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Customer Perception: Technology Based Banking and its Impact on Financial Inclusion

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Abstract: *In the banking sector, digital technology offers an unprecedented opportunity to connect people to services such as savings, loans, insurance, and payments. India remains among the most cash-intensive economies in the world, with a cash-to GDP ratio of around 12 percent. Around 97 percent of all transactions in the country are carried out in cash, and India remains amongst the countries with the lowest access to digital payments. The digital mode of payments gathered momentum in 2016-17, according to RBI's annual report. Technology has proved to be an effective tool to expand financial inclusion. With the Government initiatives, RBI has recommended banks to move towards greater technology adoption to drive financial inclusion. In this paper, the authors analyse the pattern of usage of technology by customers for banking operations and investigate the linkages between the customer satisfaction factors and the factors that influence a customer to move towards technology for various banking services. The study brings out various attributes and factors that influence a customer decision towards using technology tools for banking, makes a quality assessment and brings out the impact on customers' satisfaction. Finally, with the help of exploratory factor analysis, the paper identifies the factors that attract customers mostly to use the technology tools in banking operations.*

Keywords: *Financial Inclusion, Banking Technology, Customer Satisfaction, Technology Tools, Factor Analysis.*

I. INTRODUCTION

Use of technology in the banking sector has enhanced the convenience of banking at any time anywhere as well as reduce the cost significantly. Technology is not only the key for financial inclusion but also enables the banking sector to perform accurate and timely financial transactions process payment in the easy and quick way. Technology, with its capacity to reduce transaction costs, is key to enabling the large volume low ticket transactions that are at the centre of Financial Inclusion. Banks offer various sophisticated services to customers in a secure, reliable and affordable manner for simple banking operations for all its customers. Through this, people are benefitted and are comfortable to operate their bank accounts for all types of transactions. People thus save time and operate their accounts in a more secure way.

The digital modes of payment gathered momentum in India during 2016-17, according to the Reserve Bank of India's (RBI) annual report^[1]. The push to a less-cash society received an impetus by quick policy measures and initiatives by the RBI following the withdrawal of high-denomination specified bank notes on Nov 8, 2016. The usage of credit and debit cards increased significantly during 2016-17. The number of credit card transactions increased to 1.08 billion (0.78 billion) valued at Rs.3.28 lakh crore (2.40 lakh crore).

During 2016-17 the number of Debit card transactions increased to 2.39 billion (1.17 billion) valued at Rs.3.29 lakh crore (Rs.1.58 lakh crore). The use of prepaid instruments (PPIs) saw a significant growth during the year. The number of PPI transactions increased to 0.74 billion transactions in 2015-16. The value of transactions increased to Rs.0.83 lakh crore (Rs.0.48 lakh crore) during the year.

The number of transactions under Real Time Gross Settlement (RTGS) stood at 108 million valued at around Rs.982 lakh crore during 2016-17, against 98 million transactions valued at Rs.825 lakh crore in 2015-16. The number of transactions under National Electronic Funds Transfer (NEFT) increased to 1.6 billion transactions valued at Rs.120 lakh crore during 2016-17, against 1.3 billion transactions valued at Rs.83 lakh crore in the previous fiscal.

By the end of March 2017, NEFT facility was available through 1.30 lakh branches of 172 banks in addition to business correspondence (BC) outlets. The annual report said that the mobile banking service witnessed strong growth of 151 percent and 224 percent in volume and value terms, respectively. The number of registered customers rose to 163 million (105million) during the year.

The number of transactions under immediate payment service (IMPS) increased to 506 million (220 million) valued at Rs.4.11 lakh crore (Rs.1.62 lakh crore) during 2016-17. To promote digital transactions in the country, thrust was given to other measures as well. These included the launch of Unified Payments interface (UPI) by the National Payments Corporation of India (NPCI).

The NPCI was allowed to launch the Bharat Interface for Money (BHIM) app, providing an additional interface to customers to connect to UPI besides banks' own apps. The NPCI was permitted to introduce the Unstructured Supplementary Service Data (USSD) 2.0 (*99#) version which was also integrated with the UPI, in order to provide a better customer experience for fund transfers.

To provide a channel for customers to make digital payments using their Aadhar seeded bank accounts at merchant locations, in-principle approval was accorded to the NPCI to launch a pilot on BHIM Aadhar Pay. BHIM-Aadhaar Pay is a smart phone-based application with a dongle attached to it for the capture of customers' biometric data. The annual report also said that approval was given to the authorized card networks to introduce tokenized contact-less card payments such as Samsung Pay.

In the above background performing a research study to infer the customer acceptance of technology tools used in banking operations and measuring its effect on the customers' satisfaction is a complete necessity. The purpose of such research and the result can be applied to the yet unknown technologies in the future as well. It can also be used as a guidance for measuring and developing tools for various other purposes.

In this exploratory research paper, we have analysed the usage of technology by people for banking transactions and also the factors that influence the customers towards the adoption of technology for banking services. In order to ascertain this, empirical data were collected from a standard questionnaire survey of 200 people from Cherlapally Industrial belt at Hyderabad, India. Purposive quota sampling has been derived from non-probability sampling method to select people who have bank accounts. The data collected were analysed and meaningful inferences drawn with the help of various tools such as percentage analysis, Chi Square test, Anova and Factor analysis. Based on this, the paper investigates the linkages between the customer satisfaction, technology tools and factors accountable for its enhancement.

II. OBJECTIVE OF THE STUDY

The paper aims at the following: (i) to analyse the usage of various available technology tools by customers for banking operations and capture the respondents' view on various attributes of technology tools used for banking and overall satisfaction level (ii) to compare and analyse factors that influence a customer towards technology in banking services and (iii) to conduct an exploratory factor analysis to determine the important factors that attract the customers towards usage of technology for banking services and suggest measures to improve effectiveness of technology based banking.

III. RESEARCH METHODOLOGY

This research is about the usage of technology in the banking sector, various tools and Alternative Delivery Channels (ADCs) used and preferred by the people to avail its products and services and finally the factors that attract the people to use technology effectively in banking. In order to evaluate this we have adopted the following methods:

Descriptive research design has been used for the study.

Purposive quota sampling has been derived from non-probability sampling method to select people who have bank accounts in Hyderabad-Telangana. The samples were drawn from people who are employed in various Private sectors, Government offices and Public Sector Undertakings comprising of worker class, officers, and daily wage employees.

Based on the above, from the total population, 200 people are chosen as the sample size for the study and the data was collected through a Structured Questionnaire.

The data were subjected to various analysis using the following statistical tools like (a) Percentage Analysis (b) Chi Square test, (c) ANOVA and (d) Factor analysis.

The sample constituted about 58% of male and 42% female. 39 % of the respondents are within the age group of 26-35. About 22% of the respondents are Post Graduates.

A. Percentage Analysis

Various types of analysis using percentage analysis tools was done and the results are computed below in the Fig.1to 4.

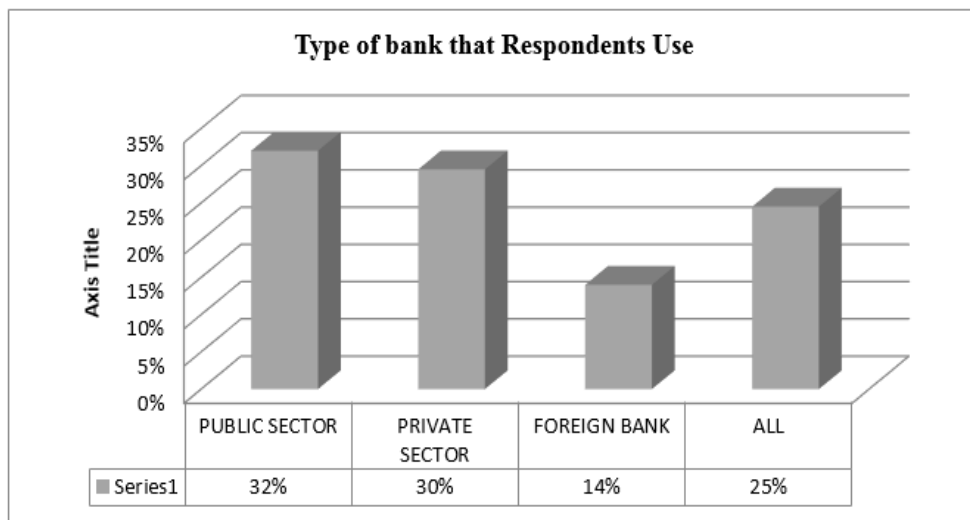


Fig.1: 32% Respondents said that Public Sector Banks are the Most Technologically Advanced

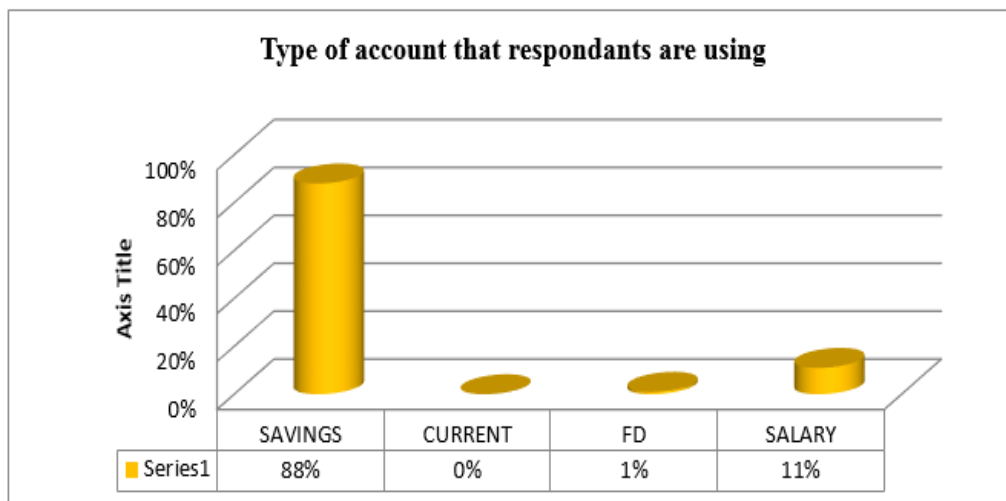


Fig. 2: 88% of Respondents are Savings Account Holders

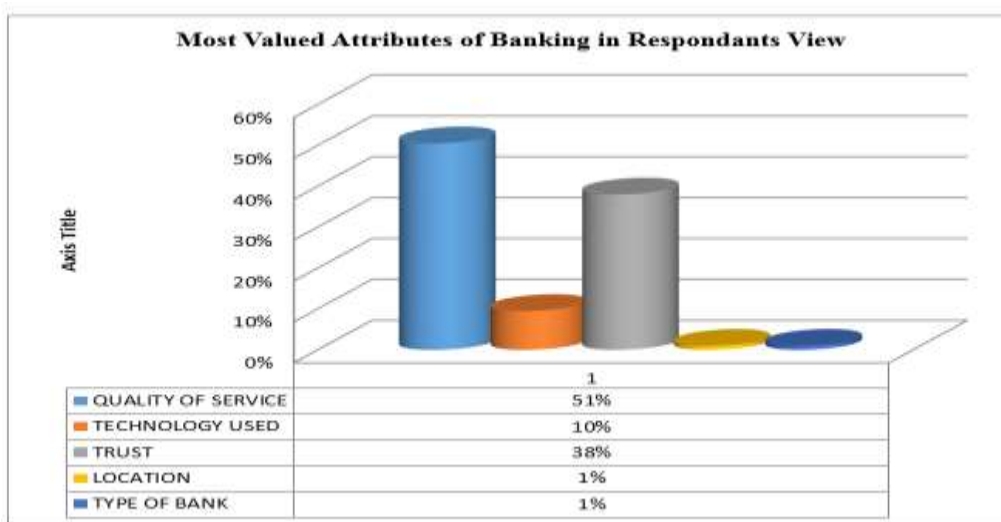


Fig. 3: The most Valued Attributes of Banking is Quality of Service Followed by Trust and Technology

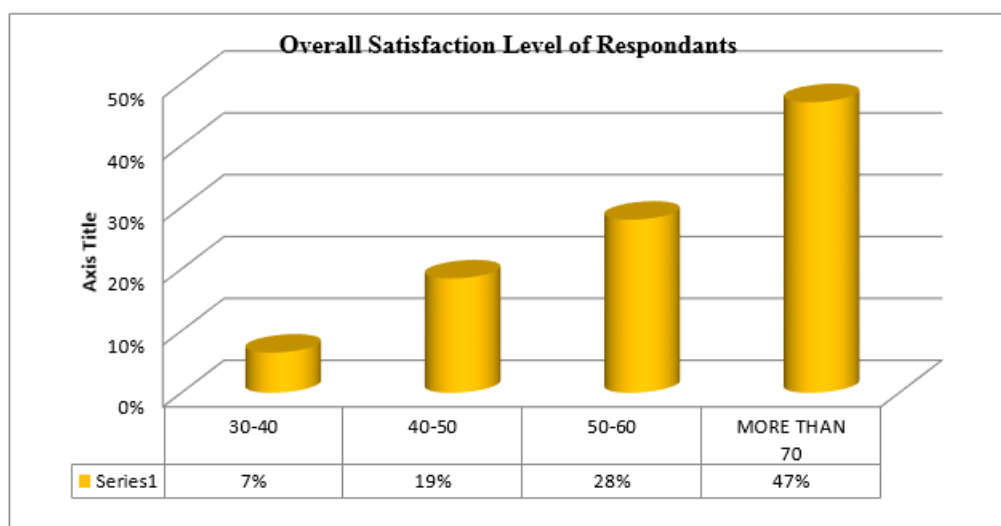


Fig. 4: 47% Respondents' Satisfaction level is more than 70%. 75% Respondents have more than 50% Satisfaction level in usage of Technology Tools for Banking Transactions

B. Data Analysis and Interpretation

Various ADCs like ATM, Internet Banking, Cards, Point Sale devices, Mobile wallets, and Kiosk are available for the customers. The pattern of usage and awareness level along with the results of the analysis are shown in Table I.

TABLE I
AWARENESS AND ADOPTION OF TECHNOLOGY TOOLS IN BANKING OPERATIONS

Degree of Acceptance	ATM (%)	Internet Banking (%)	Mobile Banking (%)	Cards (%)	Point of Sale (POS) (%)	Mobile Wallets (%)	CDM Kiosk (%)
Adopted	98	80	42	95	32	65	32
Aware but Not Adopted	2	7	19	2	14	15	17
Unaware	0	13	40	4	55	21	52

It is seen from Table I that:

ATM: 100% Respondents are aware of ATM and 98% have adopted ATM for a banking transaction.

Cards: 95% respondents are using Cards (Debit and Credit),

Internet Banking: 80% of the respondents use Internet Banking and 65% of them use Mobile Wallets (Paytm etc) for a banking transaction.

POS: More than 50% of the respondents are not aware of POS (Point of Sale) and CDM Kiosk (Cash Deposit Machine). The respondent's usage pattern of ADCs for various purposes have been captured. This gives a clear indication of the preference and convenience of digital payment usage. Details at Table II below indicates that majority of the respondents are using Technology tools for paying Consumer Bills such as Electricity, Water, Gas etc., followed by using them for Merchant Payments and Ticket Booking etc. POS tools also found to be least used by the respondents.

TABLE II
USAGE PATTERN OF VARIOUS ADCS FOR BANKING TRANSACTIONS

Types of Usage	ATM (%)	Internet Banking (%)	Cards (%)	Point of Sale (POS) (%)	Mobile Wallets (%)
Consumer Bills	52	39	42	6	36
Merchant Payments	26	18	11	21	6
Ticket Bookings	4	7	22	2	10
Share Trading	0	0	1	0	0
Shopping (Portals)	12	7	13	1	14
Not Using	7	31	12	72	35

The frequency of use of various technology tools in a month by the respondents is shown in Table III. It is seen that 69% of respondents are using ATM, 53% using Debit/Credit Cards and more than 40% are using Internet Banking and Mobile Wallets up to 5 times in a month.

TABLE III
FREQUENCY OF USAGE OF ADCS

Frequency of Usage	ATM (%)	Internet Banking (%)	Cards (%)	Mobile Wallets (%)
Up to 5 Times	69	46	53	42
5-10 Times	20	17	20	10
10-15 Times	2	5	8	9
15-25 Times	1	2	2	2
Above 25 Times	3	2	6	2
Not Using	7	30	13	38

C. CHI-Square Analysis

Three type of tests are conducted using Chi-Square Analysis:

- i. *Firstly in order to find out the motivation aspects related to use of technology tools for banking operations, the following hypothesis was tested :*

H0: Motivation for usage of ADCs for banking services **does not depend** on the various attributes inbuilt in the technology tools.

H1: Motivation for usage of ADCs for banking services **depends on the** various attributes built in the technology tools.

**TABLE IV
CHI SQUARE TEST**

Type of Statistical Tool	Observed value	Critical value	Degrees of Freedom	the p-value	alpha
Pearson's Chi Square	231.2737	36.41503	24	< 0.0001	0.05

From the above table, we conclude that motivation for people's usage of technology based ADCs in banking services depends on the various attributes in-built in the technology tools. (H1-Alternate Hypothesis is accepted)

Hence we may conclude that various attributes in technology are a factor that motivates people to use technology based ADCs in their banking transactions.

- ii. *Secondly in order to test reasons for use of technology for banking operations by the customer.*

H0: People's usage of technology based ADCs for banking services **does not depend** on the level of satisfaction derived from various attributes of technology tools.

H1: People's usage of technology based ADCs in banking services **depends** on their level of satisfaction derived from various attributes of technology tools.

**TABLE V
CHI SQUARE TEST**

Type of Statistical Tool	Observed value	Critical value	Degrees of Freedom	the p-value	alpha
Pearson's Chi Square	54.0075	31.41043	20	< 0.0001	0.05

From the above table, we say that people's usage of technology based ADCs for banking services depends on their level of satisfaction derived from various attributes of technology tools. (H1-Alternate Hypothesis is accepted)

Hence we may conclude that level of satisfaction in usage technology tools plays a key role to adopt technology based ADCs by people for banking transactions.

- iii. *Thirdly we analyze whether use technology is gender based or not?*

H0: People's preference in usage of Technology based ADCs over traditional direct banking tools does not depend on gender.

H1: People's preference in usage of Technology based ADCs over traditional direct banking tools depend on gender.

**TABLE VI
CHI SQUARE TEST**

Type of Statistical Tool	Observed value	Critical value	Degrees of Freedom	the p-value	alpha
Pearson's Chi Square	0.602635	5.991465	2	0.739843	0.05

The value of Alpha is $p > 0.05$. From the above table, we conclude that People's preference in the usage of Technology based ADCs transaction over traditional direct banking does not depend on gender. (H_0 -Null Hypothesis is accepted). Hence we may conclude that people's preference does not depend on gender.

D. ANOVA (ANALYSIS OF VARIANCE)

Technology is a driving tool to adopt ADCs by the customer for banking operations. However, due to various shortcomings especially related to security aspects and non-familiarity with the usage of the tools, lack of awareness does act as a de-motivating factor to stay away from the technology based ADCs. Despite this people are adopting ADCs for a banking transaction. To ascertain this we conduct an analysis based on the ANOVA.

H₀: There is no significant difference between means of Technology, satisfaction and de-motivating factors of technology. ($H_0: m_1 = m_2 = m_3$)

H₁: Means of Technology, satisfaction and de-motivating factors of technology are significantly different

**TABLE VII
ANOVA TEST**

Contrast	Difference	Standardized difference	Critical value	Pr > Diff	Significant
Satisfaction > De-motivation	86.333	7.017	2.597	< 0.0001	Yes
Satisfaction <> Technology	4.000	0.325	2.597	0.944	No
Technology > De-motivation	82.333	6.692	2.597	< 0.0001	Yes

From the above result, we accept Alternate Hypothesis. There is a significant difference. Here we may conclude that Technology tools with satisfaction can overcome the de-motivating factors associated with various attributes of technology. Though there are various de-motivating factors associated with technology tools, the satisfaction level associated with technology tools outweighs these de-motivating factors, thus motivating people to use technology tools for banking transactions.

E. Factor Analysis

Factor Analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called Factors. The various factors that influence a customer towards technology in banking services are analysed with the help of Factor analysis. To establish significance, we calculate the Eigen value. The Eigen value is a measure of how much of the **variance** of the observed variables a **Factor** explains. Any **Factor** with an Eigen value ≥ 1 explains more **variance** than a single observed variable.

A total 19 Factors which influence a customer towards technology are examined. Four Factors such as Fast operation, No time limit, convenience and Ease of use has been observed to have Eigen value greater than 1. According to the Kaiser criterion (Kaiser, 1960), you would retain Factors with an Eigen value greater than 1. Based on the Eigen values in the *Eigen values* spreadsheet shown below, we choose four Factors that are significant based on the higher variability than the remaining Factors towards utilization of technology for banking services.

TABLE VIII
FACTORS INFLUENCING CUSTOMER TOWARDS TECHNOLOGY

Total Variance Explained									
Factors	Initial Eigen Values			Extraction of sum of squared Loadings			Rotation of sum of squared Loadings		
	E.V	Var. (%)	Cum. (%)	Total	Var. (%)	Cum. (%)	Total	Var. (%)	Cum. (%)
F1	6.412	33.747	33.747	6.412	33.747	33.747	4.737	24.932	24.932
F2	3.685	19.393	53.140	3.685	19.393	53.140	3.979	20.942	45.874
F3	1.997	10.511	63.652	1.997	10.511	63.652	2.568	13.516	59.389
F4	1.070	5.631	69.283	1.070	5.631	69.283	1.856	9.894	69.283
F5	0.838	4.410	73.693						
F6	0.783	4.122	77.816						
F7	0.682	3.590	81.406						
F8	0.611	3.217	84.623						
F9	0.548	2.887	87.510						
F10	0.497	2.616	90.126						
F11	0.390	2.053	92.180						
F12	0.316	1.663	93.843						
F13	0.260	1.370	95.213						
F14	0.230	1.209	96.422						
F15	0.222	1.168	97.590						
F16	0.178	0.937	98.527						
F17	0.139	0.733	99.260						
F18	0.087	0.460	99.720						
F19	0.053	0.280	100.000						

#Legend: E.V = Eigen Values, Var. = Variability, Cum. = Cumulative,

In Table VIII, Factors F1 to F4 represents **Faster, No time limit, Convenience, and Ease of use**. They are showing much variability (69.283%) than remaining Factors towards utilization of technology for banking services. Remaining other factors are effective up to (30.717%) which are insignificant as compared to above four significant Factors.

IV. MAJOR FINDINGS

Major findings of the empirical study carried out in this research are summarized below:

- i. A total 200 respondents participated in the survey. Out of which 115 are Male and 85 are Female
- ii. Major age group in the survey lies between 26-35 which represent 39% of the total respondents
- iii. In respondent's opinion, Public sector banks are technically more advanced.
- iv. Most of the respondents (88%) are operating Savings account as their primary bank account.
- v. 52% of respondents opined that Technology is an essential tool in the banking transactions.
- vi. Majority of the respondents (51) feel that Quality of Service is the most valued attribute of Banking. Surprisingly, Trust (38) and type of Technology Used (10) falls into second and third place respectively.
- vii. 67% of respondents are using technology tools for banking transactions since more than three years
- viii. Majority of the respondents (63%) are familiar with usage of technology for banking transactions
- ix. Respondents (80%) are very much familiar with usage of technology for banking transactions
- x. 84% of respondents agree that various attributes of technology are motivating them to adopt ADCs for banking transactions
- xi. Majority of the respondents use only few technology tools such as ATM (98%), Internet Banking (80%), Cards (95%), Mobile Wallets (65%), CDM Kiosk (32%) etc., for banking transactions. Some of the technology tools available for banking transactions are not known to respondents.

- xii. 20% of the respondents use technology tools for paying consumer bills, 21% for Merchant Payments, Ticket Bookings and E-Shopping. It is surprising that, though many of respondents did not adopt and also not aware of various technology tools in existence. Also, 59% of technology tools are not being used by them.
- xiii. 88% of respondents are highly satisfied with the quality of Service offered by the banks due to the introduction of Technology tools.
- xiv. Majority of respondents are frequently facing problems with ATM Services.
- xv. 85% of respondents are highly satisfied with various quality dimensions of Technology tools viz. (Tangibility, Reliability, Efficiency, Accuracy, Security & Convenience of Banking)
- xvi. Satisfaction level of 150 Respondents is more than 50%
- xvii. 63% of respondents are preferring Technology based banking operations over conventional direct banking. 17% are preferring direct banking and 20 % could not decide which is convenient for them.
- xviii. 69% of respondents opined that contribution of technology towards the success of banking operations is high, where as 33 % feel Average and Below Average.
- xix. Though 63% of respondents prefer Technology based banking operations, the majority of them suggested improving various attributes of Technology viz. Security Aspects, Privacy of Customer Information, High transaction charges etc., Some of the suggestions that emerged for achieving this are as follows:
 - a. Conduct awareness programs on technology based transactions and its benefits.
 - b. All Service charges must be avoided in order to encourage the Technology Based Transactions
 - c. Instructions for usage of Technology must be user friendly and made available in Local languages also.
 - d. Awareness of technology tools must be spread across to the villages and remote areas to facilitate usage by farmers and the common man.
 - e. Respondents expressed Security as the major concern in the usage of technology tools. In order to improve security latest techniques including bio metric authentication could be introduced.
- xx. Usage of technology tools in banking services depends on various motivation factors and satisfaction level associated with technology tools.
- xxi. People's preference for Technology based transaction over direct banking does not depend on gender.
- xxii. Though there are various de-motivating factors associated with technology tools, the satisfaction level associated with technology tools is far too high to motivate people to use technology tools for banking transactions.

V. CONCLUSION

This study meets the desired objective, but it suffers from one limitation. The study concludes that majority of Customers are accepting online banking because of many favourable factors. The analysis concluded that **Faster, No time limit, Convenience and Ease of use** of technology for banking and risks related to it are the main perusing factors to accept online banking system. These factors have a strong and positive effect on customers to accept ADCs for the banking system. In closing, we note that one cannot generalize the findings of this research as they are based on a convenience sample. Additional research with a more representative sample of the ADC users in India must be undertaken before the findings can be generalized to the population of users of technology for banking operations. The result of this study indicates that perceived usefulness.

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