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DIGITAL BANKING: A STEP TOWARDS GREEN BANKING

Dr. Kalipada Munda[1], Dr. Salmamani Tudu[2] and Dr. Prafulla Pradhan[3]

[1]Lecturer in Commerce, Binayak Acharya College, Berhampur, Email: - mkalipadar11@gmail.com, Mob: 9668594621.
[2]Assistant Professor in Finance, Academy of Management and Information Technology, Khordha Odisha-752057, Email: -salmani.tudu89@gmail.com
[3]Lecturer in Commerce, Sevananda Saraswati Degree Mahavidyalaya, Bamakoyi, Ganjam, Odisha, Email: - prafulla.pradhan09@gmail.com, Mob: 9937800502.

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ABSTRACT

Banking is one of the critical sector of the economy and plays a significant role in the economy. Green Banking has emerged as a focus area of banking development in response to the current challenges of environment protection across the globe. The concept of Green Banking though of recent origin has turned into a globe movement having wide ramifications and a response of banking sector's responsibility to environment management. The present day banking business is considerably influenced by changing technology and greater digitisation. Now a days, bank customers are having access to financial data through desktop, mobile, and ATM services any time. Admittedly anywhere, digital banking reduces the paperwork and time considerably and there by protect environment. The study is based on primary as well as secondary data

KEYWORDS: Digitalisation, Green banking, Online banking, Technology.

INTRODUCTION

Sustainable development can best be achieved by allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments. One of the most important economic agents influencing the overall economic activity and growth is banking sector. Admittedly, banking sector influences the economic growth and development in terms of both quality and quantity, by shaping the nature and pattern of economic growth. Among the various operating sectors, banking is considered as environmental eco-friendly in terms of emission and pollution. The internal environmental impact of the banking sector such as use of energy, paper and water are relatively low and clean. The impact of banks is not physically related to their banking activities but with the customers' activities. Furthermore, environment management in the banking business is mostly risk management. It increases the enterprise value and lowers loss ratio as quality loan portfolio results in higher earnings. Consequently, encouraging environmentally responsible investments and prudent lending policy remain's one of the key responsibilities of the banking sector. Further, industries having

green footprints and also making serious attempts towards green pastures should be accorded priority to lending by the banks. This method of finance, often termed *Green Banking* is an effort by the banks to make the industry sector grow green and in the process restore the natural environment. This concept of Green Banking is mutually beneficial to the banks, industries and the economy as well. Green banking has two important dimensions, external and internal.

The prime benefit of the green banking approach is the protection of the natural resources and the environment. Green banking avoids paper work to the optimum level and focuses on digitalisation of transactions like use of ATM, mobile banking, online banking, Unified Payment Interface (UPI), Immediate Payment Service (IMPS), etc for various banking transactions by the customers. A faceless, paperless, cashless transaction is the key requirement of a sustainable eco-friendly environment.

REVIEW OF LITERATURE

Any research endeavour pre-requisite a thorough understanding of the studies undertaken in the subject matter earlier providing the necessary background for further extension of the problem area. Followings are some of the selected review of literature developing foundations of the present study.

Sudhalakshmi and Chinnadorai (2014)analysed *Green Banking Practices in Indian Banks* the status of Indian Banks in respect of Green Banking and summed that though *green mantra* is essential for emerging economies like India but significant efforts are yet to be taken. Banks are required to include their green aspect in the lending principle. Every step taken today will mean a better global environment in future. So a comprehensive policy measure to promote Green Banking is needed in India. Indian banks are running behind time in the adoption of this green phenomenon.

Hebbar, C.K. (2020) *A Study on Green Banking Trends in Uttara Khand District*. The objective **Hebbar, C.K. (2020)** is to identify the important 'Green Banking' products available in the Uttara Khanda district and create awareness about green banking among society as well as bank employees. He used secondary source of data and adopted random sampling technique. He observed that most of the customers think that green banking would make banking activity more convenient as well as quick. **K. Hema Divya and K. Suma Vally, K. (2018)** article entitled "*A study on Digital Payments in India with Perspective of Consumer's Adoption* "focus on the analysis of the adoption level of the digital payment systems by customers. They used primary as well as secondary data. The data were analysed by using chi-square technique. The study observed that development of technology for digital payments have improved the performance of banking sector and able to achieve the motive cash less country.

Rathee, D.V. (2017) attempted to analyse *Perception of Customer Towards Service Quality: A Study*

of Digital Banking Practices. Researcher highlights that digitalisation is attractive experience for the customers. It is also convenient for the customer to do business with their respective books and vice-versa, by effective use of technology.

RESEARCH GAP

Review of literature suggests that there has been considerable research addressing the eco-friendly technology adoption in the banking parlance and affecting factors in the Indian perspective. However, there seems to be a research gap with respect to customers' experience about the level of technology adoption and expectations from their banks. This research paper aims to fulfill this research gap, mostly the internal aspects of green banking i.e. technology offering level of Indian banks.

OBJECTIVE OF THE STUDY

1. To study the role of digitisation in Indian banking
2. To know about the recent trends of digital banking
3. To identify customers' adoption of digitalisation in banking sector.

METHODOLOGY OF THE STUDY

The present paper is based on primary as well as secondary data and uses explorative method to draw inferences and conclusion. The primary information of the study is collected through questionnaire based on survey method. Primary data have been collected from 150 respondents selected on the basis of stratified random sample. Secondary information is collected from various journals, articles, RBI annual report and website. Information is collected from the government publication also. The Autocorrelation model with Graphical method and percentage method have been used for the analysis of data.

DATA ANALYSIS

1. Digitisation of Banking

Banking digitisation has been done in a phased manner. Some banks in India, more particularly the private ones are fast paced in adopting digitisation as compared their counterparts in the public sector. The sample respondents were therefore asked about the extent level and of digitisation of their banks.

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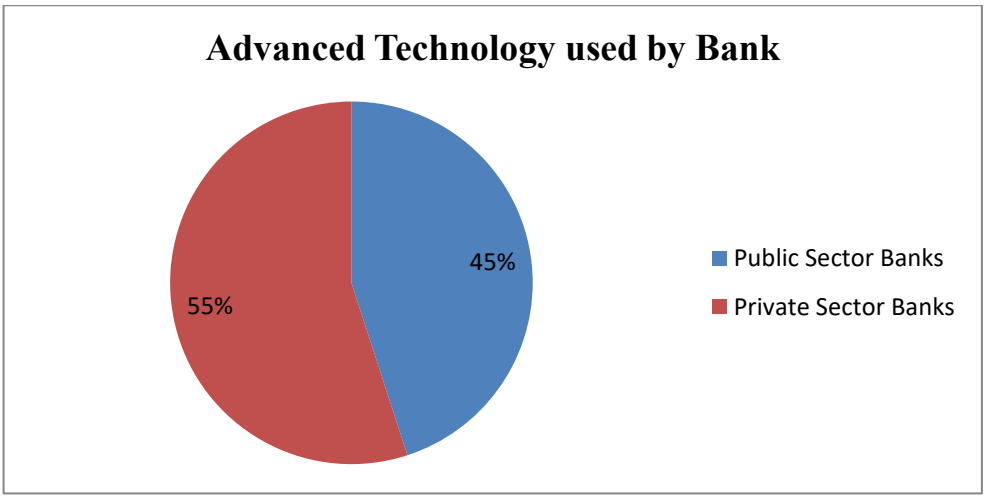

Fig. 1

It is observed from the survey (Fig. 1) that 55 percent of the respondents admitted that private sector banks have adopted digitisation more quickly advanced whereas the rest 45 percent opine positively about the digital adoption of public sector banks. This clearly establishes that though the private banks are quick to respond to digitisation but public sector banks are not lagging behind. Besides, the banking customers are more or less satisfied with the level of digitisation of their banking services.

2. Technology adoption with global standards

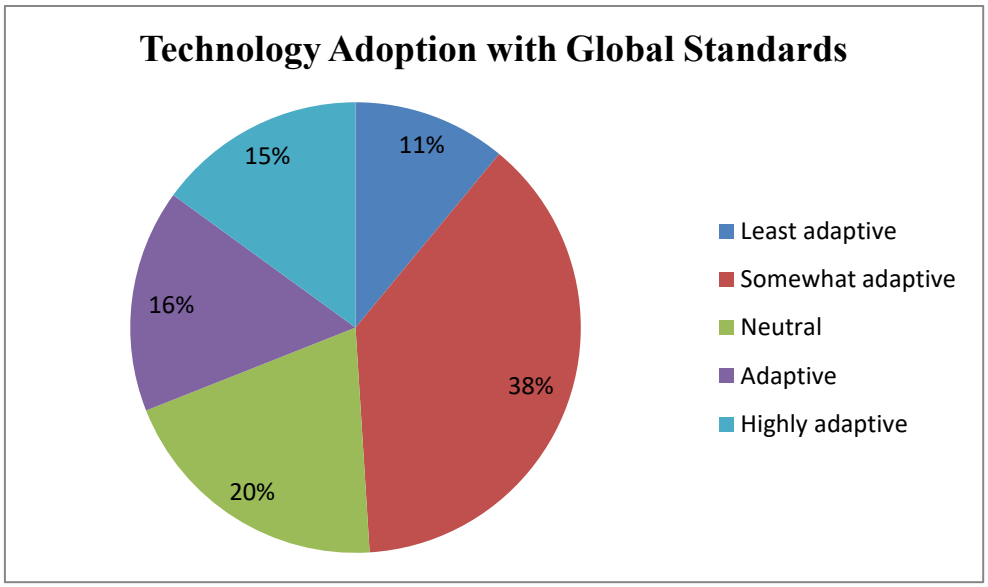

Fig. 2

Technology is fast paced in the present day world. This is truer in the service sector like banking where

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customers insist on quick safe and reliable services. In order to probe deep about the level of technology adoption by the Indian banks the sample was asked to provide opinion about the same. Figure 2 indicates rate of technology adoption by the Indian banks as opined by the sample. Thirty Eight percent of respondents perceive that their respective banks have somewhat adaptive to technology. Only 11 percent of the respondents firmly believe their banks have technology adoption of global standards. This shows that Indian banking sector has a long path ahead when it comes to technology adoption compatible to global standard.

3. Factors prompt to adopt new technology in banking

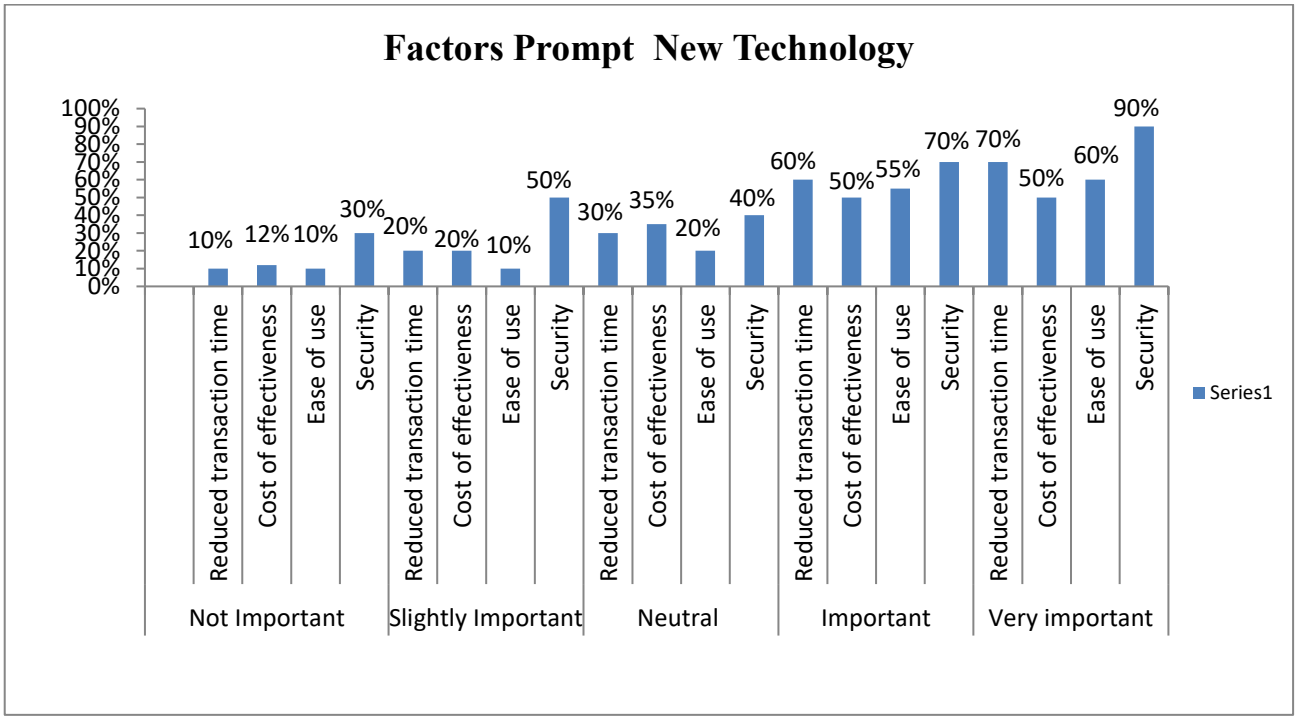

Fig. 3

Figure 3 point out the factors thatprompt banks to adapt new technology as opined by the bank customers. It can be seen that customers consider security to be the most important factor followed by cost effectiveness and time savings for adapting latest technology in banking services.

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4. Customer satisfaction in ATM services

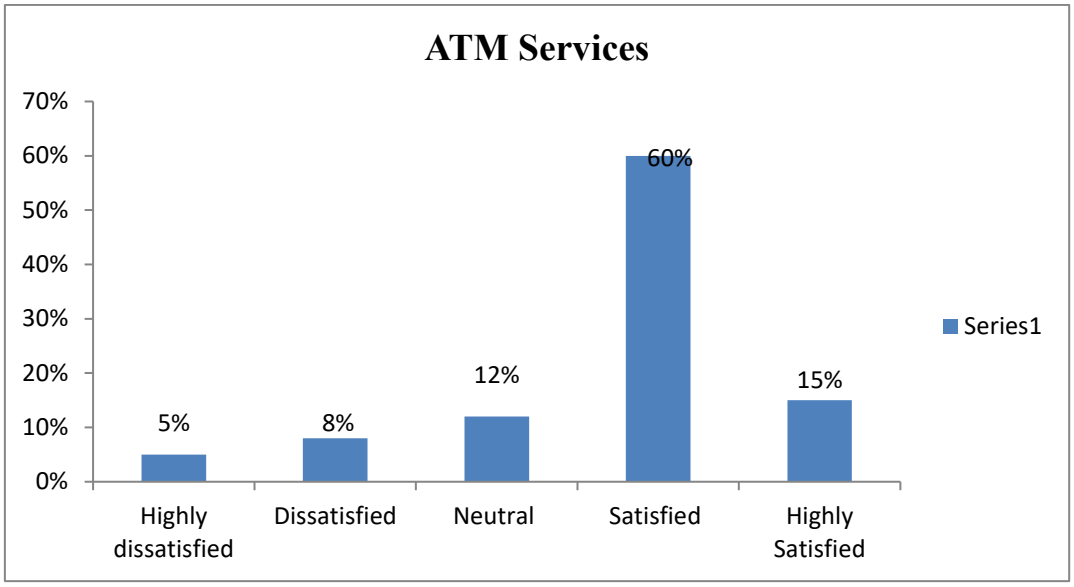

Fig. 4

ATM services are considered as one of the initial technology breakthrough in the banking sector providing anytime hassle free service at specific points. Keeping that in view, banking customers were asked to express their satisfaction in the matter. As can be seen from Fig. 4, as high as 75% expressed their satisfaction (60% satisfied + 15% highly satisfied) regarding the ATM services of their respective banks. Probing deep it can also be interpreted that customers expect a lot many added features in the ATM services for higher satisfaction.

5. Customer satisfaction in Mobile Banking

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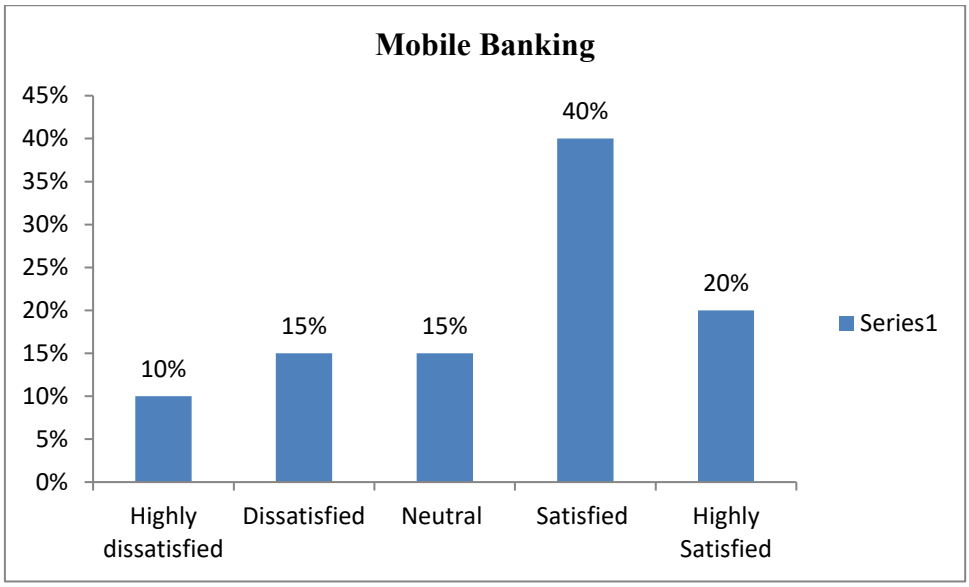

Fig. 5

Mobile banking is another feature of that makes banking services easily accessible to the customers. As high as 60 percent sample customers feel satisfied (40% satisfied and 20% highly satisfied) with mobile banking services. The dissatisfied category comprise25 percent (15 % dissatisfied and 10% highly dissatisfied) pointing out clear cut needs of improvement in the mobile banking services.

6. Customer satisfaction in Internet Banking

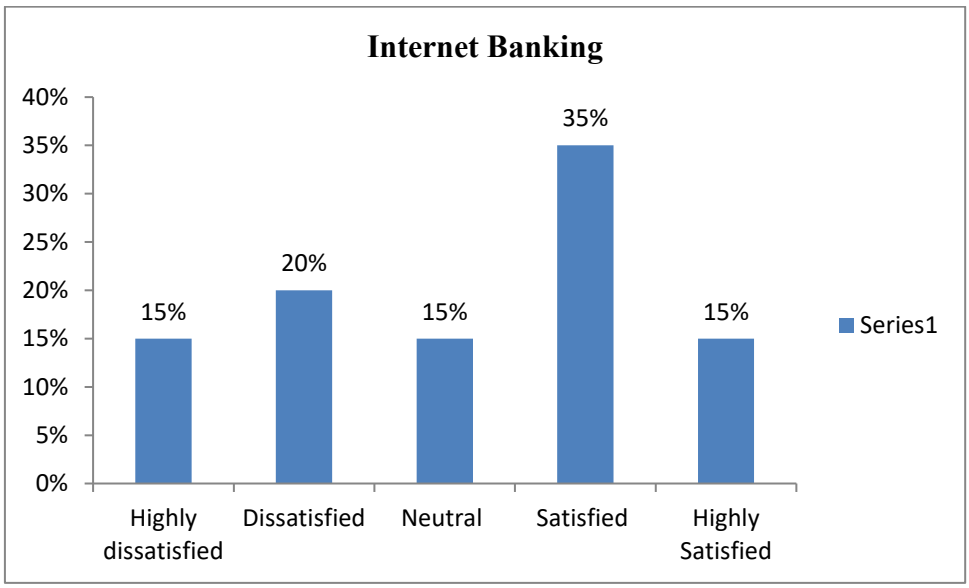

Fig. 6

In the recent past a number of internet banking services have been introduced making banking services

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faster, economical and time savings. Figure6 shows the opinion of bank customers regarding internet banking. Out of the total sample 50 percent respondents' expressed that services offered by their respective banks are satisfactory. However, 35 percent customers are dissatisfied (dissatisfied 20% and highly dissatisfied 15% taken together).

Table 1 Volume of Transactions in Digital Banking (Volume in Million)

Year	RTGS	Retail Electronic Clearing (ECS, NEFT, IMPS)	Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers)
2011-12	55.1	512.4	30.6
2012-13	68.5	694.1	66.9
2013-14	81.5	1108.3	133.6
2014-15	92.8	1687.4	314.5
2015-16	98.4	3141.5	7488.0
2016-17	107.8	4222.9	1963.7
2017-18	124.4	6382.4	3459.0
2018-19	154.6	7425.3	4402.8
2019-20	174.2	8964.2	5509.7
2020-21	187.5	10020.0	7258.6

Source: RBI Data

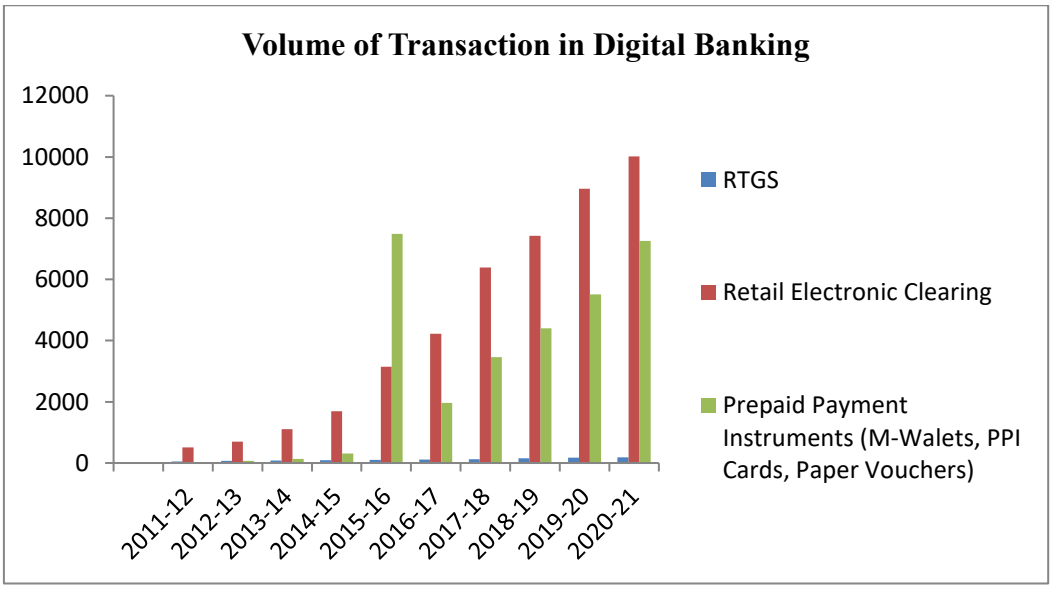

Fig. 7

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Along with the international trend, Indian banking services have also moved from traditional customer banker interface to faceless internet banking. Over the past few years the volume of banking business through internet has increased by leaps and bounds as can be seen from table – 1. Services like RTGS, ECS, NEFT, IMPS, M-Wallet, PPI Cards, and Paper Vouchers have made significant inroads into the banking arena making the services greener. These green financial instruments are capable of aiding a region in achieving a greener environment. The results prove that although green finance is new and yet to be well accepted by mainstream financial institution. It can measure the relationship between variables of current and past values of digital banking through autocorrelation and partial autocorrelation model.

Autocorrelation and Partial Autocorrelation

In a multiple linear regression model to fail is when the sample data have been collected over time and the regression model fails to effectively capture any time trends. In such a circumstance, the random errors in the model are often positively correlated over time, so that each random error is more likely to be similar to the previous random error that it would be if the random errors were independent of one another. This phenomenon is known as **autocorrelation**. The coefficient of correlation between two values in a time series is called the **autocorrelation function (ACF)**. The ACF for a time series $\mathbf{y_t}$ is given by:

$$\text{Corr}\ (y_t, y_t, y\text{-}k),\ k = 1,2, \ldots.$$

This value of *k* is the time gap being considered and is called the **lag.** A **lag 1** autocorrelation (i.e., *k* = 1 n the above) is the correlation between values that are one time period apart. More generally, **a lag *k*** autocorrelation is the correlation between values that are *k* time period apart.

The ACF is a way to measure the linear relationship between observations at previous times. If we assume an AR (*k*) model, then we may wish to only measure the association between y_t and $y_t - k$ and filter out the linear influence of the random variables that lie in between (i.e., $y_{t-1}, y_{t-2}, \ldots., y_{t-(k-1)}$), which requires a transformation on the time series. Then by calculating the correlation of the transformed time series we obtain the **partial autocorrelation function (PACF)**.

The Partial Autocorrelation Function (PACF) is most useful for identifying the order of an autoregressive model. Specifically, sample partial autocorrelations that are significantly different from 0 indicate lagged terms of *y* that are useful predictors of y_t. It is important that the choice of the order makes sense. The PACF may indicate a large partial autocorrelation value at a lag of 7, but such a large order for an autoregressive model likely does not make much sense.

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Autocorrelation means correlation with itself. Sometimes, autocorrelation is also referred to as serial correlation or lagged correlation. Autocorrelation also measures the degree of relationship between a variable's current value and its past values. The value of autocorrelation lies between 1-1 and +1.

- -1 means a perfect negative autocorrelation,
- +1 means a perfect positive autocorrelation, and
- 0 means no autocorrelation

ACF

Model Description		
Model Name		MOD - 1
	1	RTGS
	2	Retail Electronic Clearing
Series Name	3	Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers)
Transformation		Natural logarithm
Non-Seasonal Differencing		1
Seasonal Differencing		0
Length of Seasonal Period		No periodicity
Maximum Number of Lags		16
Process Assumed for Calculating the Standard Errors of the Autocorrelations		Independence (white noice)
Display and Plot		All lags
Applying the model specifications from MOD-1 a. Not applicable for calculating the standard errors of the partial autocorrelations.		

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Case Processing Summary				
		RTGS	Retail Electronic Clearing	Prepaid Payment Instruments (M-Wallets, PPI Cards, Paper Vouchers)
Series Length		17	17	17
Number of Missing Values	Negative or Zero Before Log Transform	0	0	0
	User-Missing	0	0	0
	System-Missing	7[a]	7[a]	7[a]
Number of Valid Values		10	10	10
Number of Values Lost Due to Differencing		1	1	1
Number of Computable First Lags After Differencing		8	8	8

a. Some of the missing values are imbedded within the series

Table 2 Autocorrelations of RTGS

Autocorrelations

Series: RTGS

Lag	Autocorrelation	Std. Error[a]	Box-Liung Statistic		
			Value	df	Sig.[b]
1	.246	.284	.749	1	.387
2	-.469	.266	3.859	2	.145
3	-.525	.246	8.399	3	.038
4	.010	.225	8.400	4	.078
5	.341	.201	11.279	5	.046
6	.215	.174	12.802	6	.046
7	-.161	.142	14.082	7	.050

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation.

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Table 3 Partial Autocorrelations of RTGS

Partial Autocorrelations

Series: RTGS

Lag	Partial Autocorrelation	Std. Error
1	.246	.333
2	-.564	.333
3	-.321	.333
4	-.019	.333
5	-.069	.333
6	-.027	.333
7	-.125	.333

Table 2 shows Autocorrelation of RTGS. The autocorrelation model described 1st lag, 4th lag, 5th lag, and 6th lag are positive and 2nd lag, 3rd lag and 7th lag are negative. The Std. Error notice .284 in 1st lag and it declined to .142 in the end of 7th lag. The Box-Liung Statistic value seen .749 in 1st lag and it continuous increased to 14.082 in 7th lag. The level of significance is fluctuating with down trend.

Table 3 presents Partial Autocorrelation of RTGS. Partial Autocorrelation model point out 1st lag is positive and 2nd lag to 7th lag are negative which is negative impact for the banking sector. The Std. Error recorded .333 in all lags.

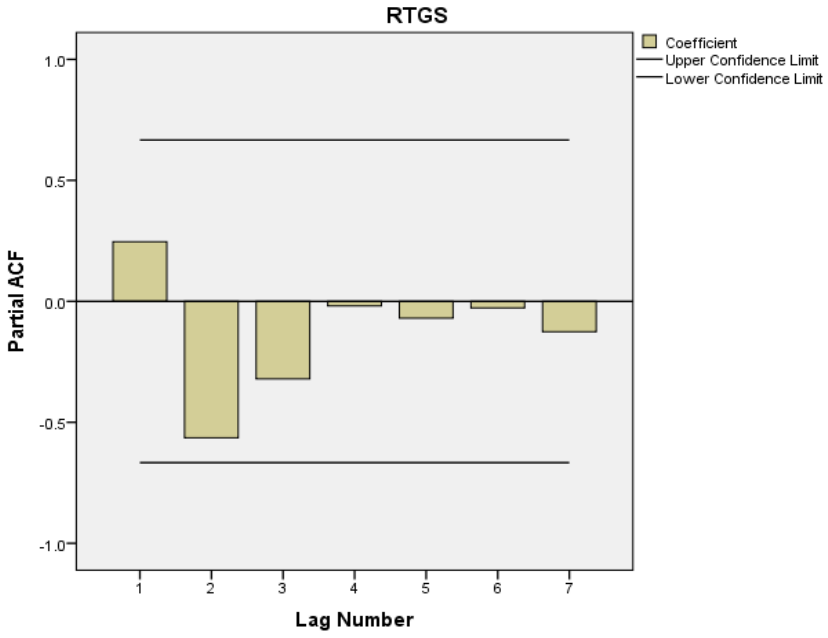

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Table 4 Autocorrelations of Retail Electronic Clearing

Autocorrelations

Series: Retail Electronic Clearing

Lag	Autocorrelation	Std. Error[a]	Box-Liung Statistic		
			Value	df	Sig.[b]
1	.289	.284	1.031	1	.310
2	.418	.266	3.503	2	.174
3	-.318	.246	5.177	3	.159
4	-.170	.225	5.752	4	.218
5	-.468	.201	11.177	5	.048
6	-.156	.174	11.983	6	.062
7	-.119	.142	12.688	7	.080

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation.

Table 5 Partial Autocorrelations of Retail Electronic Clearing

Partial Autocorrelations

Series: Retail Electronic Clearing

Lag	Partial Autocorrelation	Std. Error
1	.289	.333
2	.365	.333
3	-.630	.333
4	-.121	.333
5	.081	.333
6	-.115	.333
7	.088	.333

Table 4 presented Autocorrelation of Retail Electronic Clearing in banking sector. It shows 1st lag and 2nd lag positive and 2nd lag to 7th lag are negative autocorrelation which noted that negative impact of banking sector. The Std. Error recorded .284 in 1st lag and it continuous declined to .142 in 7th lag. The Box-Liung Statistic value shows 1.031 in 1st lag and it continuous went up to 12.688 in 7th lag it means maximum customer utilise digital banking system. The level of significance fluctuating with range between .310 in 1st lag and .048 in 5th lag.

Table 5 manifested Partial Autocorrelation of Retail Electronic Clearing in banking sector. Partial Autocorrelation model points out 1st lag 2nd lag, 5th and 7th lag are positive and 3rd lag, 4th lag and 6th lag are negative partial autocorrelation. The Std. Error comes .333 in all lags.

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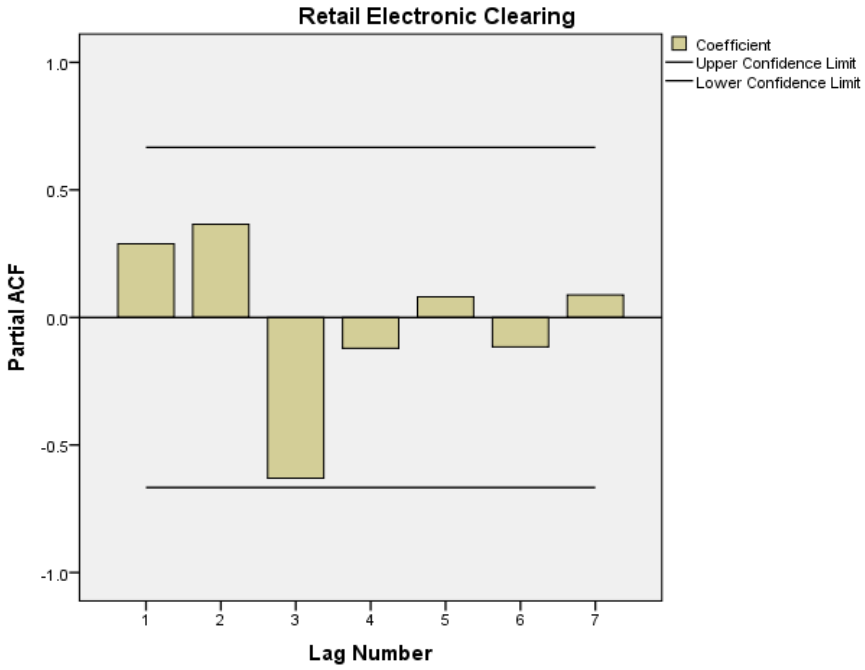

Table 6 Autocorrelation of Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers)

Autocorrelations

Series: Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers)

Lag	Autocorrelation	Std. Error[a]	Box-Liung Statistic		
			Value	df	Sig.[b]
1	-.366	.284	1.653	1	.198
2	.049	.266	1.687	2	.430
3	.006	.246	1.688	3	.640
4	-.069	.225	1.782	4	.776
5	-.090	.201	1.984	5	.851
6	-.016	.174	1.993	6	.920
7	-.008	.142	1.996	7	960

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation.

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Table 7 Partial Autocorrelation of Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers)

Partial Autocorrelations

Series: Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers?)

Lag	Partial Autocorrelation	Std. Error
1	-.366	.333
2	-.098	.333
3	-.012	.333
4	-.077	.333
5	-.169	.333
6	-.140	.333
7	-.089	.333

Table 6 reveals Autocorrelation model of Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers) in banking sector. The Autocorrelation model shows 2nd lag and 3rd lag positive and 1st lag, 4th lag, 5th lag, 6th lag and 7th lag indicates negative Autocorrelation. Std. Error noticed .284 in 1st lag and it decreased to .142 in the end of 7th lag. The Box-Liung Statistic Value recorded 1.653 in 1st lag and it continuous increased to 1.996 in 7th lag. The level of significance shows .198 in 1st lag and it constant increased to .960 in 7th lag.

Table 7 exhibits Partial Autocorrelation of Prepaid Payment Instruments (M-Walets, PPI Cards, Paper Vouchers) of banking sector. Partial Autocorrelation model point out all the lags are negative with range between -.012 in 3rd lag and -.366 in 1st lag. The Std. Error noted .333 in all lags.

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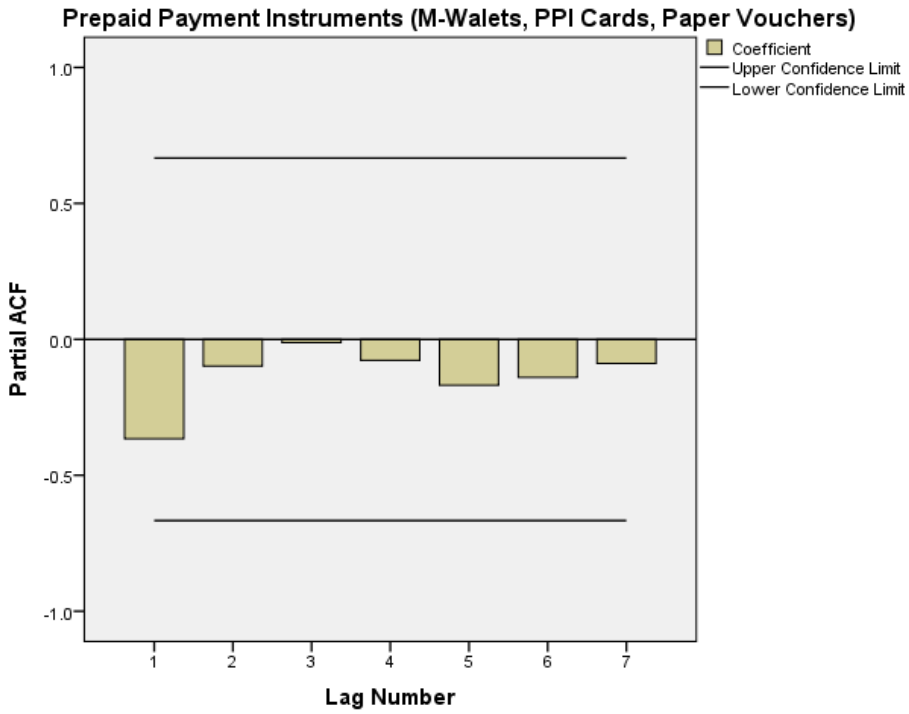

FINDINGS

- The results recommend that there is variability in the adoption of technology between private and public banks. Private sector banks appear to have adopted technology better and faster technology as compared with their public sector counterparts.
- With respect to factors that prompt customers to adapt new technology, there are no high variations between private and public sector banks. Customers in general consider security as the primary reason for technology adaption.
- As far as customer satisfaction is concerned with respect to technology adaption, there is variability in satisfaction of customers with ATM services. Overall results suggest that customers are dissatisfied with the quality of ATM services offered by public sector banks.
- With regards to phone banking, there seems to be no major variations in the satisfaction level of private and public sector banks. Regression results suggest that majority of the customers are neutral with respect to this service.
- There seems to be variations in the satisfaction level of private sector and public sector banks with regards to mobile and internet banking services. Survey results suggests that private banks offer better mobile and internet banking services as compared to public sector banks. More specifically, customers had issues with the website freezing while transacting with public sector banks.

- The autocorrelations of RTGS recorded 4 lags positive and 3 lags are negative autocorrelation whereas Std. Error value declining time to time. The Box-Liung Statistic Value highly increased.
- Autocorrelations of Retail Electronic clearing point out first two lags are positive and rest lag are negative autocorrelations. The Std. Error indicates declining from 1st lag to 7th lag and high growth of Box-Liung Statistic Value. This implies that majority of bank customers prefer digital banking system.

CONCLUSION

Digital banking has taken a new shape in the world of technology. With the increasing usage of smart phone, online banking, ATM, by the bank customers, digitalisation of banking sector is inevitable to catch up increasing expectations of the world. It has considerably reduced human error and increased convenience. Adoption of digitisation by the banking sector in India has contributed to same remarkable changes as well as removing hurdles. Digital banking currently in force breaks the time barrier imposed by the physical banking. Now-a-days transactions can be done anytime and anywhere without much restriction. As a result, customers of banks are able to save a lot of time and this has a great impact on the productivity of the economy. Besides, paperless transactions along with reduced footprints in the banking premises contributes significantly to make banks operationally efficient and improves the quality of assets of the banking sector.

Customer adoptions of digitised banking services are quite fast as indicated by the study despite lower level of internet literacy and technical glitches. The autocorrelation analysis further corroborates that bank customers in India prefer digital services which is a significant step towards green banking. Stated otherwise, banks need to rise to the occasion and adopt state of the art technology for digital banking which will contribute towards greener environment.

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