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Study of Fintech and its impact on Financial performance of Banks (A Case of Selected Indian Banks from 2010 to 2021)

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Abstract: The fintech industry is expected to grow exponentially in India in the coming decade. The Research paper is conceptual and attempts to explain the concept & its application in India. It focuses on the basic types of financial technologies & their functions, opportunities & challenges of regulations of fintech in India. The paper focuses on the application of Fintech in Electronic Banking. With the rapid pace of innovation, Indian banks' traditional revenue streams have dramatically altered the banking environment. To survive in a competitive environment, banks have invested in fintech. The research attempts to investigate the impact of income stream diversification and the rising share of Fintech-based income in non-interest income on the profitability of Indian Public Sector Banks. The research paper focuses on five public sector banks from 2010 to 2021. Return on asset is the dependent variable, while Technology-based non-Interest income and control variables like bank size, loans, capital adequacy, net interest margin, and RNPAare independent variables. According to this study, non-interest income has a positive and significant relationship with bank profitability. This study also provides some suggestions for promoting financial technology in India.

Keywords: Income Streams, FINTECH, Non- Interest Income, Public sector banks, ROA, RNA
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Introduction:

Globalization and financial liberalization have extended banking operations, resulting in a wide range of products and services (Raluca, 2012). The focus of financial services has moved from traditional operations toward atypical activities (Lozano-Vivas & Pasiouras, 2010). Commercial banks primarily generate net interest income from two sources: collecting deposits on which interest is paid and issuing loans for which they receive interest (Craigwell & Maxwell, 2005). However, commercial banks have extended beyond their formal purpose and sources of income to include a broader range of non-interest-generating operations (Sherene & Tapper, 2010). Non-interest income is revenue derived from fees and other activities outside the core activity of lending. Non-core activities include underwriting commission, consultancy fees, wealth management fees, monthly account service charges, deposit, and digital transaction fees, annual fees, profit and loss on revaluation of assets, insufficient funds fees, inactivity fees, check and deposit slip fees, ATM fees, Internet banking fees, etc.

According to Robert DeYoung and Tara Rice (2004), non-interest revenue makes up more than 40% of bank operating income. The empirical evidence shows the correlations between non-interest income, company strategies, market environment, technological development, and profitability. Non-interest income mix has also altered dramatically in recent years (Feldman & Schmidt, 1999). Fee income has become the backbone of non-interest income for banks, replacing the old mainstays of service charges and trust income (Hoang, 2014).

The popularity of electronic banking is increasing at a significant level in the world. Fintech aims to increase customer satisfaction by improving the comfort level of banking operations.The financial environment in India is currently being remodeled by Fintech firms. The EY Fintech Adoption Index report (2017) revealed that India is in the second post position after China for adopting

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Fintech services. The adoption rate is the second highest in over 20 markets globally1. The factors contributing to the growth of Fintech services are mobile wallets, the Unified Payment Interface (UPI) platform, etc. Indian consumers have embraced mobile payments to make their day-to-day transactions. Consumers are making inter-bank comparisons while shopping.

For some years, Indian banks have concentrated on non-interest income streams to supplement their usual interest-earning activities. Private and Foreign banks are shifting toward innovation adoption and new revenue streams. The influence of the shift to new revenue streams and the resulting increased diversification on the Indian banks' performance (as evaluated by profitability and income stability) is examined in this research paper.

Review of Literature

New financial technologies (Fintech) have emerged around the world. Consequently, there has been a considerable increase in the academic literature on Fintech over the last five years. Research is scantily connected with no coherent research agenda. Significant research gaps and important questions remain. A lot of work is needed before this area becomes an established academic discipline. Hidayat et al. (2012) analyzed the nexus between products Trivedi (2015) studied the impact of banking innovations diversity and bank risk in Indonesian banks. The study revealed that product diversification reduces risk (increases stability) for small banks but increases the risk (decreases stability) for large banks and the new income streams on banks' performance. The research revealed that while diversification and an increase in the fee-based and non-interest revenue in total income boost profitability, it affects risk-adjusted performance. The findings suggest that diversification has positive impact on profitability but is risky. The result is consistent with many studies in the US, Europe, Australia, and India. Kumar et al. (2019) explored the impact of revenue diversification on profitability and industry sustainability in the context of the recent financial crisis. The researchers documented that diversifying technology based on non-interest income sources can increase overall profitability and risk-adjusted performance while improving banking system stability.

Arora and Panchal (2019) described the meaning, Features, and Applications of Financial Technology (FinTech). The research revealed that India is adopting FinTech at a faster rate. The adoption index of FinTech in 2017 India was 54%. It increased to 87% in 2019. This study concluded that the application of Fintech is highest in digital payment. The government should encourage Fin Tech companies to be innovative and promote start-ups. Allen et., al (2020) explained that FinTech, particularly the blockchain, has the potential to be disruptive to financial systems and intermediation. This paper considers only non-interest incomes generated using technology-based products like internet banking, mobile banking, ATM, and credit card fees.

Objective of the study

- To discuss the opportunities and challenges of FinTech in Banking sector
- To examine the relationship between technology based Non-Interest income and profitability of Indian Public sector banks.
- To study the impact of income diversification and rising share of technology based income in Non-Interest Income on Profitability of Public sector banks in India.

Research Hypothesis:

- $H_0$1: There is no significant relationship exists between technology based Non-Interest income and Profitability of Indian Commercial banks.
- $H_0$2 There is no impact of income diversification and rising share of Technology based income in Non-Interest Income on Profitability of Public sector banks in India.

Research Methodology:

This research paper is conceptual. The research is based on information collected from secondary data and interviews of eminent people in digital finance/e-financial services. Information & data related to Financial Technology (Fintech) is collected/compiled from various banking reports. The annual report of individual banks, moneycontrol.com, RBI Database,

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State level bankers committee, Report on Trends and Progress of Banking in India, Statistical tables relating to banks in India, financial Stability Reports, etc. have been used. The study also uses information/data from different newspapers, online print media, live news channels, and various published reports/research reports of financial institutions & their websites for detailed study.

In this study selected Indian public sector banks are studied from 2010 to 2021. The impact of Fintech-based income / Technology-based income and controlled variables like bank size, loan, Capital adequacy ratio, NIM, and RNPA is studied on Return on Asset.

Diversification Score of Stiroh and Rumble (2006)

$$DIV(1) = 1 - (SH_{NON}{}^2 + SH_{IN}^2)$$
$$DIV(2) = 1 - (SH_{FOT}{}^2 + SH_{OT}^2),$$

where, SHIN = Share on interest income in total income, SHNON = Share of non-interest income or other income in total income, SHFOT = Share of 'fee-income' in non-interest/other income, SHOT = Share of 'other components in non-interest/ other income. SPSS V-20 and E-views 11 have been used for data analysis purpose.

Modelling

The study is based on panel data analysis containing the same cross-sectional units (firms) during the same period (Wooldridge, 2009). Panel data combines time series and cross-sectional data.Panel data analysis asumes heterogeneity among the cross-sectional groupings in the data set. Fixed effects and random effects models have been used in the study.

The "fixed effect" model is applied on the data when the "individual effect" is assumed to have the same slopes and constant variance across individuals (group and entity). The random effects model treats both cross-sectional units and variation within cross-sectional units.This method assumes that individual effect (heterogeneity) is unrelated to any regressor and then calculates error variance for individual groups (or times).

$$ROA_{it} = \beta_{0i} + \beta_1 NII + \beta_2 Bank\ Size + \beta_3 Loans_{it} + \beta_4 Capital\ adequacy + \beta_5 NIM_{it} + \beta_6 RNPA_i + \beta_7 NIIit + \mu it \ldots\ldots\ldots\ldots Eq–1$$

$$ROA_{it} = \beta_{0i} + \beta_1 DIV(1) + \beta_2 DIV(2) + \beta_3 Bank\ Size + \beta_4 Loans_{it} + \beta_5\ Capital\ adequacy + \beta_6 NIM_{it} + \beta_7 RNPA_{it} + \beta_8 NII_{it} + \mu it\ Eq - 1 \ldots\ldots\ldots\ldots Eq2$$

β0i = Intercept of firm i

μit = Error Term of firm i at time tor between firms error

εit = within the firms error

The Hausmantest has been applied to judge whether to select a fixed effect model or a random effect model.

Diagnostic Test is applied

The study uses some diagnostic tests. Levin–Lin–Chu (LLC) test is a unit root test used to check the stationarity of the data and avoids spurious correlation to ensure the validity of the regression. Panel data analysis consisting of the random and fixed effects models was used to analyze the data. The multicollinearity of the data is explored by using the VIF test. VIF measures the strength of the correlation between the independent variables in regression analysis.CUSUM Test Cusum tests assess the stability of coefficients in a multiple linear regression model of the form.

Empirical analysis:

Fintech services are said to influence perceived usefulness (PU), Perceived ease of use (PEU), Trust (TRU), and Social influence (SI). Consequently, these variables are considered independent variables in the study. The analysis is divided into two stages. In the first stage, the exploratory factor analysis (EFA) is conducted through principal component analysis (PCA) using the Varimax rotation method. It assesses the factor structure of the scale. Cronbach's alpha coefficients are calculated to determine the scale reliability. The second stage estimates the ordinal logistic regression. Before conducting regression analysis, the researcher conducted Cronbach's Alpha test and exploratory factor analysis (EFA) to determine the appropriate factors to put into the research model.

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Table: 1 Reliability Analysis

Variable	Explanation	Factor loading	Cronbach's Alpha
Perceived Usefulness (PU)	Fintech service can meet the needs of customers.	.722	.667
	Customers save a lot of time when using fintech services.	.714	
	Using fintech services increases customer work efficiency	.706	
	Customers can access many utilities attached when using fintech service.	.689	
Perceived Ease of Use (PEU)	The operations performed in fintech service are quite simple for customers.	.816	.679
	Instructions on the fintech service system are clear and easy to understand.	.789	
	Customers can interact with fintech service system everywhere.	.736	
Customer Trust (TRU)	Fintech service has good information security ability.	.808	.702
	Fintech service is provided by reputable units only.	.807	
	Customers feel confident when using fintech services	.760	
Social Influence (SI)	Neighbors (such as relatives, friends, colleagues...) often use fintech services	.857	.697
	Customer's work/study environment supports fintech services.	.815	
	Fintech service is in line with the development trend of society	.700	
Intention touse	If not used, customers intend to use fintech service soon	.795	

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Table 1 depicts the Exploratory Factor Analysis. The Factor analysis shows 16 items representing five original components subjected to principal component analysis using varimax rotation. Before conducting the factor analysis, the Kaiser- Meyer – Olkin (KMO) value was confirmed, as 0.653, thus surpassing the threshold value of 0.60(Rice, 1974). Bartlett's Test of Sphericity (Bartlett, 1954) revealed significant (P=.000) for the factor. Perceived Usefulness (PU) showed an eigenvalue of 15.23 and explained 100 percent of the variance. Perceived Ease of Use (PEU) exhibited an eigenvalue of 17.11 and explicated 100 percent of the variance. Customer Trust (TRU) showed an eigenvalue of 16.96 and explained 100 percent of the variance, Social Influence (SI) exhibited an eigenvalue of 13.69 and explicated 100 percent of the variance, Intention to use Fintech Service (INT) showed an eigenvalue of 18.45 and explained 100 percent of the variance.

Scale Reliability: The reliability analysis of 16 items and five components is tested to verify how strongly the attributes are associated with each other (Hair et al., 2010). The reliability values are delineated in (Table 3).the internal consistency of six components of the foundto be significant, representing Cronbach's alpha values:
±=.667 (PU), ±=.679 (PEU), ±=.702 (TRU), ±=.697 (SI), ±=.695 (INT).

Table 2 depicts the descriptive analysis of the variables used in the study. The mean and standard deviation of the variables is depicted in the table. It also shows the minimum and maximum values of the variables, which aid in understanding the variable.

Table 2: Descriptive Statistics

	ROA	NII	Bank Size	Loan	CRAR	NIM	RNPA	DIVS-1	DIV S-2
Mean	6.486	1236994	4.632	5.592	0.186	10.34	5.1444	4.6671	9.480
Median	5.790	8945457	4.667174	4.9519	0.122	0.0142	3.9156	5.1444	5.192
Maximum	21.6	50370079	5.144417	27.852	0.906	3.358	0.363	3.9156	0.138
Minimum	- 9.48	27994.0	3.915696	- 23.44	0	0.2699	- 0.497	0.3631	5.03
Std. Dev.	5.191	13202444	0.363173	10.349	0.2105	0.8737	2.26027	- 0.497	8.8118
Skewness	0.1382	1.07787	-0.497586	- 0.014	1.3319	279.58	3.20325	- 0.014	894545
Kurtosis	5.0378	3.35206	2.260275	3.3588	4.4244	0.138	0.20156	3.3588	50370079
Jarque- Bera	8.8114	9.94006	3.203253	0.2699	19.011	5.037	894545	0.2699	27994.0
Probability	0.0122	0.00694	0.201568	0.8737	0.001	8.811	50370079	0.8737	13202444
Sum	324.30	6.18E+08	231.6170	279.58	9.3069	0.012	27994.0	279.58	1.07787
Sum Sq. Dev.	1320.659	8.54E+15	6.462850	5248.8	2.1725	324.3	13202444	3.35886	3.35206
Observ.	50	50	50	50	50	50	50	50	50

Source: E-views ouput

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Table 2.A: Test Results of the Stationarity of the Panel Data

Levin– Lin– Chu (LLC) test	ROA	NII	Bank_SIZE	Loan	CRAR	NM	RNPA	DIV S-1	DIV S-2
Test Statistis	9.411	3.7774	0.38227	4.265	4.794	8.564	9.547	1.256	4.445
P- Value	0	0.0001	0.0003		0	0.012	0.011	0.000	0.002

Source: E-views ouput

The stationarity test is a test of finding the unit root in a data set. Here Levin–Lin–Chu (LLC) test has been used to check the stationarity of the data. The test is based on the null hypothesis of the presence of a unit root in the data set. The above table shows the p-value for all the variables is < 5%. The result rejects the Null hypotheis ,meaning that there is no unit root in our dataset and there is stationarity in the data.

Table 3: Multicollinearity Test

Variable	ROA	NII	Bank Size	Loan	CRAR	NIM	RNPA	DIV S- 1	DIV S- 2
VIF	0	1.138	1.135	12.082	4.564	15.235	2.366	8.5645	7.5648

Source: E-views ouput

Before running the panel data models, It is critical to study the correlation between the independent variables to ensure that multicollinearity isn't an issue. Except for Loan and NIM, all of the variables' VIFs are below 10, as shown in this table. As a result, these two variables are not included in the study.

CUSUM TEST:

The estimated coefficients are said to be stable if the plot of the CUSUM statistic remain within the 5% significance target level. The test depicts that our model is stable because the plots of the CUSUM statistic marginally cross the critical value lines and are within the two red lines. The dataset here is absolutely stable.

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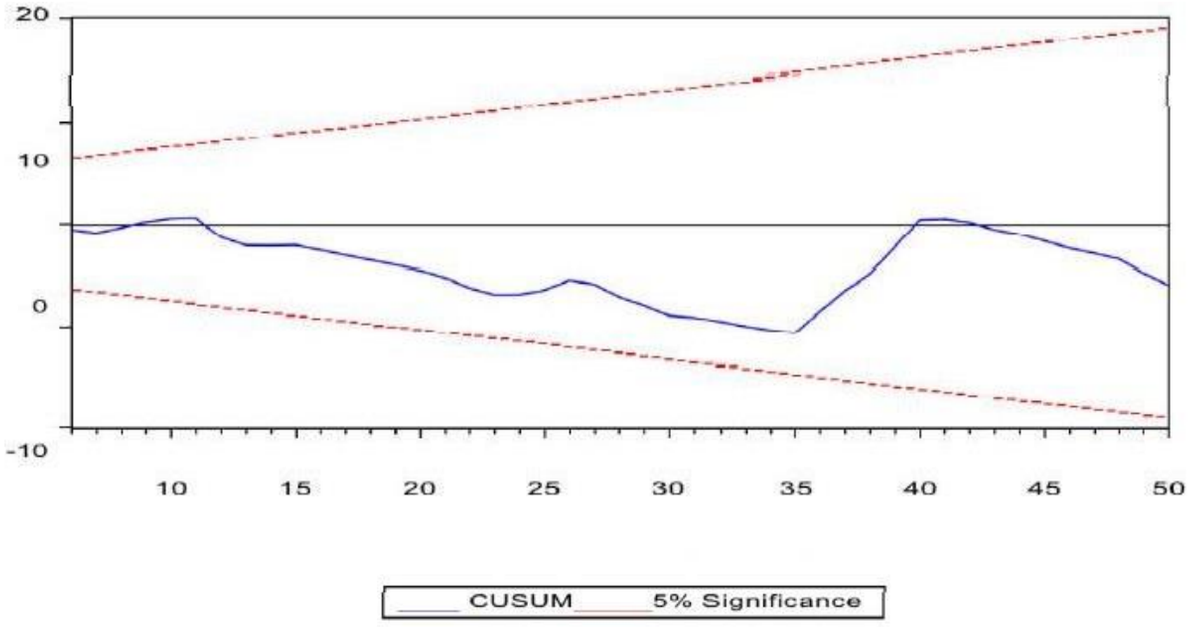

Table 4: Result of fixed effect model .:

Sample:	2014 -2018			
Periods included:	5			
Cross-sections included:	10			
Total panel (balanced) observ.	50			
Variable	Coff.	S.Error	T-statistic	Prob
NII	8.657	6.33E-08	-1.412791	0.0146
BANK_SIZE	3.352870	2.756855	-1.216194	0.2303
CRAR	0.0545	0.031323	1.742605	0.0882
RNPA	10.896	3.103569	-3.510816	0.0010
DIV S--1	5.655	9.354888	4.547888	0.0012

Source: E-Views output

To select which model will be more appropriate, Hausman test is performed and the result is depicted below.

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Table 6 : Result of Hausman Test

DIV S-2	-24.84659	12.82071	1.938004	0.0589
Effects Specification				
			S.D.	Rho
Cross-section random			4.067503	0.8118
Idiosyncraticrandom			1.958151	0.1882
Weighted Statistics				
R-squared	0.868670	Mean dependent var		1.365122
Adjusted R-squared	0.703663	S.D. dependent var		2.256151
S.E. of regression	2.013338	Sum squared resid		182.4088
F-statistic	4.132928	Durbin-Watson stat		1.775288
Prob(F-statistic)	0.006172			
Unweighted Statistics				
R-squared	0.270552	Mean dependent var		6.486000
Sum squared resid	963.3519	Durbin-Watson stat		0.658820
Total panel (balanced) observations: 50				

Table 5: Result of Random effect model .:

Variable	Coefficient	Std.Error	t-Statistic	Prob.
NII	9.93E-08	7.87E-08	-1.261675	0.0152
BANK_SIZE	-9.281686	4.202931	-2.208384	0.0337
CRAR	0.065538	0.032605	2.010072	0.0520
RNPA	-11.21984	3.554798	-3.156252	0.0032
DIV S--1	8.568778	2.254888	7.456999	0.0012
DIV S-2	-5.5458	5.256444	5.654777	0.0001
C	52.43231	19.47321	2.692535	0.0107
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.895479	Mean dependent var		6.486000
Adjusted R-squared	0.857735	S.D. dependent var		5.191552
S.E. of regression	1.958151	Akaike info criterion		4.413374
Sum squared resid	138.0368	Schwarz criterion		4.948741
Log likelihood	-96.33436	Hannan-Quinn criter.		4.617245
F-statistic	23.72522	Durbin-Watson stat		2.255598
Prob(F-statistic)	0.000000			

Source: E-Views output

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Since the ch is qu are value is 6.57 and the probability value is 0.16 which is more than 5%. So the H0 will be accepted meaning that the Random effects model will the appropriate model. The result that we found from the Random effects model is that;

ROA = 8.65 TBNII + 3.35* BANK SIZE + 0.054583* CRAR + 10.89606 *RNPA+ 5.65DIV S-1

+ – 24.84 DIV S-2 + μit

R2 of 0.86 indicates that the six independent variables can explain 86 percent of the variation in ROA. The model has statistically significant explanatory power, with an F-statistic of 4.13 and a Sig. (F-Statistic) value of0.006.When the values of all independent variables are equal to 0, the ratio of total profit has an intercept value of 24.84659.

Thus we can conclude that Fintech has shown its presence in different Indian financial services segments. Fintech is reshaping the financial sector. It enables the company to deliver various financial products and services with innovative, advanced technology. There are approximately 1500 Fintech startup firms operating in India. Digital Payment in India leads the Fintech sector, however the application of fintech can be seen in other sectors. Technological Innovation can transform the traditional financial system by making it centralized, effective, Easy, and advanced. FinTech is crucial for the future of the financial sector, as inclusive finance is strongly national economic growth. The econometric based findings are:

- Technology based Non-Interest Income has a positive and significant association with Indian Public Sector Bank Profitability.
- Diversification has a favorable and considerable impact on total revenue and the increasing share of Technology based income in total income.
- Technology based Non-interest income diversification has a negative link with bank profit.
- Fee-based income is rapidly becoming the most important source of non-interest income, both overall and within Non-interest Income.
- Well-managed banks may be able to rely on non-interest income while maintaining profit stability.

The study examines how new financial technologies, business lines, and income sources affect bank profitability. Our findings show that diversification of total income and 'non-interest' income has a positive and significant impact on profitability. As a result, banks may rely on the NII as a key source of income in addition to interest income. The Public sector banks select stable technology sources of fee-based income for the future to maintain their stability in earnings. Government must foster banks to innovate and utilize new and latest financial technologies in their income streams for their financial sustainability.

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