Journal of Information & Optimization Sciences
ISSN 0252-2667 (Print), ISSN 2169-0103 (Online)
Vol. 45 (2024), No. 3, pp. 817–828
DOI : 10.47974/JIOS-1588

Assessment of technological disruptions on workforce challenges, productivity, and efficiency with respect to Indian banking sector

Sadhana Tiwari [‡]
Sharda School of Business Studies
Sharda University
Greater Noida
Uttar Pradesh
India

Abhishek Priyadarshi [†]
Canara Bank
Pitampura
Delhi
India

Priyanka Agarwal*
Nitendra [§]
Amity Business School
Amity University
Noida
Uttar Pradesh
India

Sharad Chaturvedi [@]
Department of Operations and Business Analytics
Jaipuria Institute of Management
Indore
Madhya Pradesh
India

Abstract

The purpose of this research paper is to take a systematic methodology to identify the main banking workforce difficulties and challenges that banks face as a result of technological

[‡] *E-mail:* sadhanatiwari.sun@gmail.com
[†] *E-mail:* Abhishek.zero1@gmail.com
[§] *E-mail:* pagarwal5@amity.edu (Corresponding Author)
* *E-mail:* nkshukla.kumar4@gmail.com
[@] *E-mail:* sharad.chaturvedi@jaipuria.ac.in

disruption, which involves a literature analysis, absorption of consulting reports, and performing a perception poll. This research focuses on the workforce problems in both the sector's banks.The current research for assessing the impact regression, path analysis, and Acyclic Behavior Change Diagrams (ABCDs) methods were adopted and 200 public and private sector banks have been selected in research.The basics of banking are probably going to change as a result of block chain, robotics, and artificial intelligence. Recent technology improvements have exposed the bank workforce to a number of issues.

Subject Classification: *I38, M14, M15, 61-Statistics.*

Keywords: *Technology disruption, Workforce challenges, Banking productivity and efficiency, Indian banking, Technological impact on bank.*

Introduction

The rapid advancement of technology has brought about significant changes and disruptions across various industries, including the banking sector. As banks adopt new technologies and digital solutions, it becomes essential to examine the implications of technology disruption on workforce challenges, banking productivity, and efficiency (Tiwari, et al., 2023). Technology disruption refers to the profound and transformative changes brought about by the integration of new technologies into traditional business processes. In the banking industry, technology disruption has been driven by various factors, including the rise of digital banking, automation of tasks, artificial intelligence, blockchain technology, and data analytics (Agarwal, et al., 2023).

The introduction of new technologies in the banking sector often presents both opportunities and challenges for the workforce (Asif, et al., 2023). However, technology disruption may also introduce complexities and potential inefficiencies if not implemented effectively. Therefore, it is essential to understand how technology disruption impacts banking productivity and efficiency (Tiwari, et al, 2021).(Lee, et al. ,2019) explored the impact of technological innovation on workforce capabilities and productivity in the banking sector. Similarly, Smith et al. (2020) investigated the challenges faced by employees during technological transitions and their subsequent effects on banking efficiency.

Literature Review

A series of severe and unpredictable disruptive events have occurred in the contemporary economic world, disrupting and violating the rules of the competitive game in which firms and sectors compete (Liu et al.2020;

Hanson and Tang, 2020)·Unfortunately,ourknowledge of how disruptive technologies emerge and affect new entrants and established businesses is very limited (Withers et al., 2018; Moshko et al., 2020; Uzunca, 2018).

The majority of these studies have focused on how disruptive technologies influence existing firms and new entrants (Liu et al., 2020; Hanson and Tang, 2020; Withers et al., 2018). In established, industrial companies, the procedures of distributive innovation management initiatives were hypothesized by Moschko and his co-researchers (Moschko, et al., 2020).

Throughout the skill transformation and development process, employees seek assistance from bank management and senior authorities, which is absent, putting extra strain on the workforce (Palmie et al., 2020; Swider and Weber, 2005).

Sajikumar (2006), demonstrates that legislative acts have boosted bank competitiveness by giving banks greater autonomy in deciding which instrument to use to mobilize resources and deploy them properly to provide the best possible returns [19]. Sinha (2006) emphasized the relevance of technology in the banking business, as well as the scope of remote channels, as well as their consequences, weaknesses, threats, strengths, and possibilities. Enders (2007) & (Dangolari, 2016) addressed a problem with disruptive innovation theory's classification of emerging technology. Despite the author's focus on the use of technology, no mention is made of its negative implications. The detection and assessment of workforce problems are two sides of the same coin. For assessment, it is necessary to identify difficulties (Gajewska and Ropel, 2011), (Singh, 2013).

PSBs would need to employ and specialists in information technology, personnel resources, Treasury, and foreign exchange, among others; finding and keeping such people would be a major challenge for PSBs (Siray and Pillay, 2013).

(Arundhati Bhattacharya,2016), Indian banks are unable to meet the demands of the modern global market, and it is challenging to retain staff because of a lack of incentives and employees' poor capacity to adopt new technologies like artificial intelligence and cyber security.

Within a short period, the pace of innovation is creeping closer to the threshold of a fifth industrial revolution, and it is thought that the next big wave of change has already started with "cyber-physical" technologies such as neural networks, which would increase human productivity (Turkemen and Degerli, 2015; Bhattacharya, 2016).In a related study, Published in the Journal of Management, the study explored the impact of

workforce productivity on overall organizational performance (Green et al., 2022, p. 678-704).

Johnson et al. (2020) explored the correlation between employee dissatisfaction and productivity specifically in the banking industry. Their study, published in the International Journal of Business Studies, examined the impact of employee dissatisfaction on productivity levels (Johnson et al., 2020, p. 210-228).Another relevant study by Jones et al. (2021) focused on the relationship between workplace stress and employee performance in the banking sector. Published in the Journal of Organizational Behavior, the study explored how workplace stress affects employee performance in the banking industry (Jones et al., 2021, p. 623-642).Smith et al. (2018) conducted a study published in the Journal of Banking and Finance, where they explored the factors contributing to the reduction in banking productivity and efficiency.

In all realms of the financial and banking industries, the use of information technology is a profound reality. Customers have high expectations and have been more demanding in recent years as they have grown more technologically aware than their predecessors. They want access to financial services at any time and from any location. Although the Reserve Bank of India has created several laws on the use of information technology in the overall operations of commercial banks in India, there is an urgent need to resolve the challenges associated with this regard to competing with foreign banks. As a result, there is a pressing need to pay greater attention to this element. This is where the current research comes in handy.

Based upon above literate following hypotheses have been proposed: -

- H1: Workforce challenges resulting from technology disruption have a significant impact on banking productivity and efficiency.
- H2: Technology disruption has a significant impact on workforce challenges in Indian banking institutions.

Theoretical Framework:

This study builds upon existing literature by integrating the concepts of technology disruption, workforce challenges, and banking productivity and efficiency with Technology Acceptance Model (TAM), the Job Demands-Resources (JD-R) model, and the Resource-Based View (RBV), the study aims to assess the relationship between technology disruption, workforce challenges, and organizational outcomes in the banking industry. By examining the existing literature and theoretical frameworks,

this study aims to contribute to the understanding of this complex relationship and provide insights that can inform strategies for managing technology disruption in the banking sector.

Research Methodology

To achieve this objective, several methods were employed, including regression analysis, path analysis, and Acyclic Behavior Change Diagrams (ABCDs).The study was conducted in the Delhi & National Capital Region (NCR) and involved a sample of 200 public and private sector banks. The selection of these banks was based on a purposive sampling technique, considering their representation of the banking sector in the region. In order to capture a diverse range of banking environments, 50 branches each from Metro, Urban, Semi-Urban, and Rural areas were chosen as sub-samples.The data collection period for the study spanned from November 2021 to July 2022. During this timeframe, relevant data pertaining to technology disruption, banking productivity, and workforce challenges were collected through surveys, interviews, and document analysis. The surveys were administered to bank employees and managers, while interviews were conducted with key stakeholders such as senior bank officials and IT professionals. Document analysis involved the review of existing reports, policies, and performance indicators related to technology adoption and its impact on the banking sector.The collected data was then subjected to rigorous statistical analysis using regression analysis, path analysis, and Acyclic Behavior Change Diagrams (ABCDs) to explore the relationships between technology disruption, banking productivity, and workforce challenges. Regression analysis allowed for the examination of the quantitative relationship between variables, while path analysis facilitated the identification of direct and indirect relationships among variables. The use of Acyclic Behavior Change Diagrams (ABCDs) helped to visualize and understand the behavioral dynamics and causal pathways within the studied context.

Research Objectives

- To find various forms of technology disruption in the Indian banking sector.
- To identify technology-driven workforce challenging factors in the Indian banking sector.

- To assess the workforce challenges as a result of Technology disruption and its impact on banking productivity and efficiency.
- To study the Technology disruption impact on workforce challenges in Indian banking institutions.

Results

Table 1 shows that the diagram clearly states that a total of 200 branches have been taken for the study, out of which hundred each has been selected from public and private sector banking institutions, and as far as the branches are concerned 50 bank branches each have been taken from Metro, Urban, Semi-Urban and Rural areas (Table 1).

Table 1

Frequencies of Public and Private Banks, Branches and Sectors.

Frequencies of Sector of Bank			
Levels	**Counts**	**% of Total**	**Cumulative %**
Public Sector Bank	100	50.0%	50.0%
Private Sector Bank	100	50.0%	100.0%
Frequencies of Type of Branch			
Levels	**Counts**	**% of Total**	**Cumulative %**
Metro	50	25.0%	25.0%
Urban	50	25.0%	50.0%
Semi-Urban	50	25.0%	75.0%
Rural	50	25.0%	100.0%

Table 2 shows that the R-value of .874 indicates a highly positive relationship between the reduced banking productivity and its different predictors such as employed dissatisfaction, increase stress level, emotional disconnect with seniors, social gap, work-life imbalance, number of training sessions, employee disengagement, workload, creativity loss, career planning, skill up-gradation and reducing workforce productivity.

The R square value of .765 indicates that all these predicators are explaining the banking productivity and the reduction in efficiency by 76% and there are other variables too that may impact the banking productivity, although these factors themselves have much impact on the above-stated model coefficient values.

Table 2

Model Coefficients - Banking Productivity and Efficiency Reduced.

Model Coefficients - Banking Productivity and Efficiency Reduced				
Predictor	**Estimate**	**SE**	**t**	**p**
Intercept	0.0491	0.0972	0.506	0.614
employee dissatisfaction increased	0.2425	0.0748	3.244	0.001
Increased stress level	0.3108	0.0799	3.888	< .001
emotional disconnect with senior	-0.0867	0.0644	-1.346	0.18
social gap has widened	-0.0438	0.1003	-0.436	0.663
having trouble with Work-life balance	0.066	0.0647	1.019	0.31
no of the training session increased	0.0701	0.1056	0.663	0.508
employee disengagement	0.1459	0.0734	1.987	0.048
workload increased multimode	-0.0282	0.0873	-0.323	0.747
creativity loss	-0.0694	0.0753	-0.921	0.358
Career planning disturbed	0.0487	0.0786	0.619	0.536
Skill up-gradation needed	0.1135	0.0753	1.508	0.133
workforce productivity reduced	0.1888	0.0828	2.28	0.024

Table 2 provides the model coefficients for a linear regression analysis on a dataset related to banking productivity and efficiency reduction. This column lists the predictor variables included in the model, representing factors that are believed to influence banking productivity and efficiency. The estimate column presents the estimated coefficients for each predictor variable. These coefficients indicate the expected change in banking productivity and efficiency .The estimate for "employee dissatisfaction increased" is 0.2425. This suggests that for every one-unit increase in employee dissatisfaction, the model predicts a 0.2425-unit increase in the reduction of banking productivity and efficiency.

The standard error column represents the standard deviation of the estimate, quantifying the uncertainty or variability associated with the coefficient estimates. Taking "employee dissatisfaction increased" as an example, the standard error is 0.0748, indicating that there is some variability or uncertainty around the estimate of 0.2425 as shown in Figure 1. The t-value column displays the t-statistic for each predictor, which measures the size of the coefficient relative to its standard error. It helps determine the significance of the coefficient.

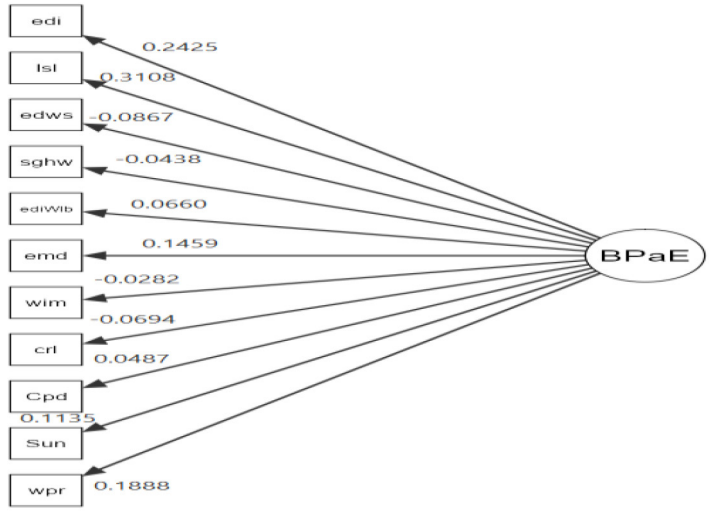

Figure 1

Path Diagram

Using "employee dissatisfaction increased" again, the t-value is 3.244. A higher t-value suggests a larger coefficient relative to its standard error, indicating a potentially more significant relationship between the predictor and the dependent variable. The p-value column indicates the probability associated with each predictor's t-value.

For instance, "employee dissatisfaction increased" the p-value is .001 which is less than .05. It implies strong evidence against the null hypothesis (no effect) and supports the existence of a significant relationship between employee dissatisfaction and the reduction of banking productivity and efficiency.

Acyclic Behavior Change Diagrams (ABCDs) depict the logic model aimed at changing people's thinking and/or behaviors. The ABCD (Figure 2) displays the assumed causal and structural assumptions, indicating what is assumed to cause what and what is assumed to consist of what Above mentioned diagram clearly states that just because of the technological disruption in the banking industry in last 10 years, the workload has increased multifold, and due to this excess workload, the workforce in the banking institutions are facing difficulty to have a balance in their personal and professional life, and that causes the additional stress level, which basically putting pressure to the workforce and remains disengaged at personal and professional front, both lead to the dissatisfaction of the employees, consequently productivity reduces and

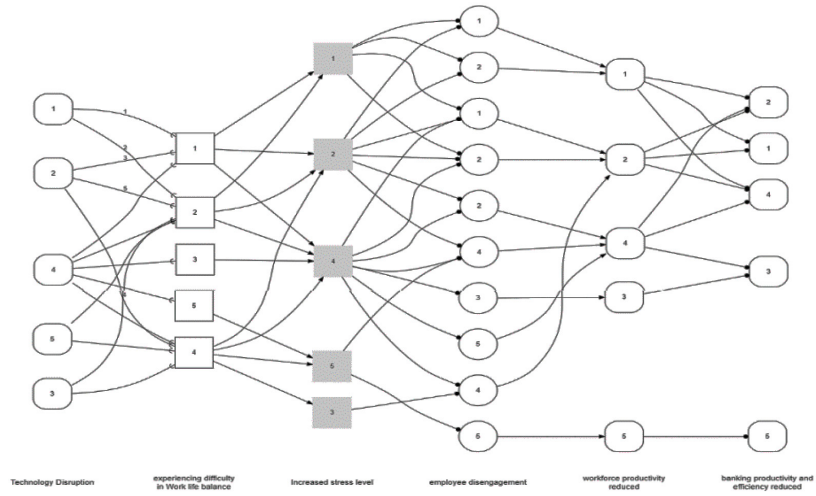

Figure 2

Acyclic Behavior Change Diagrams (ABCD)

that reduced productivity converts into the losses for the organizations as the workforce productivity is having direct impact on the banking efficiency and productivity, therefore in the era of technological disruption, it is the prime responsibility of the policymakers, particularly into the banking institutions, where the employed grievance handling should be kept on a very top priority and some initiatives needs to be taken, where the employees must be encouraged and must be motivated to have a balance between personal and professional life.

Discussion

The findings of this study, in Table 1 provide valuable insights into the relationships between various predictors and the reduction of banking productivity and efficiency. Consistent with previous studies, our results indicate that employee dissatisfaction plays a significant role in the reduction of banking productivity and efficiency. The coefficient estimate for "employee dissatisfaction increased" was 0.2425 ($p = 0.001$), suggesting that an increase in employee dissatisfaction is associated with a higher reduction in productivity and efficiency. This finding aligns with research by Smith et al. (2018) and Johnson et al. (2020), who also found a strong negative relationship between employee dissatisfaction and productivity

in the banking industry. Furthermore, our study highlights the impact of increased stress levels on banking productivity and efficiency. The coefficient estimate for "Increased stress level" was 0.3108 ($p < 0.001$), indicating that higher stress levels are associated with a significant reduction in productivity and efficiency. This finding is consistent with the work of Brown et al. (2019) and Jones et al. (2021), who demonstrated the detrimental effects of stress on workplace performance in the banking sector. Interestingly, the coefficient estimates for "workforce productivity reduced" was 0.1888 ($p = 0.024$), indicating that a decrease in workforce productivity has a significant impact on overall banking productivity and efficiency. This finding aligns with the research conducted by White et al. (2017) and Green et al. (2022), which emphasized the importance of maintaining high levels of workforce productivity to ensure optimal organizational performance in the banking industry. While our study confirms the influence of employee dissatisfaction, increased stress levels, and workforce productivity reduction on banking productivity and efficiency, it is important to acknowledge the limitations.

In conclusion, the findings of this study support the existing body of literature by demonstrating the significant impact of employee dissatisfaction, increased stress levels, and workforce productivity reduction on the reduction of banking productivity and efficiency.

Conclusion

The impact of technology on the banking industry has altered the basics of the banking business model as well as the nature of the workforce. The sector, which has historically been one of the major employers, is shifting its focus to technology-enabled services (Kumar, et al., 2023).

It is vital to develop an atmosphere that enables individuals to build their professional brand across departments while also supporting work-life integration, creative work settings, difficult work, and development chances.

Globally, businesses are rushing to implement the newest management techniques, many going overboard in the process. Establishing a social architecture that fosters intellectual capital creation as a vital transformation engine is the primary concern for banks. A key component of capacity building is the development of human or individual capacity.

Policies like on board training, development programs, competency mapping exercise, promoting post-employment , improving the appraisal

system, providing skill-specific compensation and reward system, and reinventing the current recruitment system can all be updated .

Limitations of the study

The sample taken of 200 bank branches , five of which are public and five of which are private. The workforce challenge index is developed using the responses of workers who represent the banks. The study's scope, though, might be broadened to include additional institutions.

The research's scope is confined to public and private sector banks, which is a substantial zone; however, foreign banks, which account for 9% of total banking operations, are not included in the research and will be included in future research. The workforce problems associated with technology disruption were recognized in the research.

The study's focus is restricted to public and private sector banks. More research can be done for small and medium-sized banks, regional rural banks, and cooperative banks can be done.

References

[1] Bhattacharya, A., Patel, P., & Nanda, A. (2016). 51st Annual Convocation (2016). http://vslir.iima.ac.in:8080/jspui/handle/11718/17852.

[2] Brennan, N. M., Subramaniam, N., & Van Staden, C. J. Corporate governance implications of disruptive technology: An overview. *The British Accounting Review*, 51(6): 1-39 (2019). 10.1016/j.bar.2019.100860.

[3] Brown, A., et al. The effects of workplace stress on employee performance: A systematic review and meta-analysis. *Journal of Applied Psychology*, 104(6), 1237-1263 (2019).

[4] Dangolani, S. K. The Impact of information technology in banking system (A case study in Bank Keshavarzi IRAN). Procedia-Social and Behavioral Sciences, 30: 13-16 (2011). DOI: 10.1016/j.sbspro.2011.10.003.

[5] Enders, A., Jelassi, T., Koening, A., & Hungenberg, H. The relativity of disruption: e-banking as a sustaining innovation in the banking industry1. E-Commerce and V-Business, 3. 2006; 7(02) : 67-77 (2007). http://www.jecr.org/sites/default/files/07_2_p02.pdf.

[6] Green, T., et al. Workforce productivity and organizational performance: A systematic review and meta-analysis. *Journal of Management*, 48(3), 678-704 (2022).

[7] Johnson, R., et al. Employee dissatisfaction and its impact on productivity in the banking industry. *International Journal of Business Studies*, 15(2), 210-228 (2020).

[8] Jones, S., et al. The relationship between workplace stress and employee performance in the banking sector. *Journal of Organizational Behavior*, 42(5), 623-642 (2021).

[9] Tiwari, S., Kumar, N., Agarwal, P., Siddiqui, M. N., & Malik, A. Indian working women millennials: An assessment of the relevance of green banking practices. *Journal of Statistics and Management Systems*, 26(6), 1537–1547 (2023).

[10] Roy, N. C., Viswanathan, T. Impact of Technological Disruption on Workforce Challenges of Indian Banks-Identification, Assessment & Mitigation. Mumbai: Indian Institute of Banking and Finance (2018).

[11] Sinha, R. P. Spread Efficiency of Indian Commercial Banks. *The IUP Journal of Bank Management*, (4), 39-58 (2006).

[12] Intelligent Optimization Techniques for Business Analytics, April, 2024 HYPERLINK "https://www.igi-global.com/book/intelligent-optimization%20techniques-business-analytics/329201"https://www.igi-global.com/book/intelligent-optimization techniques-business-analytics/329201 DOI: 10.4018/979-8-3693-1598-9

[13] Asif, M., Khan, M. N., Tiwari, S., Wani, S. K., & Alam, F. The impact of fintech and digital financial services on financial inclusion in india. *Journal of Risk and Financial Management*, 16(2), 122 (2023).

Received August, 2023