REVOLUTIONIZING BANKING USING THE AMALGAMATION OF ARTIFICIAL INTELLIGENCE AND BLOCKCHAIN

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Abstract :
This study aims to analyze the impact of disruptive technological innovations on the quality of service delivery and employee performance in investment banks. The cluster sampling method was used to collect primary data from 500 respondents in foreign investment banks. Variables such as employee performance, service delivery, technology, security, operations, strategy, and quality were analyzed using chi-square, linear stepwise multiple regression analysis, and correlation. Storage network, operating costs, client reporting, cloud systems, and money laundering were found to be the most significant predictors of employee performance. Banks utilizing fusion technology offer high-quality services to clients. A strategic solution causes employee performance to multiply every unit because of a strong and positive association. The integration of artificial intelligence and blockchain technology enables increased automation, enhancing efficiency and reducing operating costs. This integration plays a crucial role in fraud detection, customer support, risk management, security, digitization, automation processes, algorithmic trading, wealth management, and other areas.

Keywords :Blockchain, Statistical Package for Social Science, Artificial Intelligence

1. Introduction

The banking industry has undergone significant technological transformation in recent years, focusing on digitization to enhance customer experience and maintain customer relationships while optimizing resource management. Artificial intelligence (AI) is increasingly being applied in various functional areas of business within the financial services industry, particularly in investment and compliance sectors .Blockchain (BC) technology has the potential to reduce operating costs in investment banks' back-end operations by up to 90% by establishing a cryptographic distributed ledger between counterparties for transaction execution (Shchukina and Tarasova, 2019). However, investment banks remain vulnerable to criminal activities such as money laundering, fraud, exploitation by intermediaries, false client information, risks, limited transparency, error-prone processes, and counterparty failed trades, all of which negatively impact asset management and the quality of services provided .The integration of AI and BC technologies can provide a competitive advantage by enhancing scalability, security, efficiency, and privacy. This study aims to explore the implications of disruptive technologies, specifically AI and BC, on service delivery quality through employee performance in investment banks.The study will examine the relationship between disruptive technologies and service delivery, predict service delivery based on service differentiation variables, and evaluate the relationship between service differentiation variables and employee performance in these banks. It will also apply Christensen's (1997) theory of disruptive technology and Markides' business model with radical innovation to test the proposed conceptual research model.

The research questions focus on whether the conceptual model based on service differentiation can predict service delivery quality among investment banks, the relationship between disruptive technologies and service delivery levels, and the relationship between service differentiation and employee performance.This study aims to fill the gap by

integrating service differentiation with disruptive technologies, which has not been previously applied in investment banking to determine service delivery quality through employee performance. The implications of the study will benefit investment banks and market regulators by enabling automated trade settlements using smart contracts and cloud technology, as well as improving transparency in client reporting.

2. Literature review

Tellis has referenced Christensen's (1997) fundamental theory, which primarily focuses on the impact of disruptive technologies on firms and industries. Over time, this theory's applicability has evolved due to the varied implications of different innovations on businesses, influenced by technological advancements and changing business environments. Markides (2006) emphasizes business model and product innovations, arguing that these are distinct from technological innovations and can help established companies embrace innovative business models.The first hypothesis proposed is: There is no relationship between service delivery based on disruptive technologies (AI, BC, and fusion). However, the current phase of technological advancement has seen promising cycles of upgrades for better output delivery.

Callaway and Hamilton (2008) proposed and tested innovations in internet banking concerning strategic online banking management by conventional banks, resulting in a significant impact on bank managers' environmental and strategic decisions.The second hypothesis is: There is no impact of technological, operational, quality management, strategic solutions, and security variables on forecasting employee performance. Recent years have seen a significant resurgence in AI and BC technologies, inspired by natural intelligence, aiming to combat complex tasks more effectively.

Basari and Shamsudin (2020) emphasize customer satisfaction's role in improving customer experience with innovative business strategies, leading to a competitive advantage and improved financial performance. Technology is crucial in delivering perceived service quality to customers in the banking industry, focusing on cost reduction and removing uncertainties (Joseph et al., 1999).

Bowra et al. (2012) found a positive and significant correlation between employees' perceived performances and human resources practices, influencing the company's overall performance.

The proposed conceptual research model of service differentiation is built on the combination of disruptive technological innovation (Danneels, 2004). Service Quality models 8, 9, 10, 12, and 13 are designed to explain the importance of banking automated services, human element of service delivery, and banking service quality measurement.The third hypothesis is: There is no association between service differentiation variables and employee performance. The theoretical framework suggests that these banks use service differentiation as their "input," employee performance integrated with disruptive technologies as "process," and service delivery as the "output," aiming for long-term sustainability.

The proposed model explains the contribution of five sets of service differential variables (security, strategic solutions, quality management, operations, and technology) in promoting the adoption and application of disruptive technologies (AI, BC) to enhance employee performance and qualitative service delivery among investment banks.

3. Methodology

The research study is empirical and focuses on urban districts of India, considering the availability of various foreign-based investment banks operating at different levels. A structured questionnaire was administered to employees of leading foreign-based investment banks in urban areas to collect primary data.

The questionnaire's first section covered respondents' demographic profiles, while the second section included statements on service differentiation, disruptive technologies, and employee performance using a Likert scale. The study has three objectives: to analyze the relationship between the adoption of disruptive technologies and the level of service delivery in investment banks, predict the impact of service differentiation on employee performance, and assess the importance of service differentiation-enabled workflow in investment banks.

Cluster sampling, a non-probability technique, was used based on referential contacts in the subject area, where prospective respondents were referred by acquaintances to participate in

the study. The sample size for the research involved 500 respondents, employees of leading investment banks.

Five sets of service differentiation variables (independent variables) were considered: security, strategic solutions, quality management, operations, and technology. Each set included sub-set variables used to test the hypotheses. For example, security included variables such as Privacy, Information, Money laundering, and Nodes.

Employee performance was the dependent variable considered for the study. Statistical Package for Social Science was used for data analysis, including Chi-square, linear stepwise multiple regression analysis, and Pearson correlation to validate the hypotheses and evaluate the chosen variables.

4. Results

4.1 Correlation analysis

Based on the results of the correlation analysis, it can be concluded that there is a strong relationship between employee performance and service differentiation facilitated by technological innovation in investment banks. The significant Pearson correlation values are as follows:

Operations and quality: 0.771
Operations and strategy: 0.846
Operations and security: 0.908
Operations and technology: 0.746
Quality and strategy: 0.866
Quality and security: 0.828
Quality and technology: 0.871
Strategy and security: 0.834
Strategy and technology: 0.843
Security and technology: 0.798

These values indicate a significant, highly positive relationship between operations, quality, strategy, security, technology, and employee performance. The correlation coefficients are as follows:

Operations and employee performance: $r = 0.911$, $p < 0.01$
Quality and employee performance: $r = 0.937$, $p < 0.01$
Strategy and employee performance: $r = 0.944$, $p < 0.01$
Security and employee performance: $r = 0.935$, $p < 0.01$
Technology and employee performance: $r = 0.923$, $p < 0.01$

Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating a significant association between service differentiation variables and employee performance in the context of technological innovation in investment banks.

4.2 Regression analysis

A stepwise multiple linear regression was conducted to predict employee performance in banks, with independent variables including technology, operations, quality management, strategic solutions, and security.

Employee Performance and Technology: The regression equation for predicting employee performance based on technological variables (storage networks, smart contracts, and integration) yielded a significant result ($F(1, 46) = 16.976$, $p < 0.000$), with an R^2 of 0.901. For every unit increase in storage network capacity, smart contracts, and integration, employee performance increased by 7.173, 7.794, and 4.151 units, respectively. This indicates a significant impact of technological variables on predicting employee performance.

Employee Performance and Operations: Operational efficiency (measured by reliability, customer cost, decentralization, validation, and operating cost) was also found to significantly predict employee performance ($F(1, 44) = 8.504$, $p < 0.000$, $R^2 = 0.867$). For every unit increase in reliability, customer cost-effectiveness, decentralization, validation, and operating cost efficiency, employee performance improved by 8.124, 3.338, 4.223, 4.618, and 3.059 units, respectively. This highlights the significant impact of operational variables on forecasting employee performance.

Overall, the results support the rejection of the null hypothesis and acceptance of the alternative hypothesis, indicating a substantial influence of both technological and operational variables on predicting employee performance in banks.

4.3 Chi-square test

A test was conducted to assess the relationship between service delivery levels in investment banks and the type of technology used. The results showed a significant association ($X^2(4) = 27.62$, $p < 0.01$). Service delivery was highest (94.59%) with Blockchain (BC) technology, followed by 90% with Artificial Intelligence (AI) technology. The merger of AI and BC resulted in 83.33% service delivery. When AI was used alone, service delivery was 0.24%,

and with BC alone, it was 10%. These findings reject the null hypothesis, indicating a substantial link between service delivery and disruptive technologies like AI, BC, and their combination.

5. Conclusion

This study concludes that the proposed conceptual model, based on service differentiation, effectively predicts qualitative service delivery in investment banks. There is a strong relationship between disruptive technologies (AI, BC) and service delivery levels, as well as between service differentiation and employee performance. The model emphasizes the use of storage networks, smart contracts, and integration of functions to enhance employee performance and service delivery. Operational factors like reliability, customer cost, decentralization, validation, and operating cost are key predictors of employee performance when enabled by technology. Technology helps reduce operating costs, improve process reliability, and enhance regulatory transparency. Strategic solutions like agents, auditing, and transaction clouds also predict employee performance, improving risk handling and real-time transaction settlement. Finally, security solutions focused on money laundering, information security, nodes, and privacy enhance employee performance by offering secure access to market information and verifying traders' credibility. Overall, technological advancements have significantly improved banking operations and customer service.

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