compiled

It can be referred from the probability values that Debit card is a significant variable and NEFT, RTGS and Credit card are not significant variables because the P value is more than the rule of thumb for NEFT, RTGS and Credit Cards w.r.t Total Advances.

Total Advances = 81167.5 - 0.31 NEFT + 0.16 RTGS +21.08 Debit Card – 58.61 Credit Card

A unit change in NEFT leads to -0.31unit change in total advances. RTGS and Debit card have a positive contribution towards total advance with the extent of 0.16% and 21.08%. Credit card inversely affects Total advances to the extent of 58.61%.

Null hypothesis is "Total Advances is not impacted by NEFT, RTGS, Debit Card and Credit Card with Total Deposits" is not accepted, the probability value being more than the rule of thumb i.e., 0.05. So here, alternative hypothesis is accepted i.e. Total Advances is significantly impacted by NEFT, RTGS, Debit Card and Credit Card.

VII. FINDINGS

- Net worth of the Banks under study is significantly influenced by the explanatory variables such as NEFT, RTGS, Debit Card and Credit Card, as a whole.
- Banks' EPS ispositively and significantly associated with the independent variables under study i.e., NEFT, RTGS, Debit Card and Credit Card.
- There is an overall significant positive relationship of NEFT, RTGS, Debit Card and Credit Card with Total Deposits of the sample banks.
- NEFT, RTGS, Debit Card and Credit Card together has statistically significant impact on Total Advances of SCBs of India.

VIII. SUMMARY & CONCLUSION

Digitalized-banking is a new concept in the present scenario with higher penetration of internet and changes in consumerattitudes. Electronic commerce will make rapid strides in the near future. Having knowledge of this, banks areevolving strategies to make best use of the emerging opportunities. Banking all over the world undergoing significant changes. Every bank is being taken steps toimprove thebanking system to suit the changing requirement of the customers and market.

In this study, it is given that how Digitized banking influences the Value maximization, performance and growth of the Scheduled Commercial Banks of India. Analysis of digitalized banking is made, Statistical tool such asPanel Data Analysis using Fixed-Effect model & Random-Effect Model are used. The analysis shows the relationship of the explanatory variables of Digitization and the value maximization, performance and growth of Scheduled Commercial Banks of India. From the analysis, the variables considered for representation of Digitization of Commercial Banks i.e., NEFT, RTGS, Debit Card, Credit Card are found to have a positive and significant influence on Banks' value maximization, performance and growth factors, measured by the Net Worth, Earning per Share, Total Deposits and Total Advances.

Digital banking thus can be inferred to be important for banks' value maximization through better performance and growth. Nowadays, most of the banks are being computerized and using advanced electronictechnologies for carrying out its operations.From the analysis, it is clear that thebanks performance, growth and value maximization are significantly influenced by the factors of digitization.

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