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THE ROLE OF DIGITAL TECHNOLOGIES IN ENHANCING EMPLOYEE DEVELOPMENT AND PERFORMANCE IN THE BANKING SECTOR

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ABSTRACT

The pandemic has been the primary catalyst for rapid digitalization of the banking sector, leading to a fundamental change in the nature of work, the skills required to perform such work, and the performance expectations of employees. By employing quantitative research to study employees of a few India banks, this empirical study examines the influence of digital technologies on employee development and performance. A structured questionnaire was designed and distributed among the sample size of 384 banking employees (in public, private and cooperative banks). This research investigates the interplay between adoption of digital technologies, training interventions, skills for improvement and employee performances. The statistical correlations, regression, and ANOVA analysis showed that digital technology use has a high positive relationship with employee performance ($r = 0.782$, $p < 0.01$). The results indicate that operating in an organization that fosters digital ways of working adds up to 34 % performance outcome for employees with higher digital literacy as opponents to employees that have lower levels of digital skills. Moreover, results recognize technology-enabled training as an important mediating variable, leading to enhanced employee adaptability and productivity. The research also identifies challenges like digital anxiety, resistance to change and lack of training infrastructure. Findings reveal that digital upskilling initiatives (as long as they are ongoing) lead to better level of confidence, strategic decision making and customer service capabilities. This study adds to the ongoing discussion by providing empirical insights into the multifaceted roles of digital technologies in reshaping the skill needs of bank employees and the implications for human resource management and policy, providing practical directions for bank HR managers and governmental policymakers to better align digital transformation strategies with the skills requirements of talent development in banking.

Keywords: *Digital technologies[1], employee development[2], banking sector[3], performance management[4], digital literacy[5], technology adoption[6], workforce transformation[7].*

1. INTRODUCTION

Digital Technologies Out; Banking Sector Transformation: In Banking, the last decade has been the time of unprecedented change, in large part due to the rapid advance of digital technologies. Technology has redefined every single aspect of the banking operations from core banking solutions/ mobile banking applications to artificial intelligence-powered chatbots and blockchain-based transactions. This digital transformation is not only changing the way banks interact with consumers, but is dramatically transforming the skills, roles, and

performance expectations of banking employees throughout the organization. Banking functions, especially the backend operations which were manual and face to face, have evolved into tech-driven functions requiring complex digital skills. The rise of the Digital Age brings both opportunities and challenges to the development of employees in banking institutions. The rapid advancement of digital technologies provides unprecedented access to learning resources, real-time performance feedback, and personalized development pathways, on the one hand. However, excessive speed of technological change puts a load on employees to keep updating the skills to cope with the upcoming changes in the systems. A skill of existing employees and emerging technology has been an area of concern for banking organizations across the globe when the need for change arises. This study closes this gap by empirically investigating how digital technologies shape employees' developmental paths and consequent impact on performance outcomes.

The importance of this work is to engage in questions and reflexions that can help inform strategy with regard to human resources as executive leadership deals increasingly with a banking environment that is more digital. While banks pour billions into digital infrastructure, the shift to digital transformation involves more than just bricks and mortar; connecting it all back to the dark art of human factors and how to unlock the full potential of people, companies, and society. The present study offers evidence-based findings and implications for both academia and management on how to improve technology adoption and the performance metrics through training and skills improvement.

1.1 BACKGROUND OF THE STUDY

Banking has always been an early adopter for technologies – from ATMs in the sixties to internet banking in the nineties. The coal fired power tree, and everything to do with coal electricity, carries the burden of emissions and much more widely the current wave of digitalization is far more intense in its range, rhythm, and effects. Emerging technologies like AI, machine learning, robotic process automation and cloud computing not only automated existing processes but permutations of business models and service delivery mechanisms. As per industry reports, banks across the globe have shelled out $300 billion in technology over the years, a substantial chunk of which has been devoted to digital transformation programs. The implications of this technological shift on the banking workforce are significant. Former jobs like tellers, loan officers and branch managers are being reshaped or replaced, while digital banking, data analysts, cybersecurity specialists and other jobs continue emerging. They must gain skills in data analytics, digital customer relationship management, cybersecurity awareness, and agile work practices. Over 50% of all employees who work in banking will need reskilling because of technology by the year 2025 (World Economic Forum).

1.2 RESEARCH PROBLEM

Banking organizations have spent hundreds of billions of dollars to invest in the digital, but most struggle to translate (hard-won) technology capabilities into employee output and organizational performance. Research shows that these challenges are largely people issues rather than technology issues, and 70% of Digital transformation initiatives fail during implementation to deliver the expected business outcomes. Digital anxiety, resistance to change and lack of support systems during technology changes continue to plague employees.

Furthermore, little empirical research has been conducted to assess how different facets of digital technology adoption impact specific dimensions of employees development and performance in the banking context. The strategic question is how mediated digital technologies impact employee development and performance. The purpose of this study is to estimate which technological interventions are best for creating skills of staff members, what training processes create successful technology usage, and how do digital competencies translate into performance results. It also attempts to highlight barriers and challenges to successful use of technologies by Banking Employees.

1.3 RESEARCH OBJECTIVES

This research aims to investigate the empirical truthfulness of digital technologies on employee performance and development in the banking sector. More specifically, the objectives are: (1) To assess the extent of acceptance of digital technology by banking employees and the factors affecting technology acceptance; (2) To evaluate the effectiveness of technology-enabled training programs in creating employee digital competencies; (3) To measure the relationship between digital literacy levels and Employee Performance Metrics like productivity, accuracy, and Customer satisfaction; (4) To identify challenges and barriers faced by employees in adapting to digital technologies; (5) To analyze the role of organizational support, leadership and culture in facilitating the success of digital transformation; (6) To compare the impact of digital technologies across demographic groups and job roles, and bank types; and (7) To develop empirically- supported recommendations with regard to improving employee development strategies in the digital banking milieu.

2. LITERATURE REVIEW

Introduction In recent years the intersection between digital technologies and wider human resource development in banking has gained a growing amount of academic interest. This relationship has been investigated from multiple perspectives, including technology acceptance models, digital skill frameworks, training effectiveness, and performance outcomes (e.g. This part of the study presents existing literature along these dimensions to lay the theoretical and empirical basis for the present study. Many well-established models for technology adoption in organizational settings have also been identified, such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and Diffusion of Innovations Theory [1]. Davis suggested that perceived usefulness and perceived ease of use are the fundamental predictors of user acceptance of technology for the employees[2]. With regards to using digital technologies, attitude is also driven by system quality, training adequacy, management support and personal innovativeness among other factors [3]. Nevertheless, common studies on banking also reveal challenges of distinct flavor as security concerns, regulatory compliance requirements and level of risk associated with financial transactions may temper technology acceptance patterns. Digital literacy and DI competency frameworks for banking employees have become a hot research topic [4]. The European Banking Federation identified five key digital competencies for persons in banking: information and data literacy; digital communication and collaboration; digital content creation; digital problem-solving; and cybersecurity awareness [5]. Empirical research has shown that the level of digital literacy correlates positively with indicators such as the speed of processing financial transactions, of error rates, and of key measures of customer satisfaction. In

another study, Kumar and others [3] found that employees with advanced level digital skills processed transactions 40% more with 25% less errors than employees with basic digital competencies. But at the same time, research centres at major universities are also documenting glaring gaps in the digital capabilities of the workforce, with many bank employees complaining that they did not receive enough training for technology-heavy jobs.

Training and development have been well-covered in its relation to the ability of organisations to facilitate digital transformation [6] Technology-enabled learning approaches such as e-learning, virtual simulations, gamification or microlearning modules have proven effective in enhancing digital competencies in a relatively efficient manner. The results of such studies have been assessed in a meta-analysis of training effectiveness studies, which found that a blended learning approach (combining online and face-to-face instruction) resulted in more effective training than the individual use of traditional classroom training alone [7]. For instance, in banking contexts, simulation-based training for core banking systems and customer relationship management platforms has been shown to be effective in building employee confidence and competence [10]. On the other hand, research also indicates challenges like shortage of training budgets, scarcity of time and difficulty in measuring ROI.

This definition and measurement of employee performance in digital banking environments has been operationalized through the lens of different frameworks 8. Research has investigated task performance dimensions (efficiency, accuracy, productivity) and contextual performance dimensions (adaptability, collaboration, innovation). Research always indicates a positive link between technology ability and practical performance. Employees trained in data analytics tools, for example, can make better lending decisions, and those with experience in digital communication platforms can deliver faster and more personalized customer service 11. But this is not true across the board. For instance, high use of any technologies can be negatively related to technostress, information overload, work-life boundary problems etc. 14

Critical perspectives on digital transformation emphasize negative consequences such as job displacement, deskilling, excessive surveillance, and inequality 18[29]. Several researchers view automation and AI as a loss of workers autonomy and meaningful work, creating a less humane, more machine-like interface. The critical perspectives of the use of technology serve as a reminder that just because technology can resolve a problem or help solve an issue, it does not mean the technology outcome is positive and needs to be regularly monitored to ensure equitable. But although it has been studied in detail, much of the picture of its effects on banking employees is still missing. By investigating technology use and performance outcomes with empirical evidence gathered from a diverse sample of banking employees and using more sophisticated statistical methods, this study fills these gaps in a novel way.

3. RESEARCH METHODOLOGY

For this study, we subjectively study the impact of digital technologies on human development and the performance of employees in banks through a quantitative research design. The data was primarily collected using a survey-based method, allowing for the collection of standardised information from a large number of

banking employees across various contexts within the organisation. The cross-sectional research design collects data at one moment in time to describe the association between two variables but acknowledges that longitudinal designs and observations would be the ideal way to show more conclusively causality.

The respondents for the study include Banking Executives working at different levels in public sector banks, private sector banks and co-operative banks in India. Therefore, a stratified random sampling technique was used to guarantee representation within and across a variety of bank types, job roles, geographic locations, and demographic groups. Using Cochran's formula for large populations, with a 95% confidence level and 5% margin of error, we determined that a minimum sample size of 384 respondents was required. In the fieldwork process, 400 questionnaires were collected, however, the actual sample that met our requirements stopped at 384 valid questionnaires from respondents. Respondents represented tellers (28%), customer service (24%), back office (18%), supervision (16%) and management (14%). To this end, respondents were employees from 22 banks that are operational across urban, semi-urban, and rural locations; to ensure a variety of technological adoption contexts were covered. The data was collected using a tailor made structured questionnaire for this study source scales developed in existing literature. The questionnaire included five sections: the first section collected demographic information (age, gender, role, organization); the second section assessed digital technology usage through a 15-item scale for frequency and proficiency levels using various banking technologies; the third section measured training and development through a 12-item scale covering training access, quality, and perceived effectiveness; the fifth section assessed digital competency self-assessment using a 20-item scale; and the sixth section measured performance using self-reported and supervisor-rated measures across the dimensions of productivity, accuracy, customer satisfaction, and innovation. All of the measurement items applied five-points Likert scales varies from "strongly disagree" to "strongly agree" on items 1 {{sup}} to 4 {{sup}} and "never" to "always" on items 5 {{sup}} to 7 {{sup}} corresponding to different constructs. Before wide-scale administration, a pilot test using a smaller sample (30) of bank employees was conducted to establish clarity, relevance and reliability of the questionnaire. All Cronbach's alpha values for the scales were > 0.80, representing good internal consistency. Surveys were conducted both online through the use of email questionnaires and offline through the deployment of paper-based questionnaires at bank branches (with proper consent). The data was collected over a period of three months. Addressing ethical considerations: Informed consent, anonymity and confidentiality, voluntary participation where all participants were made aware of the purpose of the study.

4. DATA COLLECTION AND ANALYSIS

Table 1: Demographic Profile of Respondents

Demographic Variable	Category	Frequency	Percentage
Gender	Male	234	60.9%
	Female	150	39.1%
Age Group	Below 25 years	52	13.5%

	25-35 years	168	43.8%
	36-45 years	112	29.2%
	Above 45 years	52	13.5%
Educational Qualification	Graduate	145	37.8%
	Post-graduate	201	52.3%
	Professional degree	38	9.9%
Work Experience	Less than 5 years	98	25.5%
	5-10 years	156	40.6%
	11-15 years	82	21.4%
	More than 15 years	48	12.5%
Bank Type	Public Sector	186	48.4%
	Private Sector	162	42.2%
	Cooperative	36	9.4%

Table 1 shows the demographic characteristics of the 384 respondents in this study. There is a fair gender split of 60.9% male and 39.1% female respondents in the sample, with the banking sector in India being male-dominating this is indicative of the banking sector population/Gender Split. Although, there is a significant number of respondents (43.8%) in the age group of 25-35 years, hence the digitally native generations, the 36-45 years (29.2%) age category reveals that the workforce is in mid-career stages and are facing digital transitions. Education level is indeed high, wherein 52.3% are postgraduates and 9.9% are professionals, which seems like a fairly well-qualified working group. The work experience distribution suggests that 5–10 years of experience is the largest category (40.6%), creating a balance between younger employees who are digital natives and older employees who can contextualize the changes brought by technology. In terms of bank type representation, public sector (48.4%) and private sector (42.2%) banks cited similar levels of participation, with lower representations from cooperative banks (9.4%), facilitating comparative analyses across organizational contexts.

Table 2: Digital Technology Adoption Levels Among Banking Employees

Technology Category	**High Usage (%)**	**Moderate Usage (%)**	**Low Usage (%)**	**Mean Score**	**SD**
Core Banking	94.3%	5.2%	0.5%	4.82	0.44

System					
Mobile Banking Apps	78.6%	18.2%	3.2%	4.28	0.78
Internet Banking	82.1%	15.4%	2.5%	4.35	0.71
CRM Software	68.5%	24.7%	6.8%	3.94	0.89
Digital Payment Systems	86.2%	11.7%	2.1%	4.46	0.68
Data Analytics Tools	34.6%	38.5%	26.9%	3.12	1.15
Video Conferencing	62.8%	29.4%	7.8%	3.81	0.92
Cloud-based Applications	45.3%	38.8%	15.9%	3.38	1.02
AI Chatbots/Virtual Assistants	28.4%	42.7%	28.9%	2.98	1.08
Blockchain Technologies	12.5%	21.4%	66.1%	2.14	0.96

Digital technology adoption of banking employees across technology categories The data was obtained from 807 organisations and the highest level of score was for core banking systems at 94.3%, with a mean score of 4.82, indicating that these basic operational technologies are entrenched in the routine work of these organisations. The same can be said for digital payment systems (86.2% high adoption) and internet banking (82.1%), both customer-facing technologies. Mobile banking applications have high usage by 78.6% and indicating that the employees were comfortable with banking services through mobile phone. 68.5% of businesses use customer relationship management software, and only 6.8% of employees have low usage, suggesting that some employee groups may not use customer management systems directly. However, when it comes to digital tools, many advanced technologies are hardly incorporated – only 34.6% of professionals say

data analytics tools are used extensively, with 26.9% seeing low usage; AI chatbots have 28.4% extensive use with 28.9% reporting low usage; and blockchain technologies see the least average develop with just 12.5% in high usage and 66.1% at low usage. Emerging technologies (SD > 1.0) are more variable in their adoption compared to established banking systems (SD < 0.5), suggesting different exposure to these technologies, training, and job-role requirements of the participants.

Table 3: Technology Training and Development Participation

Training Aspect	Category	Frequency	Percentage
Training Received in Last Year	None	42	10.9%
	1-2 sessions	156	40.6%
	3-4 sessions	128	33.3%
	5+ sessions	58	15.1%
Training Delivery Mode	Classroom only	92	23.9%
	Online only	118	30.7%
	Blended	174	45.3%
Training Effectiveness	Low	68	17.7%
	Moderate	182	47.4%
	High	134	34.9%
Access to Learning Resources	Inadequate	95	24.7%
	Adequate	214	55.7%
	Excellent	75	19.5%
Training Time Adequacy	Insufficient	152	39.6%
	Sufficient	184	47.9%

Respondents participation in technology training or development is shown in Table 3. The data shows that 89.1% of employees had any technology training in the last 12 months (with some variations in frequency from 1-2 sessions (40.6%) 3-4 sessions (33.3%), 5 or more sessions (15.1%) but conversely, 10.9% received no Training). This points to a patchy availability of training activity across the sector. Training Delivery Mode With respect to the training delivery modes, the most common are blended (45.3% of other training methods32;41), followed by online (30.7%, 8 trainings37;38) and finally classroom (23.9%) and traditional classroom methods41, summarizing the transition toward flexible learning modalities. There is also a worrying trend around perceived training effectiveness: only 34.9% rate their training as very effective with another 47.4% rating it as moderately effective and 17.7% rate it as having low effectiveness. Fewer (19.5%) rated access as excellent, while nearly two-thirds (55.7%) rated it adequate and 24.7% inadequate, reflecting gaps in resource availability. Of the proportion of employees not satisfied with training time adequacy, it can be seen that 39.6 % feel training time is insufficient and only 47.9 % feel it is sufficient, which suggests that time limitations are a potential crucial factor limiting training effectiveness. In conclusion, the findings shed light on the necessity for more frequent and better-resourced and time-appropriate training program, in order to merely support effective digital skills development.

Table 4: Digital Competency Self-Assessment Scores

Competency Domain	Low Competency (%)	Moderate (%)	High Competency (%)	Mean Score	SD
Information & Data Literacy	14.6%	42.7%	42.7%	3.56	0.94
Digital Communication	8.3%	38.5%	53.1%	3.78	0.82
Digital Content Creation	28.4%	45.8%	25.8%	3.18	0.98
Digital Problem-Solving	22.4%	48.2%	29.4%	3.28	0.91
Cybersecurity Awareness	18.5%	44.3%	37.2%	3.42	0.88
System Navigation & Use	12.2%	35.7%	52.1%	3.68	0.86

Customer Service Technology	10.4%	40.6%	49.0%	3.72	0.79
Data Analysis & Reporting	32.8%	42.4%	24.7%	3.04	1.02
Adaptability to New Technologies	16.7%	46.4%	36.9%	3.48	0.89
Overall Digital Competency	18.5%	45.3%	36.2%	3.46	0.77

Table 4 summarizes the self-assessed levels of digital competency of employees for nine areas. The area where competency appears highest is digital communication (53.1% reporting high competency) with a mean score of 3.78, which may be reflective of the growing presence of digital communication tools in both personal and work-based environments. The third areas are system navigation and use (52.1% high competency, mean=3.68) and customer service technology (49.0% high competency, mean=3.72) which also show relatively good results, but rather this suggests employees feel comfortable enough with technology that is directly related to their work functions. However, multiple competency domains show relatively weak skills overall: For example, data analysis and reporting is the lowest competency domain overall, with only 24.7% of participants scoring high competency and 32.8% low competency (mean = 3.04), which suggests that continuing development can focus on this domain. The same trends are observed for the digital content creations with51.6% medium competency, 28.4% low competency and only 25.8% high competency respectively (mean = 3.18). Digital problem-solving shows a similar pattern of high competency (mean = 3.28) but with even more room for improvement (29.4%). It demonstrates that 36.2 per cent of participants believe themselves highly competent in terms of overall digital competency, while 18.5 per cent perceived themselves to be low competent and 45.3 per cent within the moderate range (mean = 3.46), indicating further opportunities for upskilling the banking workforce on a considerable level.

Table 5: Challenges in Digital Technology Adoption

Challenge	**Severe Challenge (%)**	**Moderate Challenge (%)**	**Minor Challenge (%)**	**Mean Score**	**SD**
Inadequate Training	38.5%	42.7%	18.8%	3.84	0.88

Time Pressure	44.3%	38.3%	17.4%	3.96	0.91
Resistance to Change	28.6%	46.9%	24.5%	3.58	0.82
Technical Complexity	32.3%	44.5%	23.2%	3.68	0.85
Insufficient Support	35.7%	41.4%	22.9%	3.76	0.87
Technology Anxiety	24.7%	38.8%	36.5%	3.42	0.94
Poor System Reliability	29.4%	42.2%	28.4%	3.54	0.86
Lack of Resources	31.5%	43.5%	25.0%	3.64	0.84
Work-Life Imbalance	26.8%	44.8%	28.4%	3.52	0.82
Job Security Concerns	22.1%	36.2%	41.7%	3.28	0.96

Table 5: Challenges faced by the banking staff in digital technology ر١ centimetre Time pressure is rated as the worst challenge (44.3% noting it as severe), with a mean of 3.96, as it is tough to keep up with the simultaneously learning of new technologies while continuing to be productive in the old ones by their jobs. The second biggest concern is inadequate training, with a whopping 38.5% ranking this as a serious issue (mean = 3.84), confirming the gaps in training outlined in Table 3. Number three, insufficient organizational support with 35.7% severe ratings (mean = 3.76), indicates that employees are frequently not receiving the coaching, mentoring, and tech support necessary to adopt technology well. Technical complexity of new systems- 32.3% (mean=3.68) - Even with sufficient upskilling, some technologies are beyond the reach of employees currently. The results indicate that organizational barriers (time, training, support, resources) are more impactful than individual psychological barriers (anxiety, resistance), suggesting that organizational interventions should be the primary target.

5. RESULTS AND DISCUSSION

Table 6: Correlation Between Digital Technology Usage and Employee Performance

Performance Dimension	**Correlation Coefficient (r)**	**Significance (p)**	**R^2**	**Relationship Strength**
Overall Job Performance	0.782	0.000**	0.612	Strong Positive

Task Efficiency	0.724	0.000**	0.524	Strong Positive
Accuracy Rate	0.658	0.000**	0.433	Moderate Positive
Productivity	0.745	0.000**	0.555	Strong Positive
Customer Satisfaction	0.692	0.000**	0.479	Moderate Positive
Innovation & Creativity	0.614	0.000**	0.377	Moderate Positive
Decision-Making Quality	0.681	0.000**	0.464	Moderate Positive
Adaptability	0.756	0.000**	0.572	Strong Positive
Collaboration Effectiveness	0.628	0.000**	0.394	Moderate Positive

** Correlation is significant at the 0.01 level (2-tailed)

Table 6 shows the Pearson correlation coefficients between the digital technology usage intensity and dimensions of employee performance. The outcome shows that all performance indicators are positively correlated and statistically significant at the 0.01 level. The relationships among overall job performance is significantly positive, with digital technology usage accounting on 61.2% variance ($R^2 = 0.612$; $p < 0.01$), suggesting that higher level use (extensively and proficiently) of digital technologies translates into substantially better performance at the job overall. There is a significant correlation ($r = 0.724$) between task efficiency indicating that digital tools greatly increase the speed and effectiveness with which workers perform their work activities. The second tightest fit is productivity ($r = 0.745$, $R^2 = 0.555$), suggesting that the use of technology accounts for 55.5% of the variance in productivity varification that digital technology significantly scales employee productivity. Adaptability shows a clear positive correlation ($r = 0.756$), which indicates that employees with better technology are more likely to adjust to work challenges and new tasks. These results give strong empirical validation to the notion that digital technology proficiency is a key determinant of the performance of employees along multiple dimensions in the banking industry.

Table 7: Multiple Regression Analysis - Predictors of Employee Performance

Predictor Variable	**Beta Coefficient**	**Standard Error**	**t-value**	**Significance**	**VIF**
Digital Technology	0.342	0.048	7.125	0.000**	1.84

Usage					
Digital Competency	0.286	0.052	5.500	0.000**	2.12
Training Effectiveness	0.194	0.041	4.732	0.000**	1.56
Organizational Support	0.156	0.038	4.105	0.000**	1.43
Years of Experience	0.082	0.034	2.412	0.016*	1.28
Educational Qualification	0.068	0.036	1.889	0.060	1.15
Age	-0.024	0.042	-0.571	0.568	1.92

Model Summary: $R = 0.856$, $R^2 = 0.733$, Adjusted $R^2 = 0.728$, $F = 147.32$, $p < 0.001$

** Significant at 0.01 level, * Significant at 0.05 level

Table 7 reports the outcomes of the multiple regression analysis for employee performance predictors. The model overall is highly significant ($F = 147.32$, $p < 0.001$) with an R^2 of 0.733 which is indicative of the predictive power of the model on employee performance. The most significant determinant ($\beta = 0.342$, $t = 7.125$, $p < 0.001$) of employee performance is the utilization of digital technology, meaning that for a 1 standard deviation increase in technology usage the employee performance increases by 0.342 standard deviation when holding other variables constant. Digital competence is the second most important predictor ($\beta = 0.286$, $t = 5.500$, $p < 0.01$), reaffirming that the quality of technology use counts as much as the quantity you want employees to not only use technology but they should have the skill required to use it well. Significant positive effect of training effectiveness ($\beta = 0.194$, $t = 4.732$, $p < 0.001$) establishes empirical rationale for investing in quality training programmes. The positive impact of organizational support is substantial ($\beta = 0.156$, $t = 4.105$, $p < 0.001$), meaning that, notwithstanding a high level of individual skills and competencies, a conducive organizational infrastructure and culture is required to guide employees through the process of becoming outstanding. Surprisingly, age did not strongly correlate with performance ($\beta = -0.024$, $p = 0.568$), very much defying the stereotype that older employees have a huge struggle with technology when we only control for the way they use technology and how competent they are with technology (age itself does not preclude high technology performance). This line of research sets technology-related factors (usage, proficiency and training)

as much more powerful predictors of performance than demographic traits and, thus, that a roadmap for performance intervention is clear.

Table 8: ANOVA - Performance Differences Across Bank Types and Job Roles

Factor	Groups	Mean Score	SD	F-value	Significance	Post-hoc Differences
Bank Type	Public Sector	3.42	0.68	18.45	0.000**	Private > Public**
	Private Sector	3.86	0.72			Private > Cooperative**
	Cooperative	3.28	0.81			Public > Cooperative*
Job Role	Teller	3.38	0.74	24.67	0.000**	Managerial > All**
	Customer Service	3.56	0.69			Supervisory > Teller**
	Back Office	3.48	0.76			Supervisory > Back Office*
	Supervisory	3.82	0.64			Customer Service > Teller*
	Managerial	4.14	0.58			
Technology Training	None	2.94	0.82	42.18	0.000**	5+ sessions > All**
	1-2 sessions	3.38	0.65			3-4 sessions > None**
	3-4 sessions	3.72	0.68			3-4 sessions > 1-2**
	5+ sessions	4.28	0.54			1-2 sessions > None**

** Significant at 0.01 level, * Significant at 0.05 level

Organizational and Individual Factors Affecting Performance: One-Way ANOVA Results (Table 8) As for bank type, there are also major differences ($F = 18.45$, $p < 0.001$) with significant scores of performance with private sector banks ($M = 3.86$), followed by public sector banks ($M = 3.42$) and cooperative banks ($M = 3.28$). This pattern is perhaps also a reflection of varying technology investments, with private banks generally devoting more significant budgets to digital infrastructure, training resources and performance management systems. ANOVAs for job role show that differences are significant ($F = 24.67$, $p < 0.001$) with managerial employees scoring highest ($M = 4.14$), followed by supervisory roles ($M = 3.82$), customer service ($M = 3.56$), back office ($M = 3.48$), and finally tellers ($M = 3.38$). This hierarchical pattern presumably mirrors the higher levels of technology exposure, training, and digital competency expected from employees in higher levels of an organizational hierarchy. Most notably, the frequency of training of technology also demonstrates differences of a major magnitude of effect ($F = 42.18$, $p < 0.001$). More specifically, employees receiving 5 or more training sessions, are the highest performers ($M = 4.28$) followed by 3–4 sessions ($M = 3.72$), 1–2 sessions ($M = 3.38$), and no training ($M = 2.94$) with dramatic between group differences across all training groups. The 46 percent difference between the means ($M = 2.94$ for untrained employees and $M = 4.28$ for highly trained employees) offers strong support for investing in ongoing training. These ANOVA findings emphasize that organizational factors (type of bank, type of job, type of training provided) create large between group performance differences that individual effort is insufficient to overcome.

5.1 CRITICAL ANALYSIS OF DATA AND COMPARISON WITH PAST WORK

The empirical results from this research are mostly in line with previous research, yet they also uncover some unique features specific to the Indian banking context. This study shows that there is a strong positive correlation between the use of digital technology and employee performance ($r = 0.782$) and is in line with Kumar et al. This also led us to believe that this relationship gap that related importance of managerial skills to enhanced productivity is very robust as was the case in Geyskens et al.'s (2006) study of European banks and as Li and Zhang (2010) found for Chinese banks, as we found a strong correlation ($r = 0.76$) between our finding and theirs. Yet the strength of the correlation in this research is greater and this may be due to the fact that Indian banking digitalisation is relatively new and, therefore, there are bigger divides between digitally literate workforce and traditional-oriented employees compared to more mature digital banking environments.

The result of the regression analysis, where 73.3% of the variance in performance is explained by use of digital technology, is a significantly higher degree of explanatory power than was reported in the majority of previous studies. For example, the findings of Anderson and Thompson's (2004) meta-analysis, which established an R^2 of.54 as an average to 28 studies, and the longitudinal of Garcia (2005) found R^2 of.61. The degree of explanatory power in our study is likely due to two factors. This study contributed in several ways: first, it introduced an approach to the measurement of frequency and proficiency in technology use as opposed to either intentions to adopt or the use (or non-use) of technology (as in most prior studies), thus providing a more nuanced variance in the predictor variable. First, Indian banking has experienced a more rapid digitalization than more slowly digitizing systems, which may have formed clearer distinctions between high and low technology users.

The identification of digital competency (β = 0.286) as a strong independent predictor when controlling for technology usage frequency also empirically justifies the skills-based training procedures promoted by the competence framework of the European Banking Federation. This aligns with argument of Patel and Kumar of proficiency being as or more important than access, however more robust quantitative evidence is found in our study. However, the precise competency domains that were weakest for employees (data analysis (mean = 3.04) and digital content creation (mean = 3.18)) map onto the signature patterns recognized by Rahman in Southeast Asian banks compared to Western studies where cybersecurity awareness was found to be the weakest domain. Despite methodological differences that complicate comparing their study design (cross-sectional vs. experimental), the estimated increase in performance of employees with 5+ training sessions over their untrained co-workers (46%) is more dramatic than the 28% increase Johnson and Lee report in their training intervention study. More compelling evidence of continuous training compared to earlier work which most often examined only Trained vs.Untrained clearly exists when examining total weekly training load (Fig.4C) to explore a putative dose-response relationship across training frequency levels.

The differences in bank type private sector outperforming public sector are broadly in line with current literature on organizational performance in Indian banking. Patterns were similar, reported Sharma and Gupta, with a few extra touches thrown in, related to private banks having greater autonomy from their corporate offices in HR decisions, growth through performance-linked pay and technology investments. Yet, the fact that we find these differences to persist even after controlling for each individual's technology usage and competence indicates that organizational culture, leadership, and support systems provide further performance advantages beyond individuals' capabilities. The lack of considerable age effects on performance through technology competency (β = -0.024, p = 0.568), which starkly contrasts negative age stereotypes around the technological proficiency of older workers; but complementing recent meta-analytic results from Morris et al., that most age-performance associations can be explained away by training and support rather than underlying ability. This calls into question age-discriminatory HR practices as well as establishes a case for providing inclusive training within organizations.

6. CONCLUSION

The implications of this empirical research are extensive as it shows the significant effect that the digital technologies have on employee performance and development in the banking sector. Using data from 384 banking employees, it is found that digital technology use significantly positively correlates with performance within the employees at the level of $r = 0.782$, $p < 0.01$, and Technology-related variables account for 73.3% of variance in performance. Results validate that employees with high digital literacy and higher technology use levels outperform those with lower digital literacy and lower technology use levels across several life's. Digital competencies that can only be gained through effective training programs and are essential to performing well with technology are crucial to the potential performance benefits of technology, the study said. When workers do get training in technology a few times a year (5+ annually), they perform 46% better than those who receive no training, making the case for investing in ongoing training for the business crystal clear. Yet alongside that, there are areas where training exists but is inadequate; forty per cent of employees receive little, hardly enough, or no time at all to train and fewer than a third of employees rate their training as highly effective. The two key

competency weakness remain in data analytics and digital content creation which imply training program must also cover from the basic system operation to high training on analytical and creative capabilities.

The findings identify a range of barriers to technology adoption, namely time pressure, inadequate training, and organizational support and suggest that while individual skill development is important, relevant organizational interventions are essential enablers to concomitantly facilitate adoption. This absence of large age-related performance differences once controlling techno social competencies challenges stereotypes about generations and suggests that digitally savvy organizations should adopt inclusivity in their digital transformations. The findings not only enhance academic literature, presenting strong, empirically based, context-specific results on the relationships between technology and performance in banking, but also extend existing theorical frameworks by showing the interaction among individual, technology, and organizational factors.

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