The impact of Financial Digitalization on State Bank of India

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ABSTRACT

Indian Financial Industry is rapidly transitioning from traditional financial services to the digital financial services. This digital revolution is challenging the traditional business model of financial services providers, in particulars to the banks. The digitalization of banking and financial services had changed the face of traditional banking activities. Customers no longer need to visit the banks physically; they can now access the majority of banking services such as money transfer, balance enquiry, bill payment, and account statement online. Technological innovation and IT-based improvement proved the important drivers to the expansion of digitalization in the banking industry. The adoption of digitalization will attract huge investment and bring growth for the banks and countries. It can be seen that digitalization contributes to increased customer satisfaction, better products, better financial services, lower transaction costs, more profitability, positive perception, and higher bank share prices. In India, there are 27 Public Sector Banks, of which the SBI is the second largest public bank of India and ranked 7th among all Indian Banks (Top 10 Largest Banks in India 2021). The main aim of this paper is to analyze the relationship between IT investment and performance of SBI. Through Bag of Words method total 25 words were classified and relationship between these words and financial of SBI were measured. The higher the company is concerned about digitalization, the higher the impact can be observed on the revenue, advances, deposits, reverence and number of customers. On the other hand, the RoA, RoE and number of employees were observed less effected due to digitalization.

Keywords: *Digitalization; Information Technology; Banking; Text as data; Financial Performance.*

1.0 Introduction

Indian Financial Industry is rapidly transitioning from traditional financial services to the digital financial services. This digital revolution is challenging the traditional business model of financial services providers, in particulars to the banks. The core function of banks is to raise the deposits from the customer and used it as lending money. In India, Reserve Bank of India is regulating Indian Banking sector (Impact of Technology on Banking Sector - Inventive, n.d.). The major types of banks in India are scheduled public sector bank, scheduled private sector bank, scheduled small finance banks, payment banks, regional rural banks, and foreign banks (Reserve Bank of India - Database, n.d.). Currently, these financial institutions compete not only with one another, but also with consumer brands like Amazon, Facebook, and Google (Impact of Technology, n.d.).

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In 1988, Dr. C. Rangrajan advocated for financial services computerization and digitalization. Digitalization improves client interaction and customer relationship management (CRM) while decreasing the likelihood of human error (Harchekar, 2018). The rapid adoption of IT and ITES services has contributed significantly to the advancement of the Indian banking sector to world-class level. In 1992, the Indian government had opened the economy for the foreign investment which plays vital role in computerization of banking system. The digitalization of banking and financial services had changed the face of traditional banking activities. Customers no longer need to visit the banks physically; they can now access the majority of banking services such as money transfer, balance enquiry, bill payment, and account statement online. Technological innovation and IT-based improvement proved the important drivers to the expansion of digitalization in the banking industry. The millennial generation's increased use of smart phones has led in distinct buying patterns, payment habits, and attitudes toward financial products and services. Today, the customers required quick, reliable, and cheap financial services which is possible because of the Artificial Intelligence (AI) and Machine Learning (ML). Customers' financial transactions have altered as banking services have evolved. Improved financial services contribute in development of society, industries, foreign trade, and the economy.

In 2020, half of all millennial shopped online for a deposit account and over 50 percent of consumers now interact with their bank through mobile apps or websites at least once a week—compared to just 32 percent two years ago(*Tech Spend of Banks*, n.d.). The financial inclusion campaign of developing nations added 69% young population worldwide to access banking services(*Fin Inclu*, n.d.). According to Forbes the banks are required to accommodate the upcoming technologies like Digital account opening, Application programming interfaces (APIs), Video collaboration, P2P payments and Cloud computing(Shevlin, n.d.). The adoption of digitalization will attract huge investment and bring growth for the banks and countries. It can be seen that digitalization contributes to increased customer satisfaction, better products, better financial services, lower transaction costs, more profitability, positive perception, and higher bank share prices. However, banks have not been candid about the profits they have made as a result of the digitalization of their products and services (Andonova et al., 2016).

Digitalization and technology advancements have the potential to make Indian banks more competitive. Thus, the Indian banking sector is significantly investing in IT which will change the face of Indian Banking sector. In India, there are 27 Public Sector Banks, of which 21 are Nationalized Banks and 6 belong to the State Bank Group. In addition, 45 Foreign Private Sector Banks. From the public sector bank, the SBI is the second largest public bank of India and ranked 7th among all Indian Banks (Top 10 Largest Banks in India 2021). During the reform period from 1992-99, the State Bank group were observed more efficient than the competitors (Shanmugam & Das, 2004). According to the annual report of the financial year 2020-21 SBI is having 45.92 cr customers, 22,219 branches, 13.19% market share in POS machines, 19.77% market share in Advances, 23.29% market share in Deposits, 29.23% market share in Debit card spending, 16.23 Cr financial inclusion accounts, 62,617 ATMs, 41 lakh home loan customers, Agriculture Business to 1.37 Cr farmers, owning 20 Non-Banking subsidiaries, having presence in more than 31 countries with 229 points, second largest bank with credit card issue in 2020, 88% digital transactions during Covid, leader in Individual mortgage loan with 34% market share, home loan of Rs. 5 Lakh Cr, market leader in providing education loan with 29% market share, market share of 34% in country's total ATM transactions, market leader in highest NPS accounts with 22% market share, market leader with highest transactions with the Government, Highest Agri Business of Rs. 2,13,000 Cr., highest SHG covering 75 Lakh women through YONO Krishi, 37.09 million users of YONO app which included personal loan of Rs, 21,268 cr, Agri Loan of 45,701 Cr and Letter of credit of Rs. 3562 Cr YONO Business. The adoption and application of IT generate good business for the SBI and other banks. The

main aim of this paper is to analyze whether and to what extent one of the main factors of digitalization, i.e., investment in information technology (IT) affects the financials of State Bank of India (SBI).

2.0 Review of Literature

The financial services business, particularly banking services, is undergoing a technological revolution. The digital services bring about significant changes in the country (Niemand et al., 2021). The influence of digitalization on the financial services sector was researched by Ekinci (2021). The data of 26 Turkish commercial banks was studied using a truncated regression model, and it was concluded that digitization has a positive impact on financial performance. (Wadesango & Magaya, 2020) had studied the relationship between the digital banking services and its impact on financial performance of Commercial Banks in Zimbabwe. It was concluded that because of digital banking the online deposits, fees commissions, and banks transactions were increased which resulted into increased in ROA and total assets ratio. In contrast to that, Andonova (2016) had found that there is negative relationship between the banks' investment on IT-Software and profitability. They analyzed the relationship between investment in IT and profitability. The financial ratios from 2012 to 2015 were considered for the analysis purpose and concluded that the profitability of Macedonian banking sector is negatively related to the investments in IT and Software.

Payments and receipts in banks are not the only applications of IT. IT allows for services such as credit card payments, balance checks, ATM transactions, fund transfers, shopping, ticket booking, FX transactions, mobile banking, and phone banking, among others. (Dangolani, 2011) looked into the impact of technology on the financial industry. Bank clients and bank employees were polled for their opinions. It was concluded that IT could help with cost-cutting, expense-cutting, time-saving, and employee visibility. As a result, IT has become critical to banking efficiency. Customers are increasingly tried to avoid going to banks for the majority of their everyday banking transactions. Human relationship banking, on the other hand, is as vital. Banks with good customer relationships can better understand their clients' needs and offer innovative products and services, which can lead to higher business (Jakšič&Marinč, 2019). Banks have begun to collaborate with Fintech companies in order to strengthen their core competitiveness and expand market share through new customer acquisitions. The biggest challenge, though, is getting clients to adopt new financial technology. (Hu et al., 2019) used the Technology Acceptability Model to investigate the elements that influence technology acceptance (TAM). According to the 387 responses, the customers' attitudes regarding the adoption of Fintech services were influenced by the popularity of the internet, intelligent terminal equipment, perceived risk, privacy, and usefulness, perceived ease of use, user innovativeness, brand image, and government support. IT is advantageous, but its advancement necessitates the development of ICT infrastructure such as telephone, mobile phone, internet access, and broadband availability. (Bahrini&Qaffas, 2019) investigated the influence of ICT on economic growth in 45 developing nations in the Middle East and North Africa region, as well as Sub-Saharan Africa, from 2007 to 2016. The two-step panel GMM growth model was used, and it was determined that other information and communication technologies, such as mobile phones, Internet usage, and broadband adoption, were the primary drivers of economic growth in selected developing nations from 2007 to 2016.

Doubtlessly there are many advantages to adopt IT and digitalization in banking and financial markets but there is little evidence where the relationship between IT investment and profitability is measured. The relationship between digitalization and performance of cooperative banking studied by (Agboola et al., 2019). Based on 80 responses and financial data it was concluded that the digitalization can increase efficiency in terms of better services and products. The customers were

more satisfied, the sales-force were able to increase sales and positive relationship between digital investment and profitability of the banks. The IT spending impact positively on the growth of the company in the year of investment and first year while there was negative impact of IT spending observed in the year of investment and first year of investment (Lee et al., 2016).

While there is a big dilemma, do IT investments improve profitability? Because IT infrastructure improve the operating efficiency of firms it becomes difficult to compare the effect of IT on profitability like impact of marketing, advertising, research, and development (Mithas et al., 2012). The IT investment leads outflow of money which impact negatively in the year of investment but it leads to reduction in the costs, increase in efficiency, and increased in the profitability. In the manufacturing units the impact could be measured in terms of reduction in cost and increase in production while in service sector it needs complex procedure to measure the impact of IT investment on companies' profitability. In India, after 1991 major banks had modernized their services. They started to offer ATMs, Internet Banking, Passbook printing machines, NEFT, RTGS, debit card, credit card, phone banking, mobile banking and many more (Gupta et al., 2018). The earlier research was failed to establish relationship between IT investment and profitability because of unavailability of internet connectivity and lack of infrastructure in rural area. But in current scenario banks are doing great due to great Indian IT infrastructure. The IT oriented banks are reaching to rural customers and able to offered services at lower rates compared to traditional banks. The FinTech had offered great benefits to the big size Indian banks like SBI, PNB, ICICI, HDFC, Kotak Bank and others. These banks have the big client base and huge network. The IT investments make them prosper in tough economic conditions.

Based on the review of previous research papers, the positive and negative correlations observed between IT investment and performance of the Banks. The most of the studies are in the context of developing and developed countries but very few research work have been done in Indian context in recent years. Indian Banking sector is promising sector which contribute in economic growth. Annually the Indian banking is spending around INR 200-400 Cr which is expected to grow INR 800-1000 Cr. Only SBI is planning to invest INR 3500 Cr in coming 5 years (ANI, 2018). Gradually banks make the big investment in business development and IT. The impact of this investment can observe gradually in coming years. Thus, the paper studies the relationship between IT investment and performance of SBI.

3.0 Methodology

The IT investment needs huge capital investments which reduce cash balance, increase assets, increase operational expenses, and increase the liability. But the IT infrastructure can increase operating efficiency which results in improvement of profit efficiency. The impact of capital expenditure can be observed on Return on Assets (RoA), Return on Equity (RoE), Dividend payout, Earning per Share (EPS). These quantitative variables are easily obtained from the financial statements but there are qualitative features like improvement in customer services, fast payment, easy fund transfer, online availability of different products (insurance, saving account, FD, recurring deposit), accessibility of financial services, and comfort in using banking services, online advisory, financial inclusion and many more which cannot be traced from financial statement. The objective of the study is to find out the progress of adoption of IT by the India's largest public sector bank, SBI, and its impact on the bank's performance.

Table-1: Year wise usage of IT Related words in Annual Report of SBI										
Words	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Information Technology/IT	4	29	0	29	48	48	82	90	99	81
Information	21	48	22	59	57	46	54	90	92	101
Digital/lly/isation	0	1	0	30	66	86	117	86	129	158
Software	9	14	11	14	20	16	12	14	26	30
Hardware	5	5	8	4	5	4	4	4	4	4
Technology/ies	13	29	32	50	85	90	78	73	62	97
Web/Website/Websites	4	22	26	26	32	31	26	20	44	50
Social Media	0	0	2	13	10	10	7	5	8	3
Online	8	15	12	33	64	47	36	39	50	67
OnlineSbi	0	1	1	2	9	1	0	4	2	0
Online Banking	0	0	0	3	4	2	1	4	0	0
Modern Banking	0	0	0	2	1	0	0	0	0	0
Internet	5	15	16	23	27	23	17	13	14	16
Internet Banking	4	11	14	16	17	15	9	7	10	9
Mobile	8	10	15	56	61	110	31	54	36	46
Mobile Banking	0	1	1	23	20	23	11	8	6	7
Financial Inclusion	7	13	11	11	10	12	14	11	20	12
Big Data	0	0	0	2	3	7	2	4	0	0
Analytics	0	2	0	5	10	22	7	20	17	16
Network/s	5	20	5	28	17	25	18	30	42	38
Connect/vity	0	1	1	9	4	8	6	11	5	15
App (Mobile App)	0	0	0	4	15	26	23	18	35	23
electronic	8	12	12	13	25	23	27	21	10	14
Cashless	0	0	0	4	3	7	1	0	1	0
Green	10	13	7	17	15	17	12	20	27	25
Total	**111**	**262**	**196**	**476**	**628**	**699**	**595**	**646**	**739**	**812**

To obtain list of words, we had considered the annual reports of SBI from 2011 to 2021. The annual reports provide the summary of yearly progress made by the company. The efforts regarding adoption of digitalization and new banking services and products were mentioned in the annual reports.

It becomes necessary to identify the meaningful important words which highlight the adoption and importance of digitalization for the bank. There is no specific data is available regarding investment in IT and technology in audited report. So, to study the impact of technology the Bag of word approach was applied. This method is very simple and easy to interpret. It matches the list of words with the words mentioned in the audited report and counts them. We gone through the audited reports of last 10 years starting from F.Y 2011-12 to 2021-22 and identified the usage of IT related words. We had shortlisted twenty-five words which emphasized on the usage and adoption of digitalization by the SBI. The bag of words approach is concerned about how often specific words occur in a document irrespective of the place of occurrence is not considered. Then after we calculated how many times those words were mentioned in the audited reports of all ten years (See Table 1). The common observations are

- The SBI had started to focus on adoption of IT and digitalization from 2011 but it increased drastically after 2014 and kept rising till 2021.
- "Digital", "technology" and "information" were the top 3 words repeatedly used in audited reports while "modern banking", "online banking" and cashless were least used words in the audited reports.

These words are not sufficient to interpret the impact of Digitalization. So, to set the relationship between these words and the accounting data and other related facts we had collected and summarized the facts (see Table 2). The lists of words were classified under four major heads – Technology, Online, social media and Financial Inclusion. So, our data includes ten years financial with total 620 observations.

Table-2: Year wise financial descriptive in Annual Report of SBI										
Details	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Branches- Domestic	14097	14816	15869	16333	16,784	17170	22414	22010	22141	22219
Branches-Overseas	173	186	190	191	198	195	206	208	233	229
ATMs		32752	43515	54560	59000	59263	59541	58415	58555	62617
Pan-India village coverage	12931	12931	52260	84036	103,565	104991	NA	NA	NA	NA
POS Machines		70000	135853	200000	300000	509000	610000	575000	672000	747000
POS Transactions				56500000	88200000	NA	NA	NA		
Mobile Bankig Transaction				77100000	144100000	24100000	27600000	27400000	138200000	
Mobile Banking Users			9500000	13500000	17700000	19800000	30500000	14100000	16800000	
Internet Banking Transaction (Cr.)				90	124	149	159	162	158	
Internet Banking Users		143000	17700000	22000000	25500000	32700000	47900000	60823000	73500000	
Total Revenue - Consolidated (Cr.)	176673	200087	226502	257289	272871	298640	301491	334163	365357	385416
Total Revenue - SBI Standalone (Cr.)	120739	135338	154487	174972	191843	210979	257111	277219	296209	305481
Retail Banking Revenue (Cr.)	54091	82613	89329	90340	76531	84411	111809	120968	130906	131783
Operating Expenses- Consolidated (Cr.)	46856	52819	63368	73848	73717	87290	96154	114800	131781	150429
Operating Expenses- SBI Standalone (Cr.)	26068	29284	35725	38053	41782	46473	59943	69687	75173	82652
Operating Profit (Cr.) - Consolidated (Cr.)	31574	31082	32109	39537	43258	50848	59511	55436	68133	71554
Net Profit - Consolidated (Cr.)	11707	14105	10891	13102	9951	10484	-6547	862	14488	20410
Cost to Income Ratio	45.23	48.51	52.67	49.04	49.13	47.75	50.18	55.7	52.46	53.6
Operating Profit as a percentage to Working Funds (%)	2.38	2.01	1.78	1.94	1.92	1.99	1.72	1.49	1.71	1.6
The business per employee (BPE) (Lakh)	798	1063	944	1234	1411	1624	1670	1877	210	237
profit per employee (PPE) (Lakh)	5.31	6.45	4.85	6.02	4.7	5.1	-2.43	0.33	5.78	8.28
No. of Employees - Total	230570	228296	222033	213238	207739	209567	264041	257252	249448	245652
No. of Employees - Officers	81600	80796	78579	78,540	80818	81041	107077	108113	106361	108772
No. of Employees - Assistant	110778	109686	106575	94,455	88606	92979	110348	105440	103134	100796
No. of Employees - Sub-staff Others	38192	37814	36879	40,243	38315	35547	46616	43699	39953	36084
Return on Asset	0.88	0.97	0.65	0.68	0.46	0.41	-0.19	0.02	0.38	0.48
RoE	14.36	15.94	10.49	11.17	7.74	7.25	-3.78	0.48	7.74	9.94
EPS - Standalone	184.31	210.06	156.76	17.55	12.98	13.43	-7.67	0.97	16.23	22.87
DPS	35	41.5	30	3.5	2.6	2.6	Nil	Nil	Nil	4
Debit card users	110000000	136000000	170000000	210000000	233000000	345000000	395000000	509500000	542400000	
Credit Card Users				3100000	3294000	4569000	6258000	8271000	10000000	
Active Customers			219200000	273200000	301200000	337500000	424200000	435100000	449000000	459200000
Core Banking Transactions (daily average transactions)			56300000	64000000	72200000	NA	NA			
Deposits (Cr.)	1043647	1202740	1394409	1576793	1730722	2044751	2706343	2911386	3241621	3681277
Advances (Cr.)	867579	1045617	1209829	1300026	1463700	1571078	1934880	2185877	2325290	2449498
Business Size (Cr.)			2639531	2900000	3190000	3600000	NA			
Net NPA (Cr.)	15818	21956	31096	27591	55807	96978	110855	65894	51871	36809

Estimating the impact of digitalization on SBI was not straightforward. So, we had applied regression model. Very strong too strong to moderate correlations across different dependent variables for the different text count as independent variables which show a multiple linear regression mode for each specific Dependent variable, however limitation is that the analysis is based on a small data set. Table 3 represents the summary of result. It was observed that total consolidated revenue, total standalone revenue, advances, and operating expense are having higher R with *p value* less than 0.05. While net profit, number of staff, RoA, RoE and EPS had moderate to lower correlation. So, the study supports the earlier findings and conclude that the digital expansion initially impacts on operational efficiency but negatively impact on the profitability. The technology adoption had statistically significant positive relationship with all dependent variable compared to online, social media, and financial inclusion.

Table - 3 The relation between the digitalization and Financials of SBI

DV (Y)	R2	Adj R2	Technology	Online	Social Media	Financial Inclusion
TOTREVCON	0.975542	0.951683	**0.017931876**	0.198566221	0.12541945	0.372298968
TOTREVSTDALO	0.94499	0.94499	**0.006951052**	0.07504004	0.105568459	0.186442746
RTLBNKREV	0.94255	0.8884	**0.013715066**	**0.042720173**	0.168430967	0.426771042
OPEXPCON	0.942737	0.888752	**0.032527077**	0.195101578	0.300335117	0.581872611
OPEXPSTDALO	0.960207	0.921998	**0.009317488**	0.070605536	0.147902541	0.240500085
OPPRO	0.944397	0.891885	**0.053759987**	0.29258272	0.277149807	0.531928153
NTPRO	0.528581	0.279398	0.527607505	0.795271039	0.700957427	0.299513384
COSTOINCOM	0.83557	0.698178	**0.059504738**	0.091790422	0.204186676	0.183373416
OPPROPCTWKFUND	0.884737	0.782759	**0.04079909**	0.118887509	0.193274236	0.139908203
BIZPEREMPLO	0.557203	0.310475	0.97751921	0.444788009	0.746562916	0.602973399
PROPEREMPLO	0.557407	0.310703	0.417597976	0.673529487	0.636271573	0.269178737
TOTEMPL	0.86566	0.749368	**0.018071047**	**0.06260257**	0.396645876	0.263411565
OFFICEREMPL	0.930208	0.865286	**0.00747793**	0.063474039	0.311224926	0.218492853
ASSISTEMPL	0.883581	0.780715	0.070869514	**0.029067248**	0.293511658	0.272705934
SUBSTAFFEMPL	0.546705	0.298887	0.211755302	0.81404596	0.802210252	0.760473873
ROA	0.804672	0.647498	0.23508563	0.586854533	0.353950016	0.153487409
ROE	0.746363	0.557058	0.310776284	0.668804452	0.428383605	0.179315874
EPS	0.912441	0.832549	0.61934608	0.182673514	0.720915893	0.993798388
DEPOSITS	0.916038	0.848869	**0.012228124**	0.101779013	0.180504836	0.270275077
ADVANCES	0.952018	0.913632	**0.004069047**	**0.040557054**	0.074094556	0.137866619
NETNPAT	0.545497	0.181895	0.886749894	0.97101017	0.343474897	0.260262603

4.0 Conclusion

Even though, the digitalization is difficult both to quantify and to differentiate from general innovation(Fritzsh et al., 2020). The impact of digitalization was observed but there are other factors which may responsible for the better financial of the company. The higher the company is concerned about digitalization, the higher the impact can be observed on the revenue, advances, deposits, reverence and number of customers. On the other hand, the RoA, RoE and number of employees were observed less effected due to digitalization. This study is limited to SBI only so studying a greater number of banks can give more clarity on the impact of digitalization on the performance of the Bank.

References

Agboola, M. G., Awobajo, K. A., Oluwatobi, S. O., Akinbode, M. O., Fagbohun, M. O., Esse, U. C., Segun-Adeniran, C. D., Asaolu, A. O., & Betek, C. M. (2019). Effect of digitalization on the performance of commercial banks in Nigeria. *IOP Conference Series: Earth and Environmental Science*, *331*, 012014. https://doi.org/10/gmbvq7

Andonova, M., Karadja, A., Pachovski, V., & Bojadjiev, M. (2016). *Digitalization of Banking services as a Driving Force towards Profitability – IT Perspective of the Macedonian Banking Sector*. 6.

ANI. (2018, June 9). SBI now invests 3500 crore in technology per year; releases 100 + new IT initiatives. *Business Standard India*. https://www.business-standard.com/article/news-ani/sbi-now-invests-3500-crore-in-technology-per-year-releases-100-new-it-initiatives-118060900588_1.html

Bahrini, R., & Qaffas, A. A. (2019). Impact of Information and Communication Technology on Economic Growth: Evidence from Developing Countries. *Economies*, *7*(1), 21. https://doi.org/10.3390/economies7010021

Dangolani, S. K. (2011). The Impact of Information Technology in Banking System (A Case Study in Bank Keshavarzi IRAN). *Procedia - Social and Behavioral Sciences*, *30*, 13–16. https://doi.org/10.1016/j.sbspro.2011.10.003

Fritzsh, S., Scharner, P., & Weiß, G. (2020). Estimating the relation between digitalization and the market value of insurers. *Wileyonlinelibrary*, *58*, 529–567.

Financial Inclusion—Overview. (n.d.). [Text/HTML]. World Bank. Retrieved September 7, 2021, from https://www.worldbank.org/en/topic/financialinclusion/overview

Gupta, S., Raychaudhuri, A., & Haldar, S. (2018). *Information Technology and Profitability: Evidence from Indian Banking Sector*. https://www.emerald.com/insight/content/doi/10.1108/IJoEM-06-2017-0211/full/html

Hu, Z., Ding, S., Li, S., Chen, L., & Yang, S. (2019). Adoption Intention of Fintech Services for Bank Users: An Empirical Examination with an Extended Technology Acceptance Model. *Symmetry*, *11*(3), 340. https://doi.org/10.3390/sym11030340

Impact Of Technology on Banking Sector—Inventiva. (n.d.). Retrieved July 26, 2021, from https://www.inventiva.co.in/stories/priyadharshini/impact-of-technology-on-banking-sector/

Jakšič, M., & Marinč, M. (2019). Relationship banking and information technology: The role of artificial intelligence and FinTech. *Risk Management*, *21*(1), 1–18. https://doi.org/10.1057/s41283-018-0039-y

Lee, H., Choi, H., Lee, J., Min, J., & Lee, H. (2016). Impact of IT Investment on Firm Performance Based on Technology IT Architecture. *Procedia Computer Science*, *91*, 652–661. https://doi.org/10/ggk3zx

Mithas, S., Tafti, A., Bardhan, I., & Goh, J. M. (2012). Information Technology and Firm Profitability: Mechanisms and Empirical Evidence. *MIS Quarterly*, *36*(1), 205–224. https://doi.org/10/ggfxpn

Reserve Bank of India—Database. (n.d.). Retrieved July 26, 2021, from https://m.rbi.org.in/scripts/bs_viewcontent.aspx?Id=3657

Shanmugam, K. R., & Das, A. (2004). Efficiency of Indian commercial banks during the reform period. *Applied Financial Economics*, *14*(9), 681–686. https://doi.org/10/db6h6p

Shevlin, R. (n.d.). *The 5 Hottest Technologies in Banking For 2021*. Forbes. Retrieved September 7, 2021, from https://www.forbes.com/sites/ronshevlin/2021/01/18/the-5-hottest-technologies-in-banking-for-2021/

Top 10 Largest Banks in India: Government /Private Bank. (2021, September 3). *Embibe Exams*. https://www.embibe.com/exams/top-10-largest-banks-in-india/

Wadesango, N., & Magaya, B. (2020). The Impact of Digital Banking Services on Performance of Commercial Banks. *Journal of Management Information and Decision Sciences*, *Volume 23*, (Special Issue, 2020). https://www.proquest.com/openview/346d2f6e22a380b51894fcb9c2eed2d4/1?pq-origsite=gscholar&cbl=38743

Why banks must increase tech spend and invest in digital first. (n.d.). NCR. Retrieved September 7, 2021, from https://www.ncr.com/blogs/banking/increased-tech-spending