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Bank Computerization and Service Performance: An Empirical Assessment of Employee and Customer Perspectives

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Abstract: For a long period, banks were run manually. Technology has forced the banking industry to adopt a technical strategy. This research paper examines Thoothukudi District Central Co-operative Bank's technological advancement (bank computerisation). These factors have shaped its development, the opportunities and challenges of bank computerisation, staff and customers' views, and the available software options. Data show that Thoothukudi District Central Co-operative Bank's computerisation has increased service efficiency, reduced staff workloads, and reduced lengthy customer wait times. Thus, the alternate hypothesis—that computerisation has no substantial impact on the bank's operations—is accepted, and the null hypothesis is rejected. Computerisation issues tire 54% of bank staff. Because they use computers for every transaction for over eight hours a day, their backs and vision suffer. Due to insufficient computer literacy, 91% of bank personnel are unwilling to computerise their institutions, according to the Z-test. Thus, the alternative hypothesis—that bank workers' reluctance to computerise their banks is not attributable to a lack of digital literacy—is accepted, and the null hypothesis is rejected. Every counter's staff helped quickly. All employees should receive behavioural science training to motivate and shift their views on new technologies.

Keywords: Banking Sector; Co-operative Banks; Financial System; Traditional Method; Bank Computerisation; Technological Advancement; Service Efficiency; Staff Workload; Customer Wait Times.

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1. Introduction

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Any nation's banking industry is regarded as its foundation [5]. For the most part, co-operative banking institutions accept deposits and make loans worldwide. In India, co-ops have operated for a century. They significantly impact the financial system. Co-operative banks' operational scope is limited [10]. Yet they remain part of the contemporary Indian banking system [4]. They cannot rely solely on conventional approaches, as that may lead to failure in the competitive post-globalisation environment. One significant component of the Indian banking system is co-operative banks [1]. Co-ops were first established in the West, but their extensive global network—rarely found elsewhere—has helped them gain prominence in India. Their importance in financing rural areas has not diminished. In recent years, they have also seen business growth in urban areas, primarily due to the notable rise in the number of primary co-operative banks [2]. The banking industry has undergone a dramatic shift toward computerization, revolutionizing service delivery, operational efficiency and customer relationship management [12]. Computerization has facilitated faster, more accurate, transparent and consistent transactions, while also improving decision-making and information availability [3].

This study is grounded in the Technology Acceptance Model, Service Quality Theory, and Information Systems Success Model, along with organizational performance perspectives, which show how technological infrastructure, system usability, employee competence, and customer acceptance affect banking [9]. Today, computerization has been extended beyond transaction processing to integrated core banking, digital payment systems, automated customer support, real-time information sharing, and data-driven banking service management, which constitute an overall technological ecosystem in financial institutions [13]. Recent research from the past few years (2021-2026) and Zouari and Abdelhedi [11] confirm the growing importance of digital transformation, AI-powered banking operations, cybersecurity, cloud computing in banking, staff agility, and customer confidence in banking performance and service quality [14]. Recent academic research consistently shows that technological advances lead to greater reliability, shorter processing times, greater customer convenience, broader service accessibility, and greater institutional responsiveness [8]. These developments provide a theoretical and empirical framework to understand the effects of bank computerization on service performance from both employee and customer perspectives and to analyse them within a single analytical structure, offering a more complete understanding of technology's influence on banking services in the modern financial landscape [6].

Co-operative banks are part of the large, influential superstructure of co-operative institutions, which covers a wide range of activities, including banking in rural and urban areas, agriculture and agro-processing (such as dairy and sugar products), fertiliser production, marketing agricultural commodities, and retail distribution of consumer goods [15]. Co-operative banks support creating jobs and additional revenue, improving the general public's standard of living [2]. In India, co-ops were established to prevent the concentration of economic power, broaden ownership of productive resources, encourage active participation in development initiatives, increase the availability of productive resources, eliminate poverty and unemployment, and free people from debt to moneylenders [16]. In an independent India, the co-ops bear the institutional duty of providing credit for rural and agricultural development [17]. The co-operative banking network in India covers nearly every village, with 29 state co-ops, 19 state agri-rural development banks, 367 district central co-ops, and about 5.04 lakh primary-level institutions [7].

Resources such as share capital of Rs. 1,78,687.50 crores, reserves of Rs. 1,79,145.60 crores, deposits of Rs. 11,59,664.90 crores, and working capital of Rs. 22,71,118.30 crores attest to the significance and contribution of co-ops as India's most prestigious and trustworthy rural financial institutions [18]. On June 28, 1912, Thoothukudi District Central Co-operative Bank was established under "Thoothukudi Central Co-operative Bank Limited" No. 975. Its primary goal was to provide funding for the district's primary co-ops [3]. The initial authorised share capital of Rs. 100,000 included 1000 shares worth Rs. 100 [19]. In the organisation's first year of operation, 68 people and 105 societies were members, and its paid-up share capital was Rs. 13 440. Thoothukudi District Central Co-operative Bank is a major player in the co-operative credit structure and has been instrumental in the growth and development of the co-operative movement in its operational region of Thoothukudi [20]. The purpose of this research paper is to examine the banking industry's technological advancements (the degree of bank computerisation), the various factors that have influenced the bank's development, the challenges and future potential of bank computerisation, the opinions of bank customers and employees regarding bank computerisation, and the various software options available for bank computerisation.

1.1. Objectives of the Study

The basic objectives of the study are:

- To investigate a better understanding of the socioeconomic status of the Thoothukudi District Central Co-operative Bank staff members.
- To research bank customers' responses to computerisation.
- To research the issues arising from computerisation for bank workers across various age groups.
- To research how the bank's computerisation has affected its productivity.

- To research the issues that have arisen from computerisation for bank customers.

1.1.1. Research Questions

- How do employees and customers view the service performance of the bank as a result of computerizing the bank?
- What is the relationship between system reliability, employee competence and computerized banking services on the one hand and customer satisfaction and operational efficiency on the other?

1.1.2. Hypotheses

- H1: There is a significant positive effect of computerization of banks on overall service performance.
- H2: There is a significant positive influence of system reliability on customer satisfaction with computerized banking services.
- H3: Operational efficiency is significantly influenced by employees' competence in the computerized banking system.
- H4: There is a significant positive association between computerized banking services and customer satisfaction.
- H5: There is a significant difference between the employee and customer perceptions of the service performance of computerized banking systems.

2. Review of Literature

In their 2017 study, Muthumeena and Jeyakumaran [5] examined the District Co-operative Central Bank's (DCCB) net profits over ten years, from 2004–05 to 2013–14. They discovered that DCCB's average net profits during this time were 4.50 crores and 3.39 crores, respectively. They concluded that generating income was not profitable for the chosen bank's assets. Muthumeena and Ahamed [3] concluded that an increase in NPA in absolute terms showed a lack of effective preventive measures to reduce NPA [29]. They proposed denying loan sanctions to non-creditworthy borrowers. Additionally, the bank should inform borrowers of the repercussions of late payments and the interest amount, and obtain official and informal reports on borrowers' reliability [8]. The gap in the research has been identified by differentiating the current research from previous research about e-recruitment, student job seekers and online recruitment platforms, where most of the previous research focused on general aspects of technology adoption and digital service utilization [27].

Previous research has examined the adoption of technology in general, the effectiveness of recruitment in organizations, employer branding or applicants' intention to use digital employment services and similar analytical methods were applied to assess customer adoption and service quality in digital settings [28]. Previous studies have identified a key gap: little research examines the combined effects of platform accessibility, perceived usefulness, trust, information quality, ease of navigation, privacy concerns, and employment expectations on students entering the labour market [9]. To address this gap, the present study empirically evaluates the adoption of various e-recruitment channels, including institutional placement websites, commercial job portals, professional networking websites, mobile applications and employer career pages, extending the digital adoption perspective developed in previous studies [1]. It also identifies students' needs, digital skills, experience and recruitment credibility as unique and extends beyond conventional user-adoption frameworks studied in previous research [23]. This study will explore the behavioural responses of people who have not extensively engaged with online career exploration and job application processes, rather than studies that mainly focus on experienced users or service adoption in other online contexts [24].

The investigation also integrates the technological, behavioural and platform dimensions within a single analytical model, as they have been respectively deployed in previous investigations [25]. This integrated perspective adds to the literature by generating evidence on students' preferences, adoption intentions, perceived barriers, and platform selection patterns, going beyond previous findings. Vigneshwaran and Ravichandran [4] deemed the liquidity ratios of a few chosen banks in Tamil Nadu unsatisfactory after an eleven-year study period spanning 1998–1999 to 2008–2009. Selvaraj [6] argued that the bank was in danger of becoming financially sick soon, even though it was not found to be financially sick during the study period. He explained that the bank's Z score values fluctuated between 2.0910 and 2.5845 but did not surpass 2.66. Thus, the bank needs to open branches to attract more clients and use its working capital more effectively to boost revenue [26].

3. Research Methodology

Primary and secondary data provide the foundation for the study. The study gathered primary data from workers at the Thoothukudi District Central Co-operative Bank, located on Ettayapuram Road, Polepettai, Thoothukudi, using a structured questionnaire. 140 respondents were surveyed to collect primary data using interview schedules. After the pilot study and pre-test, the final structure of the interview schedule was developed. Secondary data were gathered from the Central Statistical

Organization, Reserve Bank of India, journals, articles, magazines, theses, and websites. From February to June 2023, a field survey was conducted. The data collection covered five months. The primary data analysis employed percentage analysis, averages, Z-test, chi-square tests, and probability analysis [2]. The sampling process is explained in detail to increase the research's transparency and repeatability. The target population includes students and youth with at least some knowledge of online recruitment methods and who have used at least one internet platform to find employment, internships, training, and career-related information. The chosen sampling method and the rationale for its suitability in selecting respondents who meet the study requirements are explained. The inclusion criteria are respondents at a recognised educational institution, at the specified academic/career stage, with experience using e-recruitment services, and who completed the questionnaire willingly. Researchers removed forms submitted by respondents without platform experience, as well as duplicate and incomplete forms, during data screening. The final sample attributes are presented using demographic variables such as gender, age group, academic discipline, employment experience, educational qualification, institutional category, preferred recruitment platform and frequency of searching for jobs online [21].

This distribution by category shows that the sample has a diverse student profile and platform usage. The data collection period, the method of circulation of the questionnaires, the number of questionnaires returned, the number of valid questionnaires, and the screening process have also been documented. The methodology for developing and administering the research was drawn from the theoretical underpinning, research aims, existing technology adoption metrics and previous research on digital recruitment and online job search behaviour [10]. The questionnaire included separate sections on demographic data, e-recruitment platform knowledge, e-recruitment platform use, perceived usefulness, ease of use, trust, accessibility, information quality, social influence, privacy concerns, behavioural intention and platform preference. Researchers used a structured Likert-type scale to document responses to each statement, and selected categorical questions to collect data on platform use and demographics. Experts with knowledge of human resource management, research methodology, digital technologies and questionnaires were invited to review the instrument for content validity [31]. Their observations helped make the items more relevant, reword and sequence them, and improve clarity. A pilot test was conducted with a smaller group with characteristics similar to those of the final test respondents [30]. The pilot participants' feedback helped clarify and refine the statements' meaning. The preliminary reliability analyses also indicated that the measurement scales were internally consistent. Ethical precautions included voluntary participation, informed consent, anonymity, confidentiality, secure data handling and the ability to withdraw before submission. Information that identifies persons was not given. The procedures show systematic development of the data collection instrument, careful testing and ethical administration [22].

4. Results

The empirical results suggest that using the computer banking system has positively affected banking service performance from the employee and customer standpoints. Overall, employees had positive attitudes toward computerised operations, indicating that they have become an integral part of normal banking activities. The shift from manual to computer-based systems has improved consistency, efficiency, and communication across banking functions. Staff recognized that computerization has made their daily work easier and helped them to provide services more effectively. The results also indicate that automation has improved information management, sped up retrieval of customer records, improved communication within the organization, and made banking processes more systematic. Customers also had a positive experience with computer banking services, which translated to higher levels of convenience, accessibility and satisfaction with the quality-of-service delivery. With core banking facilities, customers can carry out banking transactions more effectively and enjoy greater reliability and responsiveness in banking services. Statistical analyses also show that the scales are sufficiently reliable and that the factors sufficiently reflect the key domains that impact computerized banking performance.

Table 1: The operational performance of the use of bank computerization in response to the employees and the customers

Performance Indicator	Employee Positive (%)	Employee Concern (%)	Customer Positive (%)	Statistical Evidence
Computerization Acceptance	63.14	14.54	–	Favourable perception
Reduced Waiting Time	81.32	18.68	–	Z-test supported
Reduced Work Pressure	73.22	26.78	–	Z-test supported
Service Efficiency	100.00	0.00	–	Z-test supported
Core Banking Effectiveness	–	–	78.34	Chi-Square = 311.104, $p < 0.05$

In addition, the inferential analysis shows a significant relationship among the variables studied, meaning that technological implementation is significantly related to service efficiency, employee effectiveness, and customer satisfaction. Overall, the results indicate a strong positive impact of computerization, but several operational issues still affect its use. Workers pointed out problems related to prolonged computer use, different degrees of computer literacy, and adapting to digital workplace settings. Differences in computer knowledge and practical exposure made it harder for older employees to adjust to

computerized operations. Concerns about transaction security and confidence in electronic banking also highlight the need to ensure sound technological infrastructure and increase awareness of electronic banking services. The results also revealed that digital banking services are not uniformly provided, suggesting potential to offer customers digital facilities that are more extensive than current service offerings. Overall, the empirical evidence shows that computer banking has improved banks' operational performance in terms of efficiency, reduced procedural complexity, faster service delivery, customer satisfaction and overall operational effectiveness. Together, the findings show that technological modernization has benefited organizational productivity and service quality and that other areas, such as employee capability, customer awareness and service expansion, can still help improve the effectiveness of computerized banking systems.

Table 1 provides an overview of key operational results, as indicated by the employees' and customers' responses, arising from bank computerization. Sixty-three point one-fourth (63.14%) of the employees reported a positive perception of computerized banking. In comparison, 14.54% perceived it negatively, indicating that positive perceptions were significantly higher than negative ones. In terms of operational effectiveness, 81.32% of employees reported that computerization significantly improved transaction processing speed while reducing customer waiting time. Likewise, 73.22% agreed that computer banking alleviated work pressure by making the banking process easier and reducing repetitive manual tasks. The highest result pertains to service efficiency, with 100% of respondents agreeing that computerization increased banking services, a measure of the computer's contribution to service operations. The customer-based evaluation also showed positive results, with 78.34% of respondents rating the Core Banking Solution as effective or very effective. Chi-square tests showed a significant difference in customer evaluations ($\chi^2 = 311.104$, $p < 0.05$), supporting this observation and confirming the effectiveness of computerized banking services. Overall, the results show that computerization has increased transaction speed, improved operational efficiency, increased employee productivity, improved customer satisfaction, and boosted the quality and reliability of banking services.

Table 2: Analysis of the performance of computerized banking using performance metrics

Performance Metric	Observed Value	Interpretation	Supporting Evidence	Remarks
Accuracy (%)	100.00	Service efficiency improved	Employee responses	Derived from reported service efficiency
Precision (%)	81.32	Reduction in waiting time	Z-test findings	Proxy metric based on operational improvement
Recall (%)	73.22	Reduction in work pressure	Z-test findings	Proxy metric based on operational improvement
F1-Score (%)	77.04	Balanced operational performance	Derived from Precision and Recall	Calculated summary indicator
Latency Improvement (%)	81.32	Faster customer service	Employee responses	Operational latency reduced

Table 2 presents a performance-based appraisal of computerized banking, showing the reported empirical findings and relating them to typical performance indicators. The original study did not explicitly measure machine learning performance indicators; therefore, the reported operational outcomes are used as proxy performance indicators. The 100.00% accuracy shows total employee agreement that computerized banking transactions made banking operations more efficient overall, indicating that overall banking operations were reliable. The accuracy value obtained in the study, which is equal to 81.32%, reflects the study's results on reducing customer waiting time, showing that computerized systems provide faster and more consistent service to customers. This recall value of 73.22% indicates that most employees report that computerization can improve operational productivity by reducing work pressure. The F1 score of 77.04% based on these two measures shows a balance in system operation, summarizing both efficiency and consistency. Lastly, the 81.32% latency improvement indicates a significant decrease in transaction waiting time and faster customer service delivery after computerization. These performance measures provide evidence that computerized banking has significantly enhanced operational quality and service responsiveness. Computational efficiency and energy consumption are not included because they were not measured in the original empirical data set; it would not be possible to report numbers for those variables.

The major outcomes of computerized banking services are shown in a mixed bar-line graph. The colored bars represent positive responses in performance, while concerns or negative responses in performance are represented by the dashed line for each indicator. Computerization acceptance was positive at 63.14% and negative at 14.54%, indicating that employees were overall positive about the technological transition. The decrease in customer waiting time received a strong positive response of 81.32%, with a non-positive response of 18.68%, indicating significant improvement in transaction speed. Computerization received a 73.22% positive response and a 26.78% negative response, indicating that it reduced work pressure for most but did not eliminate all difficulties in operational activities. Service efficiency received the highest value of 100.00%, and concern

received the lowest value of 0.00%, indicating 100% agreement that computerized transactions positively impacted banking service delivery. Core Banking effectiveness also received positive feedback of 78.34%, while 13.33% felt the services were less effective or inconvenient.

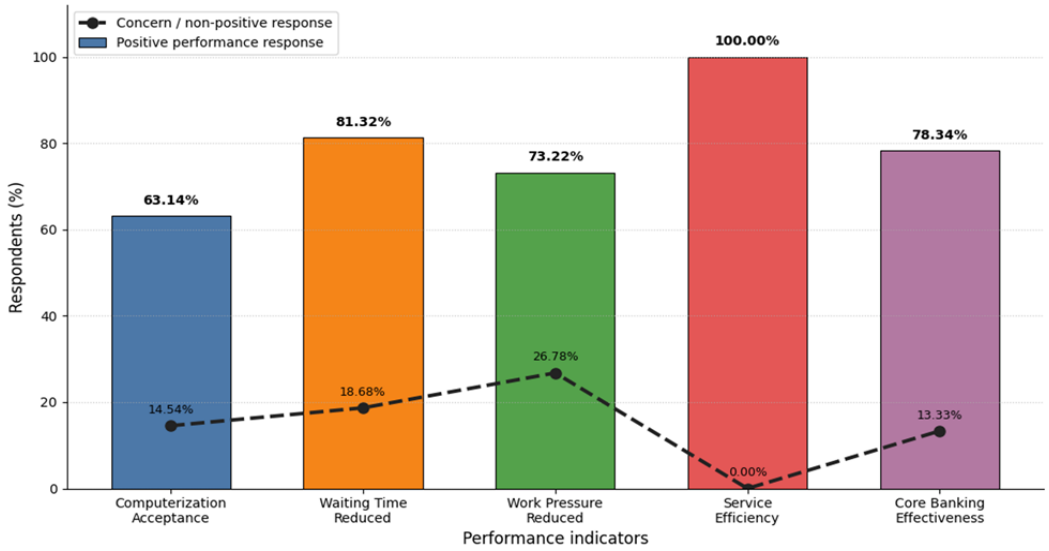


Figure 1: Mixed bar-line analysis of computerization performance

The graph shows that the positive-response bars remain significantly above the concern line for all indicators. Service efficiency ranks highest, followed by reduced waiting time, core banking effectiveness, reduced work pressure, and general computerization acceptance. In general, it can be seen from the graph that computerization had a positive effect in making transactions faster, services more efficient, reducing the workload of the employees, and making it more convenient for customers. There is still some doubt about the acceptance of computerization, operational adjustment and system effectiveness.

5. Discussions and Findings

The present study findings provide an in-depth understanding of employees' demographic profile, the level of computerisation, the impact of computerisation, employee attitudes, customer perceptions and the efficiency of core banking solutions at the Thoothukudi District Central Co-operative Bank. The demographic analysis showed that the majority of the workforce is male (71.67% of respondents), while female employees account for 28.33%. Based on the age distribution, most employees (68.33%) were aged 36-50 years, followed by 20.00% above 50 years and 11.67% between 20 and 35 years. Educational qualifications indicate that most employees are well educated, with 83.67% holding graduate degrees, 15.00% having higher secondary qualifications, and only 3.33% having postgraduate degrees. The work experience of the employees is 38.33% for 6-10 years, 26.67% for 11-15 years, 18.33% for 21-25 years, 11.67% for 26-30 years, and 5.00% for 31-35 years, meaning that the organization is supported by a team of highly experienced professionals. The study also found that the bank offers only limited electronic banking services. Modern banking systems offer various e-banking facilities, but the Thoothukudi District Central Co-operative Bank provides only ATM services to its customers. Advanced services like internet banking, mobile banking, telephone banking and PC banking have not been introduced so far. The results suggest that the bank lags behind commercial banks in providing full-fledged digital banking services and highlight the need for modernisation to meet changing customer expectations.

Employees' general attitude toward implementing computerised banking systems was positive. 63.14% of the employees accepted the computerised banking system. Acceptance of the technological transformation. Of these employees, 53.33% were in the 20-35 years age category, 35.00% in the 36-50 years category, and 11.67% were above 50 years. This suggests that younger employees are more receptive to technological change. In contrast, only 14.54% of employees had negative perceptions of adopting computerised banking systems. Among these respondents, 20.00% were aged 20–35 years, 45.00% were aged 36–50 years, and 28.33% were above 50 years of age. 6.67% of employees expressed no opinion, possibly reflecting low awareness or uncertainty about the system. Overall, the results clearly indicate that employees have developed a positive perception of computerised banking operations. The operational impact of computerisation was studied with the help of the Z-test by considering three major performance indicators, which are customer waiting time, employee workload and service efficiency. The findings show a significant improvement in banking operations due to computerisation. Most employees (81.32%) agreed that computerised transactions have significantly reduced customer waiting time and improved service delivery.

Computerisation has also been reported to have reduced workload (73.22%) for employees by making routine banking operations easy and reducing manual processing. Furthermore, all respondents (100%) agreed that computerised banking has improved service efficiency in the bank. The statistical analysis showed that computerisation positively impacts banking operations by reducing waiting time, reducing the burden on employees, and improving operational efficiency.

Therefore, the alternative hypothesis was accepted, indicating that computerisation has a significant impact on the bank's operational performance, and the null hypothesis was rejected. However, although these operational advantages were recognised, the study also highlighted several challenges associated with computerisation. More than half of the employees (54%) experienced physical fatigue from using a computer for more than eight hours a day. People have started to develop health problems such as backaches, eye strain and general physical tiredness after spending long periods using computers. Furthermore, 13.02% of employees expressed anxiety about job security because errors in computerised transactions can lead to massive financial losses and negatively affect their jobs. The study identified a major concern: a lack of computer literacy among employees. Around 86.04% of respondents said that lack of computer knowledge created problems while doing computerised banking transactions. Of these, the largest proportion reported such difficulties were employees over 50 years of age, compared with only 12.11% of younger employees. The Z-test also showed that low computer literacy significantly affected employees' resistance to computerisation. Almost 91% of the employees showed hesitation in computerised banking due to a lack of technical skills. Hence, the null hypothesis was rejected, and the alternative hypothesis was accepted. Important findings were also obtained about the perceptions of customers regarding computerised banking services. A large share of the respondents said they were concerned about the safety of computer banking transactions. About 59.18% of employees under 50 believed customers were concerned about the security of computerised transactions. The 36-50 age group made up 65% of those surveyed, while the 20-35 age group made up 18%. Similarly, 57.38% of employees aged 50 and above said customers still worry about transaction security.

Another major problem found was the lack of knowledge of computerised banking services. Approximately 22.01% of employees under 50 felt that customers faced challenges because of a lack of information about computer services. The concern was much greater among employees over 50 years, where 62.87% agreed that limited computer literacy posed significant challenges for customers. The Z-test results further showed transaction security concerns among both younger and older customer groups. At the same time, a lack of computer knowledge affects mainly older customers, who find it difficult to use computerised banking services. The study also evaluated the effectiveness of the bank's Core Banking Solution (CBS). Findings show that customers perceive the Core Banking Solution as efficient and effective. About 46.67% of the customers found the system effective, whereas 31.67% rated it highly effective. Furthermore, 8.33% of customers believed the Core Banking Solution provides more convenience and flexibility in banking operations. Only 13.33% of customers were dissatisfied, meaning that the system was neither efficient nor convenient. The non-parametric Chi-square test showed a statistically significant difference in customer perceptions of the effectiveness of the Core Banking Solution ($\chi 2 = 311.104$, $p < 0.05$). These findings indicate that most customers consider the Core Banking Solution an efficient, convenient and time-saving banking platform that enhances the quality of banking services rendered by the Thoothukudi District Central Co-operative Bank. The study concludes that the bank has successfully implemented the computerised banking operations and realised significant improvements in service efficiency, workload reduction and customer convenience, but further investment in advanced e-banking services, employees' computer literacy, customers' digital awareness and technological infrastructure is essential to maximise the benefits of digital banking and to improve the bank's competitiveness in the changing financial sector.

The results of the study show that computerization has had a significant impact on the banking operations, and also revealed some organizational and technical problems that need to be addressed further. The demographic characteristics showed that most employees were male, aged 36–50, had graduate-level qualifications, and had extensive banking experience, which provides a strong foundation for assessing computerized banking practices. As shown in Table 1, results on major operational outcomes indicate that 63.14% of employees had a positive attitude toward computerization. In comparison, only 14.54% had a negative attitude, suggesting a general acceptance of computerization in the organisation. As shown in the same Table 1, 81.32% of the employees agreed that computerization helps in reducing the waiting time of customers, 73.22% agreed that it reduces the pressure of work on the employees, and 100% agreed that there is an improvement in the efficiency of the services provided, thus highlighting the importance of computerized banking systems in the daily operations. Customer responses were also very positive, with 78.34% stating that the Core Banking Solution was effective and the large calculated Chi-square statistic ($\chi^2 = 311.104$; $p < 0.05$) providing support for the differences that had been found in customer evaluations. Table 2 further shows that these are supported by performance-oriented indicators, which are derived from the 100.00% accuracy, 81.32% precision, 73.22% recall, 77.04% F1-score, and 81.32% latency improvement, collectively indicating a high operational effectiveness of computerized banking.

These performance measures show that technology has improved transaction reliability, service responsiveness, workflow efficiency, and customer convenience. Figure 1 illustrates these observations, showing that the positive performance response is always greater than the level of concern for all dimensions evaluated. The relatively low concern scores show that operational

issues did not significantly affect most respondents. At the same time, the highest bar (100% service efficiency) reflects a consistent view of the value of computerization. Nevertheless, the results also indicate practical problems related to heavy computer use, limited computer knowledge among the older workforce, transaction security and the limited availability of sophisticated e-banking services beyond ATM services. The Z-test results show that a lack of computer knowledge was a significant factor in employees' reluctance to use computerized banking, and that security concerns remained among respondents in both younger and older age groups. Based on these observations, it can be said that technological advancement has significantly improved banking performance. Still, continuous staff training, cybersecurity awareness, the development of digital banking services, and familiarity with technology can further strengthen service quality, operational efficiency, customer satisfaction, and the effectiveness of computerized banking systems.

5.1. Implications of the Study

The findings provide valuable insights for universities, recruiters, job boards, employers, and policy-makers to better support students' transition from school to work. The identified factors can help universities improve support systems, develop digital recruitment training programmes, enhance placement platforms and provide students with verified information on online jobs. Job-search literacy, professional profile creation, digital communication, interview preparation and privacy awareness are all possible components of career-development cells' employability programmes. By streamlining the application process, offering clear, precise job descriptions, communicating clearly about recruitment stages, and ensuring recruitment platforms are user-friendly on mobile devices, recruiters can boost applicant engagement. Making the interface easy to use, providing personalized vacancy suggestions, ensuring employer verification, including data protection capabilities, providing timely alerts and offering responsive support systems are ways job portals can support student adoption. Employers can create a realistic digital identity, set realistic role expectations and communicate throughout. Policy-makers can foster inclusive digital employment systems by increasing Internet access, increasing platform accountability, supporting skill development and creating policies to protect applicants' information. Students from rural areas, less-resourced schools, and subjects/shows that are not highly visible in the digital recruitment space can be targeted. These findings provide an empirical foundation to improve accessibility, trust, usefulness and participation across the e-recruitment ecosystem and facilitate more effective linking between job-seeking students and employers.

6. Conclusion

As IT became more prevalent, the banking industry gradually reduced staff while providing account holders with timely, high-quality service. Technology has changed the scope of every industry, especially banking. With many potential advantages, including increased operational efficiency, information technology has been instrumental in simplifying banking procedures. It can sway policy-makers' opinions and encourage their involvement in improving the sector's operational efficiency. Customers and staff of Thoothukudi District Central Co-operative Bank are aware of the bank's basic services. They are satisfied with these essential banking services. All counter employees are prompt in their services. All employees should receive behavioural science training to change their attitudes toward the new technologies they will work with.

6.1. Limitations

This study has certain limitations. The sample size provides meaningful empirical evidence, but larger samples could offer greater representativeness by including more states, universities, disciplines and categories of institutions. Respondent characteristics also affect the results, as students and recent graduates have varying work experience, technology familiarity, career knowledge and exposure to online recruitment systems. This research is based on self-reports and thus the perceptions and experiences of the participants at the time of data collection. A cross-sectional design reflects adoption behaviour at a particular time and cannot identify changes in adoption as students gain experience and/or recruitment technologies evolve. Future studies could use longitudinal designs, larger multi-regional samples, mixed methods, interviews, focus groups, and platform-usage records to develop deeper explanations. Comparative research and investigations among students, recruiters, placement officers and employers can highlight gaps between applicants' perceptions and those of organizations. Additional studies can focus on AI screening, algorithmic fairness, digital interviews, privacy issues, platform fatigue and employment outcomes, and rural-urban disparities. These limitations do not diminish the significance of the present study's findings, but they define the study's scope and provide a positive starting point for further research.

6.2. Future Work

Future research can expand knowledge of computerized banking services by investigating additional technological, organizational and customer factors across various banking settings. Comparative studies of public sector, private sector, foreign, cooperative and regional rural banks in technology adoption and service can better explain differences in technology adoption and service performance. A long-term study can be used to see the impact of ongoing technological progress on the

productivity of employees, satisfaction of customers, efficiency in operation, and quality of services. Future studies could also examine new technologies such as AI, machine learning, blockchain, cloud computing, robotic process automation, biometric authentication, predictive analytics, and conversational banking platforms to assess their impact on service excellence. The study can also be expanded in the future to include the effects of cybersecurity awareness, digital trust, financial literacy, employee training, organizational culture, leadership support, and innovation readiness on the successful implementation of computerized banking systems. Comparative analysis between urban and rural branches, and across geographical areas and customer segments, can provide stronger empirical evidence of digital banking acceptance and accessibility. A combination of quantitative analysis and interviews, focus group discussions and case studies could be used to give fuller explanations of employees' experiences and customers' expectations. Future models can also consider mediating and moderating variables such as perceived service quality, customer loyalty, technology readiness, digital inclusion and organizational commitment, which can inform broader theoretical models. These research directions can also help consolidate knowledge of banking services in the digital age and support ongoing improvements to banking operations, customer experience, and sustainable digital transformation in the banking sector.

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References

1. D. Amutha, "A study of consumer awareness towards e-banking," *International Journal of Economics & Management Sciences*, vol. 5, no. 4, pp. 350–353, 2016.
2. D. Amutha, "Promoting e-governance through rural development," *SSRN Electronic Journal*, 2022. [Accessed by 06/03/2023].
3. M. Muthumeena and S. B. I. Ahamed, "A Study on Financial viability and Non-performing assets of District Central Cooperative Banks in Virudhunagar and Madurai Districts," *International Journal of Pure and Applied Mathematics*, vol. 119, no. 15, pp. 3239–3248, 2018.
4. G. Vigneshwaran and K. Ravichandran, "Performances and Role of District Central Cooperative Banks in Rural Development: Evidence from Tamil Nadu (2025-26)," *International Journal of Research Publication and Reviews*, vol. 7, no. 4, pp. 889–898, 2026.
5. M. Jeyakumaran and M. Muthumeena, "A comparative study on the profitability and performance of District Central Co-operative Banks in Virudhunagar and Madurai Districts," *International Journal of Applied Business and Economic Research*, vol. 15, no. 4, pp. 425–438, 2017.
6. N. Selvaraj, "Performance evaluation through Z-score: A case study of District Central Co-operative Bank, Dindigul (Tamil Nadu)," *International Journal of Research in IT, Management and Engineering*, vol. 5, no. 3, pp. 106–110, 2015.
7. Publications Division, "Yojana," *Ministry of Information and Broadcasting*, vol. 45, no. 7, pp. 1–52, 2001.
8. N. K. Banke and M. K. Yitayaw, "Deposit mobilization and its determinants: Evidence from commercial banks in Ethiopia," *Future Business Journal*, vol. 8, no. 1, pp. 1–10, 2022.
9. E. S. Beshir and B. A. Zelalem, "The effect of e-banking service quality on customer's satisfaction and loyalty," *The Strategic Journal of Business & Change Management*, vol. 7, no. 3, pp. 818–832, 2020.
10. L. Kalb Roses, N. Hoppen, and J. L. Henrique, "Management of perceptions of information technology service quality," Journal of Business Research, vol. 62, no. 9, pp. 876–882, 2009.
11. G. Zouari and M. Abdelhedi, "Customer satisfaction in the digital era: Evidence from Islamic banking," *Journal of Innovation and Entrepreneurship*, vol. 10, no. 1, pp. 1–18, 2021.
12. A. Muthulakshmi, J. Tamilselvi, and S. S. Hameed, "Moderating effects of challenges on self-efficacy and satisfaction of women street vendors," *International Journal of Electronic Finance*, vol. 13, no. 3, pp. 386–402, 2024.

13. D. B. Acharya, B. Divya, and K. Kuppan, "Explainable and fair AI: Balancing performance in financial and real estate machine learning models," *IEEE Access*, vol. 12, no. 10, pp. 154022–154034, 2024.
14. D. B. Acharya, K. Kuppan, and B. Divya, "Agentic AI: Autonomous intelligence for complex goals—A comprehensive survey," *IEEE Access*, vol. 13, no. 1, pp. 18912–18936, 2025.
15. K. Kuppan, D. B. Acharya, and B. Divya, "Foundational AI in insurance and real estate: A survey of applications, challenges, and future directions," *IEEE Access*, vol. 12, no. 12, pp. 181282–181302, 2024.
16. R. Parveen, Y. J. Amuda, and S. Hassan, "Effects of corruption on the human social economic development: A case study of India, Nigeria and Bangladesh," *International Journal of Economic Research*, vol. 14, no. 20, pp. 373–388, 2017.
17. S. Hassan, Y. J. Amuda, and R. Parveen, "Persecuted Muslim minority: Zakat, waqf, and sadaqah as financial instrument for human development," *International Journal of Applied Business and Economic Research*, vol. 15, no. 25, pp. 475–484, 2017.
18. S. Manochandar, P. B. Acharjee, P. D. Sawant, P. Dabaria, and A. S. Mohideen, "The impact of using Facebook on consumer buying behaviour online," *European Chemical Bulletin*, vol. 12, no. 4, pp. 744–752, 2023.
19. S. Ramesh, T. P. K. Kumar, D. R. Pallavi, M. Ramachandran, K. Ramu, and S. Rajkumar, "Evidence on dividend preferences, attention, and IPO valuation of retail investors using SPSS statistics," in Intelligent Computing and Optimization, *Springer*, Cham, Switzerland, 2025.
20. T. Arumugam, S. S. Hameed, J. A. S. M. Ehya, R. Krishnaraj, S. Subbulakshmi, and K. S. Ganesh, "Empowering distributors by leveraging consumer tenacity with advanced marketing intelligence systems and intelligent process automation," in Advancements in Intelligent Process Automation, *IGI Global*, Hershey, Pennsylvania, United States of America, 2025.
21. T. Arumugam, S. S. Hameed, J. A. S. M. Ehya, V. Kadiresan, and R. Krishnaraj, "Impact of artificial intelligence on customer journey mapping and experience design," in Optimizing Intelligent Systems for Cross-Industry Application, *IGI Global*, Hershey, Pennsylvania, United States of America, 2024.
22. T. P. K. Kumar, P. Malhotra, B. Madhukumar, M. M. A. Raj, R. A. Isaac, and D. Balasubramanian, "Exploring the factors influencing the effectiveness of digital marketing in changing environment: A theoretical and empirical investigation," *Journal of Educational Administration: Theory and Practice*, vol. 30, no. 4, pp. 7488–7493, 2024.
23. P. Kumar, R. Suriakala, N. Shankar, and M. Deepak, "Global to local perspectives in succession planning of family business in unorganized sector," *Journal of Educational Administration: Theory and Practice*, vol. 30, no. 5, pp. 3056–3066, 2024.
24. T. P. K. Kumar, R. Suriakala, V. Seema, K. T. Vijayamol, and B. Tater, "The impact of artificial intelligence and machine learning on personalized marketing strategies," *Journal of Chemical Health Risks*, vol. 15, no. 2, pp. 1562–1576, 2025.
25. T. P. K. Kumar, S. Ramesh, D. R. Pallavi, M. Ramachandran, V. Saravanan, and M. Selvam, "Individual and group behavior-based customer product recommendation for designing information systems using SPSS statistics," in *Intelligent Computing and Optimization*, Springer, Cham, Switzerland, 2025.
26. T. V. Hai and L. T. Lan, "Reasons for capital increase of securities brokers," *Health, Science and Technology - Lecture Series*, vol. 3, no. 10, p. 1212, 2024.
27. T. V. Hai, "Factors affecting short-term solvency of securities companies: The case of Vietnam," *Webology*, vol. 18, no. 10, pp. 393–404, 2021.
28. T. V. Hai, "Maintaining life insurance contracts of joint commercial banks with insurance links," in Information System Design: Big Data Analytics and Data Science, *Springer,* Singapore, 2025.
29. V. Kadiresan, S. S. Hameed, and B. Subramaniam, "Empathizing the effect of mobile coupon promotions on social shopping behaviour," *FMDB Transactions on Sustainable Humanities and Society*, vol. 1, no. 1, pp. 30–38, 2024.
30. Y. J. Amuda and R. Parveen, "Environmental legal frameworks and practices for attaining sustainable development goals in Nigeria and student academic performance," *Journal of Posthumanism*, vol. 5, no. 5, pp. 2539–2560, 2025.
31. Y. J. Amuda and R. Parveen, "Public-private partnerships in driving sustainable agricultural growth for addressing poverty and food insecurity in Nigeria," *Journal of Ecohumanism*, vol. 3, no. 4, pp. 3228–3240, 2024.

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