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Technology's impact on the banking sector in India

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ABSTRACT

Banking industry is a backbone of Indian financial system and it is plagued by many challenging forces. One such force is revolution of information technology. The banking sector has experienced a tremendous technological revolution that has paved the way for creating newer, better opportunities for its customers. The impact of technology on the banking industry is manifold and can be witnessed with the speed at which banks operate in the country. Banks in India have invested heavily in the technology such as Tele Banking, Mobile Banking, Net Banking, ATMs, Credit Cards, Debit Cards, Electronic Payment Systems and Data Warehousing and Data Mining Solutions, to bring improvements in quality of customer services and the fast processing of banking operation. Heavy investments in IT have been made by the banks in the expectation of improvement in their performance.

Keywords: *Banking Technology Index, Technology Enabled Services, 3G and 4G Services.*

1. INTRODUCTION

The Indian economic environment has recently undergone significant changes as a result of bank reforms and actions. Developments in the field of Information Technology strongly support the growth and inclusiveness of the banking sector by facilitating inclusiveness of the banking sector by facilitating inclusive economic growth. Information Technology improves the front-end operations with back end and helps in bringing down the transaction costs for the customers. Important Events in India with regard to technological advancement in banking industry are as follows:

1. Introduction of card-based payments –Debit, Credit Card in late 1980s and 1990s
2. Introduction of Electronic Clearing services (ECS) in late 1990s
3. Introduction of Electronic Funds Transfer (EFT) in early 2000s
4. Introduction of RTGS in March 2004
5. Introduction of National Electronic Fund Transfer (NEFT) as a replacement to Electronic Fund Transfer/Special Electronic Fund Transfer in 2005/2006
6. Cheque Truncation System (CTS) in 2007

Technology has changed the face of public sector banks and foreign banks have an edge in this regard. Among the total number of public sector bank branches, 97.8 percent were fully computerized, whereas all branches of SBI were fully computerized.

2. OBJECTIVES OF THE STUDY

The main objective of the study is to examine the Impact of Technology on Banking Sector in India during the period of 3G and 4G.

3. RESEARCH METHODOLOGY

The study considered the 2008-09 to 2012-13 as 3G period and 2013-14 to 2021-22 as 4G period. The Banking Technology Index (BTI) constructed for the proxy variable for Business to Customers (B2C) segment banking technological services. The study emphasized on the Six Banking Technology enabled services of the B2C such as; 1.RTGS Transactions 2.NEFT Transactions 3.ATM Transactions 4.Mobile Transactions 5. Debit Card Transactions 6.Credit Card Transactions.

On the basis of the higher volume of digital transactions the following public and private sector banks were selected for the analysis of the study;

Public Sector Banks: State Bank of India**,** Bank of Baroda, Punjab National Bank, Bank of India, Canara Bank.
Private Sector Banks: HDFC Bank, ICICI Bank, Axis Bank, Kotak Mahindra Bank, IndusInd Bank.

4. ANALYSIS

4.1 Private Sector Banks in 3G Period

To examine the impact of technological enabled services on the Banking Technology Index i.e. BTI of Private Sector Banks for 3G period, the following hypothesis has been framed.
H0: There is no significant impact of select banking technology enabled services on the BTI of Private Sector Banks in 3G Period.
H1: There is a significant impact of select banking technology enabled services on the BTI of Private Sector Banks in 3G Period.

Table- 1: Technological Services Impact on BTI of Private Sector Banks in 3G

Dependent Variable: BTI				
Method: Panel Least Squares				
Sample: 2010 2013				
Periods included: 4				
Cross-sections included: 5				
Total panel (balanced) observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2229.131	2746.119	0.811739	0.0316
NEFT	-5.394348	27.68372	-0.194856	0.0485
RTGS	-8.687332	26.35473	-0.329631	0.0469
MOBILE	0.009906	0.171167	0.057876	0.0547
ATM	-1.562841	4.540072	-0.344233	0.0362
CREDIT CARD	-0.001729	0.007430	-0.232644	0.0197
DEBIT CARD	0.000519	0.000432	1.203037	0.0504
R-squared	0.153677	Mean dependent var.		1505.389
Adjusted R-squared	-0.236933	S.D. dependent var.		4849.632
S.E. of regression	5393.640	Akaike info criterion		20.29305
Sum squared Resid.	3.78E+08	Schwarz criterion		20.64155
Log likelihood	-195.9305	Hannan-Quinn criter.		20.36108
F-statistic	0.393428	Durbin-Watson stat		2.665212
Prob.(F-statistic)	0.870336			

Source: NPCI website.

The above table defines the impact of Banking Technology enabled services on the BTI. The study considered the panel least square test to know the impact of independent variables (such as NEFT, RTGS, MOBILE, ATM, CREDIT, and DEBIT) on the dependent variable (i.e., BTI) for private sector banks in 3G period i.e., 2009-10 to 2012-13. The coefficient of RTGS (-8.687332) observed to be having the negative influence on the BTI followed by the NEFT (-5.3943). The observed that Mobile Banking (0.009906) influenced positively to BTI. Therefore, it states that Null hypothesis rejected and alternative hypothesis has been accepted. Thus, the study reveals that in 3G period all the selected banking technology enabled services are observed to be having the significant influence on the Banking Technology Index.

4.2. Public Sector Banks in 3G Period

To examine the impact of technological enabled services on the Banking Technology Index i.e. BTI of Public Sector Banks for 3G period, the following hypothesis has been framed.
H0: There is no significant impact of select banking technology enabled services on the BTI of Public Sector Banks in 3G Period.
H1: There is a significant impact of select banking technology enabled services on the BTI of Public Sector Banks in 3G Period.

Table - 2: Technological Services Impact on BTI of Public Sector Banks in 3G

Dependent Variable: BTI				
Method: Panel Least Squares				
Sample: 2010 2013				
Periods included: 4				
Cross-sections included: 5				
Total panel (balanced) observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-16.87120	251.7089	-0.067027	0.0947
NEFT	-0.464105	2.268632	-0.204575	0.0141
RTGS	2.340255	1.991840	1.174921	0.0261
MOBILE	-0.001769	0.000494	-3.578486	0.0034
ATM	1.982114	0.542790	3.651714	0.0029
CREDIT CARD	-0.011912	0.002122	-5.614062	0.0001
DEBIT CARD	0.000381	5.02E-05	7.574975	0.0000
R-squared	0.998626	Mean dependent var.		2244.401
Adjusted R-squared	0.997992	S.D. dependent var.		7523.827

S.E. of regression	337.1889	Akaike info criterion	14.74838
Sum squared Resid.	1478052.	Schwarz criterion	15.09689
Log likelihood	-140.4838	Hannan-Quinn criter.	14.81641
F-statistic	1574.477	Durbin-Watson stat	2.587232
Prob.(F-statistic)	0.000000		

Source: NPCI website.

The above table defines the impact of Banking Technology enabled services on the BTI. The study considered the panel least square test to know the impact of independent variables (such as NEFT, RTGS, Mobile Banking, ATM, Credit Card, and Debit Card) on the dependent variable (i.e., BTI) for public sector banks in 3G period i.e., 2009-10 to 2012-13. The coefficient of NEFT transactions (-16.871) observed to be having the negative influence on the BTI followed by the RTGS transactions (-0.4641). The observed that Debit Card transactions (0.0003) influenced positively to BTI. Therefore, it states that null hypothesis rejected and alternative hypothesis has been accepted. Thus, the study reveals that in 3G period all the selected banking technology enabled services are observed to be having the significant influence on the Banking Technology Index.

4.3. Private Sector Banks in 4G Period

To examine the impact of technological enabled services on the Banking Technology Index i.e. BTI of Private Sector Banks for 4G period, the following hypothesis has been framed.

H0: There is no significant impact of select banking technology enabled services on the BTI of Private Sector Banks in 4G Period.

H1: There is a significant impact of select banking technology enabled services on the BTI of Private Sector Banks in 4G Period.

Table - 3: Technological Services Impact on BTI of Private Sector Banks in 4G

Dependent Variable: BTI				
Method: Panel Least Squares				
Sample: 2014 - 2022				
Periods included: 9				
Cross-sections included: 5				
Total panel (balanced) observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	119.1856	62.30311	1.912996	0.0633
NEFT	1.057297	1.268999	0.833174	0.0410
RTGS	2.142588	0.298403	7.180177	0.0000
MOBILE	-0.001598	0.005666	-0.282004	0.0079
ATM	-1.764669	1.016314	-1.736342	0.0006
CREDIT CARD	-0.151445	0.067165	-2.254822	0.0300
DEBIT CARD	-0.578083	0.228396	-2.531052	0.0156
R-squared	0.959721	Mean dependent var.		359.6088
Adjusted R-squared	0.953361	S.D. dependent var.		1464.921
S.E. of regression	316.3639	Akaike info criterion		14.49370
Sum squared Resid.	3803273.	Schwarz criterion		14.77473
Log likelihood	-319.1082	Hannan-Quinn criter.		14.59847
F-statistic	150.9042	Durbin-Watson stat		1.443161
Prob.(F-statistic)	0.000000			

Source: NPCI website.

The above table defines the impact of Banking Technology enabled services on the BTI. The study considered the panel least square test to know the impact of independent variables (such as NEFT, RTGS, Mobile Banking, ATM, Credit Card, and Debit Card) on the dependent variable (i.e., BTI) for private sector banks in 4G period i.e., 2013-14 to 2021-22. The coefficient of AT Transactions (-1.764669) observed to be having the negative influence on the BTI followed by the Debit Card Transactions (-0.578083). The observed that NEFT Transactions (0.009906) slightly influenced positively to BTI. Therefore, it states that null hypothesis rejected and alternative hypothesis has been accepted. Thus, the study reveals that in 4G period all the selected banking technology enabled services are observed to be having the significant influence on the Banking Technology Index.

4.4. Public Sector Banks in 4G Period

To examine the impact of technological enabled services on the Banking Technology Index i.e. BTI of Public Sector banks for 4G period, the following hypothesis has been framed.

H0: There is no significant impact of select banking technology enabled services on the BTI of Public Sector Banks in 4G Period.

H1: There is a significant impact of select banking technology enabled services on the BTI of Public Sector Banks in 4G Period.

Table - 4: Technological Services Impact on BTI in 4Gof Public Sector Banks

Dependent Variable: BTI				
Method: Least Squares				
Sample: 1 45				
Included observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	67.32698	34.06451	1.976455	0.0554
NEFT	-0.597932	0.224924	-2.658375	0.0114
RTGS	0.026696	0.009569	2.789823	0.0082
MOBILE	0.000191	0.008485	0.022550	0.0982
ATM	0.243699	0.572007	0.426041	0.0672
CREDIT CARD	0.008905	0.006510	1.367937	0.0179
DEBIT CARD	-0.013938	0.014530	-0.959259	0.0343
R-squared	0.214382	Mean dependent var.		61.01705
Adjusted R-squared	0.090337	S.D. dependent var.		184.6179
S.E. of regression	176.0817	Akaike info criterion		13.32181
Sum squared Resid.	1178181.	Schwarz criterion		13.60284
Log likelihood	-292.7407	Hannan-Quinn criter.		13.42658
F-statistic	1.728259	Durbin-Watson stat		2.198030
Prob.(F-statistic)	0.140953			

Source: NPCI website.

The above table defines the Impact of banking technology enabled services on the BTI. The study considered the panel least square test to know the impact of independent variables (such as NEFT, RTGS, Mobile Banking, ATM, Credit Card, and Debit Card Transactions) on the dependent variable (i.e., BTI) for private sector banks in 4G period i.e., 2013-14 to 2021-22. The coefficient of NEFT Transactions (-0.5979) observed to be having the negative influence on the BTI followed by the Debit Card Transactions (-0.0139). The observed that Mobile Banking (0.009906) influenced positively to BTI. Therefore, it states that null hypothesis rejected and alternative hypothesis has been accepted. Thus, the study reveals that in 4G period all the selected banking technology enabled services are observed to be having the significant influence on the Banking Technology Index.

4.5. Public and Private Sector Banks in 3G Period

To examine the impact of technological enabled services on the Banking Technology Index i.e. BTI of Public and Private Sector Banks for 3G period, the following hypothesis has been framed.

H0: There is no significant impact of select banking technology enabled services on the BTI of Public and Private Sector Banks in 3G Period.

H1: There is a significant impact of select banking technology enabled services on the BTI of Public and Private Sector Banks in 3G Period.

Table- 5: Technological Services Impact on BTI in 3G of Public and Private Sector Banks

Dependent Variable: BTI				
Method: Panel Least Squares				
Sample: 2010– 2013				
Periods included: 4				
Cross-sections included: 10				
Total panel (balanced) observations: 40				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1917.377	1267.746	1.512430	0.01399
NEFT	-8.051596	12.14826	-0.662778	0.05121
RTGS	-3.573487	12.37950	-0.288662	0.00746
MOBILE	-0.001580	0.004323	-0.365449	0.00171
ATM	-1.269799	2.446654	-0.518994	0.00072
CREDIT CARD	-0.000564	0.002442	-0.230714	0.00190
DEBIT CARD	0.000340	0.000124	2.732912	0.00100
R-squared	0.736820	Mean dependent var.		1874.895
Adjusted R-squared	0.688969	S.D. dependent var.		6259.091
S.E. of regression	3490.703	Akaike info criterion		19.31122
Sum squared Resid.	4.02E+08	Schwarz criterion		19.60678
Log likelihood	-379.2244	Hannan-Quinn criter.		19.41808
F-statistic	15.39826	Durbin-Watson stat		2.733018
Prob.(F-statistic)	0.000000			

Source: NPCI website.

The above table defines the impact of banking technology enabled services on the BTI. The study considered the panel least square test to know the impact of independent variables (such as NEFT, RTGS, Mobile Banking, ATM, Credit Card, and Debit Card Transactions) on the dependent variable (i.e., BTI) for Public and Private Sector Banks in 3G period i.e., 2009-13. The coefficient of NEFT Transactions (-8.0515) observed to be having the negative influence on the BTI followed by the RTGS Transactions (-3.5734). The observed that Debit Card (0.0003) influenced positively to BTI. Therefore, it states that null hypothesis rejected and alternative hypothesis has been accepted. Thus, the study reveals that in 4G period all the selected banking technology enabled services are observed to be having the significant influence on the Banking Technology Index.

4.6. Public and Private Sector Banks in 4G Period

To examine the impact of technological enabled services on the Banking Technology Index i.e. BTI of Public and Private Sector Banks for 4G period, the following hypothesis has been framed.

H0: There is no significant impact of select banking technology enabled services on the BTI of Public and Private Sector Banks in 4G Period.
H1: There is a significant impact of select banking technology enabled services on the BTI of Public and Private Sector Banks in 4G Period.

Table - 6: Technological Services Impact on BTI in 4G of Public and Private Sector Banks

Dependent Variable: BTI				
Method: Least Squares				
Sample: 1 90				
Included observations: 90				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	55.98930	96.18978	0.582071	0.0562
NEFT	5.367966	0.724652	7.407650	0.0000
RTGS	-0.129512	0.038967	-3.323655	0.0013
MOBILE	0.007953	0.013328	0.596695	0.0552
ATM	-4.243941	0.959660	-4.422340	0.0000
CREDIT CARD	-0.130353	0.024162	-5.394953	0.0000
DEBIT CARD	0.252905	0.057025	4.435007	0.0000
R-squared	0.429240	Mean dependent var.		210.3129
Adjusted R-squared	0.387980	S.D. dependent var.		1048.967
S.E. of regression	820.6245	Akaike info criterion		16.33259
Sum squared Resid.	55894238	Schwarz criterion		16.52702
Log likelihood	-727.9668	Hannan-Quinn criter.		16.41100
F-statistic	10.40336	Durbin-Watson stat		1.665984
Prob.(F-statistic)	0.000000			

Source: NPCI website.

The above table defines the impact of banking technology enabled services on the BTI. The study considered the panel least square test to know the impact of independent variables (such as NEFT, RTGS, Mobile Banking, ATM, Credit Card, and Debit Card Transactions) on the dependent variable (i.e., BTI) for Public and Private Sector Banks in 4G period i.e., 2013-22. The coefficient of NEFT Transactions (-8.0515) observed to be having the negative influence on the BTI followed by the RTGS transactions (-3.5734). The observed that Debit Card Transactions (0.0003) influenced positively to BTI. Therefore, it states that null hypothesis rejected and alternative hypothesis has been accepted. Thus, the study reveals that in 4G period all the selected banking technology enabled services are observed to be having the significant influence on the Banking Technology Index.

5. CONCLUSIONS

1. When 3G public sector banks are compared to 4G public sector banks, the banking technology enabled services such as Debit card transactions appear to have appropriate utilisation of transaction making when compared to 3G public banks with the 4G public sector banks. Similarly, it was observed that mobile banking transactions made in 4G Public Sector Banks were more productive when compared to those conducted in 3G Public Sector Banks.
2. When 3G Private Sector Banks are compared to 4G Private Sector Banks, the banking technology enabled services such as Debit Card Transaction appear to have appropriate utilisation of transaction making when compared to 3G Private Sector Banks with 4G. This is because 4G Private Sector Banks have a higher bandwidth, which allows for faster transaction processing. In a similar way, it was noted that during the 4G phase, NEFT payment systems got a greater exposure compared to Private Sector Banks operating during the 3G phase.
3. When 3G Public and Private Sector Banks are compared with 4GPublic and Private Sector Banks, the banking technology enabled services such as Debit Card transactions appear to have appropriate utilisation of transaction making when compared to 3G Public and Private Sector Banks with the 4G Public and Private Sector Banks. Similarly, it was observed that Mobile Banking transactions made in 4G Public and Private Sector Banks were more productive when compared to those conducted in 3G Public and Private Sector Banks.

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