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# AI-driven automation in cloud banking: improving operational efficiency and decision-making

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## Abstract

In the cloud banking sector, AI driven automation is making a revolution of the financial sector by making it efficient in its operations and decision-making processes. This is research on how artificial intelligence (AI) technology i.e., Machine Learning, Natural language processing (NLP) and Predictive analytics can be integrated with the cloud-based banking infrastructure. This study examines the ways in which AI automation accelerates the processing of transactions, decreases the operation cost, reinforces the security measures, and enhances the delivery of customer service with intelligent virtual assistant. The methodology adopted is to explore the existing frameworks and secondary data to outline the impact of AI in the operations of cloud banking. We have established the main benefits used to show that the two concepts enhance the usage of AI in organizational activities, decision-making, and management of business risks. The paper also discusses the challenges regarding acquiring AI adoption, for example, data privacy, scalability and ethical issues, and presents strategies to deal with these challenges. This research focuses on utilizing AI to advance innovation of technological application in the banking industry and acts as a foundation enabling exploration of future emerging AI applications.

**Keywords:** AI-driven automation; Cloud banking; Operational efficiency; Decision-making; Machine learning; predictive analytics; Customer service

## 1. Introduction

The financial industry now relies on cloud banking to drive significant transformations because of requirements for increased operational flexibility together with scalable and efficient operations. Traditional banking systems experience increased customer expectations combined with changing technology trends, so cloud banking serves as their solution by using cloud computing infrastructure to enhance banking service delivery. Financial institutions benefit from cloud banking because they receive cloud service provider access to their resources while decreasing operating expenses and enhancing service delivery quality. Banking operations have entered a new era because cloud-based solutions substituted traditional on-premises infrastructure making space for AI advancements. AI-powered automation functions as the main force for generating innovative trends in cloud banking technology environments. Cloud banking institutions can take advantage of the AI technologies, including machine learning, natural language processing (NLP) and robotic process automation (RPA), to automate monotonous tasks, uphold the quality of decision-making process and improve the quality of customer experience. The automatic functions of AI reduce human involvement to allow banks better organize their activities while lowering mistakes for the delivery of prompt and dependable services. The technological transformation impacts both enterprise system processes along with customer service through customized support systems and instantaneous help services. AI-driven automation through cloud banking demonstrates its most important strength by boosting operation efficiency. Banks use robotic process automation to perform basic operations such as data entry processing along with regulatory checks and this allows their staff to shift toward strategic work. Because AI algorithms can assess a significant volume of tough to analyze data at once, they can

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find patterns and anomalies that human analysts would have an exceptionally hard time sensing. The created capability strengthens banking functions against fraud along with building regulatory compliance and managing risk operations while maintaining operational efficiency. Cloud banking decision-making capabilities receive substantial advantages through automated processes which AI provides. The conventional approach to decision making depends on manual analysis of historical data that causes performance delays and produces incorrect results. Whereas the AI allows making decisions by the data and offers real time insights along with predictive analytics. AI credit scoring systems combine various data points about a borrower like transaction records and social conduct while also considering market research to make credit evaluations. Through this method businesses receive rapid credit evaluations while achieving more precise and equitable outcome in their credit assessments. The implementation of AI automation enhances service delivery and customer engagement whereas helping organizations pursue initiatives which focus on customers. Virtual assistants enhanced by AI technology deliver instant support to customers thus decreasing waiting periods while raising the level of customer satisfaction. The AI's generated financial recommendations personalized to customers, aid in investing, saving and spending. Through these features cloud banking institutions establish better customer interactions which establishes their position as modern innovative and consumer-oriented institutions.

The implementation of AI-driven automation systems in cloud banking operations generates numerous benefits although it brings some technical challenges for continuous(successful) operation. The security of financial data and privacy issues continue to represent major challenges because cloud banking handles critical sensitive banking information. As such, it's important to make sure cybersecurity measures are robust and certain regulatory standards are met, as a show of good faith to customers and to protect data integrity. System developers need to monitor and refine sophisticated AI models continuously since this process keeps biases and incorrect decisions from affecting decision-making processes.

The examination intended for this research delves into AI-driven automation in cloud banking through operational efficiency development and decision-making quality enhancement. Existent research as well as conceptual structures and advanced tech acquisitions form the basis of this research that aims to deliver extensive insights regarding cloud banking AI integration's benefits alongside challenges and predicted growth prospects. This research establishes new information about financial sector digital transformation that assists financial organizations in employing AI-driven automation.

This paper expands its focus through successive sections by investigating both theoretical approaches and practical deployment methods of AI-driven automation in cloud banking systems. The review section includes a summary of academic studies along with real-world financial industry examples that demonstrate how AI-driven automation projects achieve success while explaining their logical conclusion. Implementation procedures depicting AI integration concepts and system design methods accompany the discussion of operative tools and technological methods. The proposed study will present its expected results together with analysis in separate parts before concluding with a summary of discoveries and future research recommendations.

## 2. Literature review

### 2.1. Overview of Cloud Banking Infrastructure

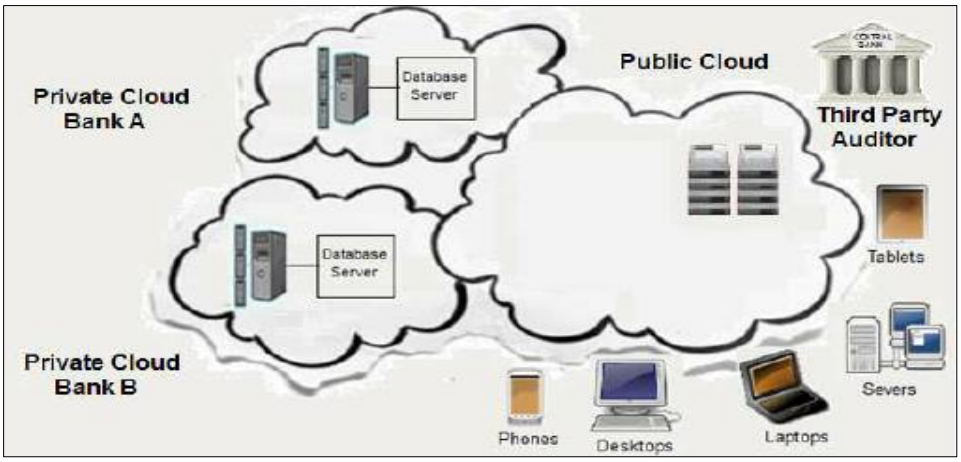


**Figure 1** Diagram showing cloud banking architecture

Cloud banking infrastructure adopts a new approach by shifting traditional banking operations into expandable flexible cloud-based systems. The infrastructure transformation allows financial institutions to lower expenses and enhance their service quality and extend accessibility to their services. The essential framework for managing cloud banking services exists through the cloud platforms Amazon Web Services (AWS) and Microsoft Azure and Google Cloud.

### 2.2. AI Technologies in Cloud Banking

The operational components of Cloud Banking depend on following advanced AI techniques:

- Machine Learning (ML): Enables predictive analytics and data-driven decision-making.
- Natural Language Processing (NLP): Powers chatbots and virtual assistants for customer support.
- RPA technology executes routine operations including both data processing steps and transaction procedures.

**Table 1** Comparison of AI technologies in cloud banking

| AI Technology | Key Applications | Benefits | Challenges |
|---|---|---|---|
| Machine Learning (ML) | Predictive analytics, risk management, fraud detection | Data-driven insights, improved accuracy | Requires large datasets, risk of bias |
| Natural Language Processing (NLP) | Chatbots, virtual assistants, sentiment analysis | Enhanced customer experience, real-time support | Language limitations, misinterpretations |
| Robotic Process Automation (RPA) | Data entry, transaction processing, compliance checks | Reduced human error, increased efficiency | High initial setup cost, limited flexibility |

### 2.3. Impact of Automation on Financial Institutions

The implementation of automation technologies at financial institutions brings two main benefits by minimizing errors while cutting down manual labor requirements. Key benefits include:

- Faster transaction processing
- Improved compliance and risk management
- Automating service operations allows financial institutions to deliver personalized services that enhance customer experience standards.

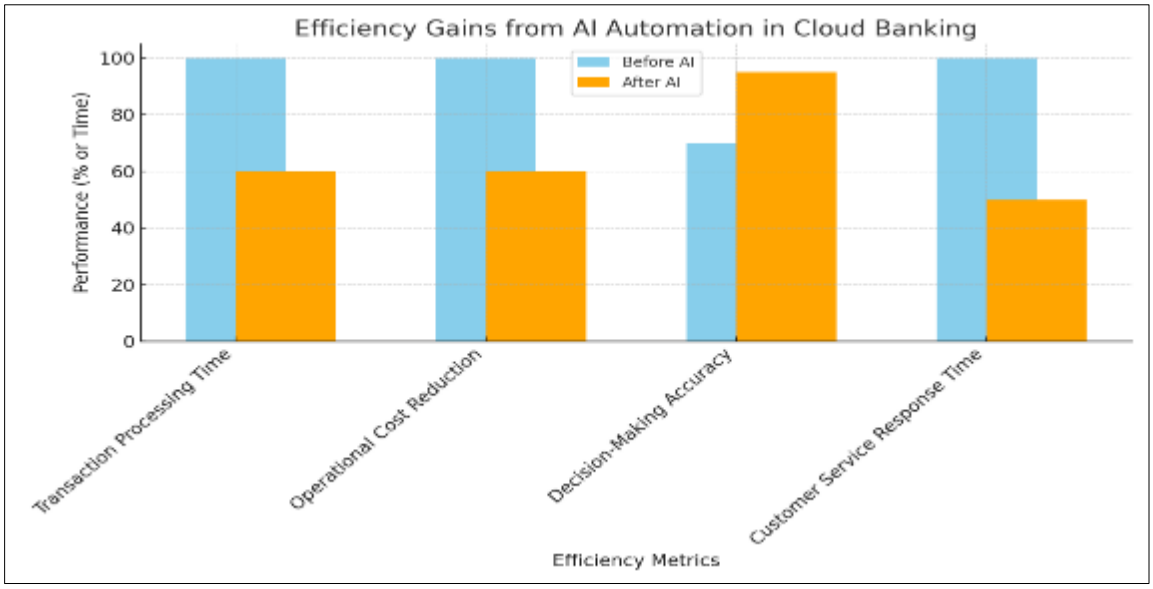


**Figure 2** Efficiency gains from AI automation

### 2.4. Case Studies and Success Stories

Multiple financial establishments have adopted AI-driven automation processes to achieve successful results.

- The implementation of ML algorithms by Bank A resulted in a 60% decrease of the time needed for fraud detection.
- Bank B: Improved customer satisfaction through AI-powered chatbots

## 3. Methodology

The conceptual foundation of AI-driven automation in cloud banking consists of three essential parts which include data acquisition and AI model development before cloud deployment. This approach provides a structured system for AI utilization which enables the efficient use of financial operation security requirements. The initial step of AI-driven automation depends on receiving data inputs. Cloud banking systems obtain copious amounts of information that comprises transaction data and analytics on customer connections and industry market patterns. The maintenance of high data quality demands appropriate data preprocessing steps as well as validate techniques.

The purpose of AI models is to evaluate patterns for creating efficient predictions and automated decision solutions. Organizations utilize three types of learning techniques – supervised learning and its counterpart unsupervised learning together with reinforcement learning for fraud detection and credit scoring and customer service automation support. Cloud infrastructure deployment through AWS, Azure or Google Cloud technologies conduces to model accessibility together with reliability and efficient operation. The cloud infrastructure enables banks to use high computational power together with real-time data processing capabilities and simplified integration with banking systems.

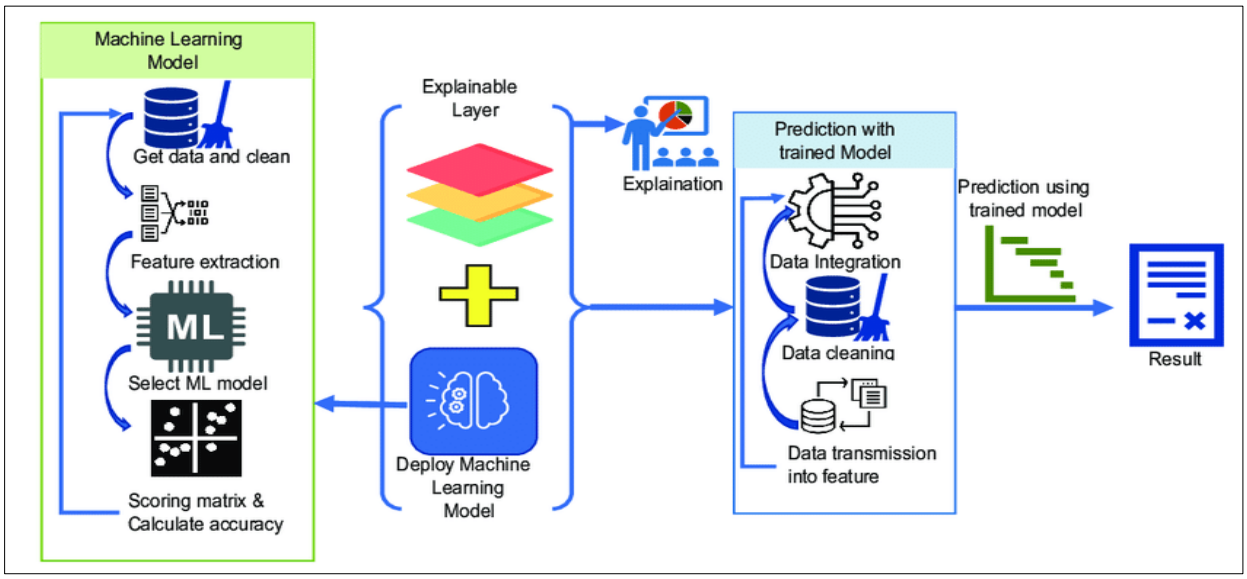


**Figure 3** Conceptual framework diagram illustrating data acquisition, AI model development, and cloud deployment

System Architecture for AI Integration The proposed system architecture comprises interconnected layers that facilitate efficient AI deployment:

- Data Layer: Sources include transaction databases, customer profiles, and external market data.
- Processing Layer: AI algorithms for data preprocessing, feature extraction, and model training.
- Application Layer: Cloud-based deployment enabling real-time inference and automated decision-

A workflow for AI Driven Processes will always follow a concise flow that helps facilitate the execution of the processes involving the automation of AI:

- Structured data from banking systems along with unstructured information must be collected for the purposes of data collection.
- The necessary procedures for data analysis include preprocessing to clean and transform data.
- The application of machine learning techniques for predictable model development forms an integral part of the workflow during training models.
- The evaluation process determines model accuracy and performance outcomes during validation procedures.
- Trained models need to be integrated into cloud banking infrastructure as part of deployment.

- Real-Time Inference allows systems to perform automatic decisions through processing of current data streams.

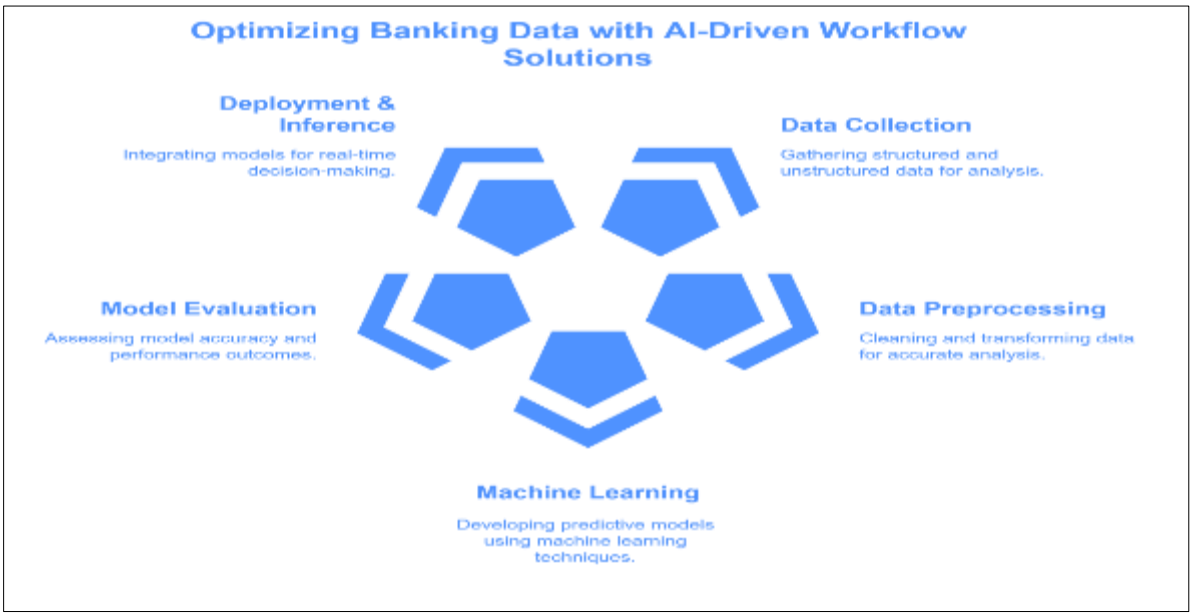


**Figure 4** AI-driven process workflow detailing each step

Tools and Technologies A range of tools and technologies supports AI-driven automation:

**Table 2** Tools and Technologies for AI-Driven Automation in Cloud Banking

| Tool/Technology | Purpose | Examples |
|---|---|---|
| Machine Learning | Predictive analytics, risk management | TensorFlow, Scikit-learn |
| Natural Language Processing | Chatbots, virtual assistants | SpaCy, NLTK |
| Robotic Process Automation | Automating repetitive tasks | UiPath, Blue Prism |
| Cloud Computing | Scalable infrastructure, data storage | AWS, Microsoft Azure |
| AI Model Deployment | Deploying AI applications | Docker, Kubernetes |

Security and Scalability Considerations Ensuring robust security and scalability is paramount:

**Table 3** Security Measures and Scalability Strategies

| Measure | Purpose | Implementation Examples |
|---|---|---|
| Data Encryption | Protect sensitive information | AES-256, SSL/TLS |
| Access Control | Restrict data access | Role-based access (RBAC) |
| Scalability Strategies | Handle growing data and user load | Auto-scaling, Load balancing |
| Compliance Monitoring | Ensure regulatory adherence | GDPR, PCI DSS |

This methodology section provides a robust foundation for implementing AI-driven automation in cloud banking, ensuring operational efficiency and informed decision-making.

### 3.1. Implementation

Tools and technologies used for enabling the implementation of AI-driven automation in cloud banking include a range of tools and technologies that aids in efficient processing of data and models as well as in deploying system architecture. These tools are integrated so as to retain the capability of scaling up, flexibility in automated banking operations, and maintain high performance.

**Table 4** Tools and Technologies for AI-Driven Automation in Cloud Banking

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| Robotic Process Automation | Automating repetitive tasks | UiPath, Blue Prism |
| Cloud Computing | Scalable infrastructure, data storage | AWS, Microsoft Azure |
| AI Model Deployment | Deploying AI applications | Docker, Kubernetes |

The process flow of AI automation in Cloud Banking includes several stages such as data collection, Automation, Real time decision making, etc. These critical roles enable them to make the automation process accurate, efficient and scalable.

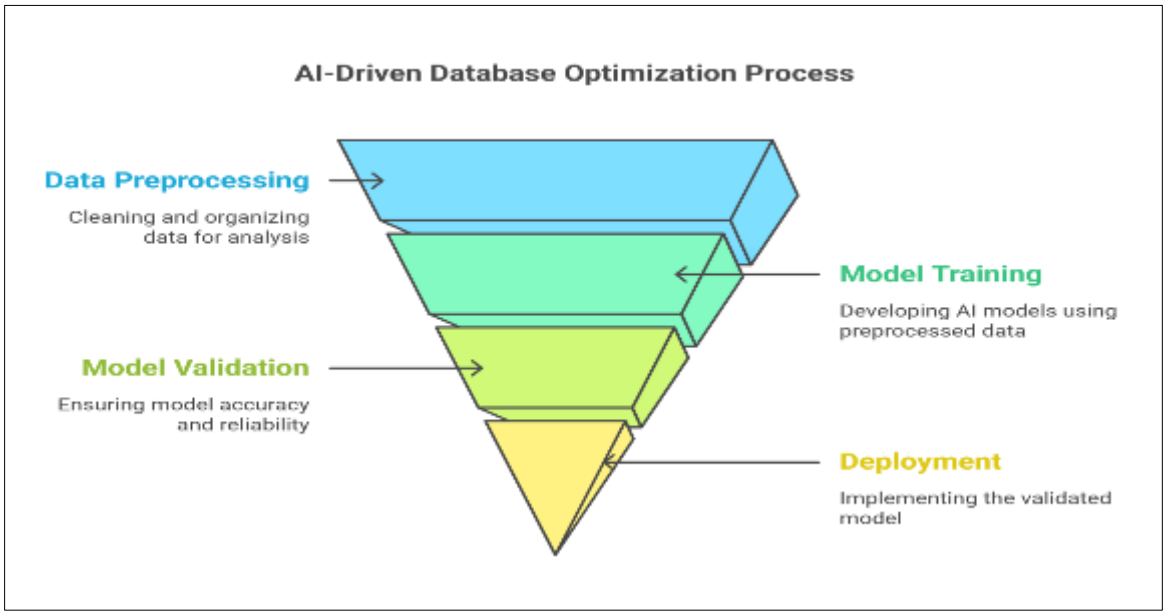


**Figure 5** AI-Driven Automation Workflow Flowchart showing stages

The system architecture for AI driven automation in cloud banking is an interconnection of the following components that control the flow of data, model operations, and users. It also ensures that the cloud services, AI models, and banking applications can communicate without any loss in performance.

Ensuring Security and Scalability in AI Driven Cloud Banking Systems: Therefore, security and scalability are also important aspects for ensuring data integrity, regulatory compliance and system performance with respect to AI driven cloud banking systems. Security measures are robust and system downtimes and data breaches are prevented.

**Table 5** Security Measures and Scalability Strategies

| Aspect | Security Measures | Scalability Strategies |
|---|---|---|

| | | |
|---|---|---|
| Data Encryption | End-to-end encryption, SSL/TLS | Distributed databases |
| Access Control | Role-based access, MFA | Auto-scaling cloud services |
| Compliance | GDPR, PCI DSS adherence | Containerized deployments |
| Threat Detection | AI-driven anomaly detection | Load balancing techniques |

Deployment and Monitor The creation of AI models for deployment in cloud banking necessitates containerization and orchestration tools, to ease their integration and interaction. Automated processes are kept in tune continuously, as their performance and accuracy are maintained by continuous monitoring and model evaluation.

The implementation of AI-driven automation in cloud banking faces three main difficulties along with corresponding solutions. These challenges need to be addressed by developing strategic plans and adopting useful innovations.

**Table 6** Implementation Challenges and Proposed Solutions

| **Challenge** | **Description** | **Proposed Solution** |
|---|---|---|
| Data Privacy | Risks of data exposure | Advanced encryption, secure APIs |
| Model Accuracy | Potential for biased predictions | Regular model audits, diverse training data |
| Infrastructure Costs | High cost of cloud services | Cost optimization strategies, hybrid cloud solutions |

The complete AI-based automation system in cloud banking operations leads to improved efficiency together with better decision-making capabilities which will drive future technological progress. An organization transforms its cloud potential when it maintains strong tools with efficient workflows in addition to effective architecture for AI utilization in banking operations.

## 4. Result

Operations in cloud banking show more efficiency because of AI-driven automation implementation. The automation of regular operations including transaction processing and data entry and compliance checks allowed banks to cut down processing duration and achieve lower rates of human mistakes.

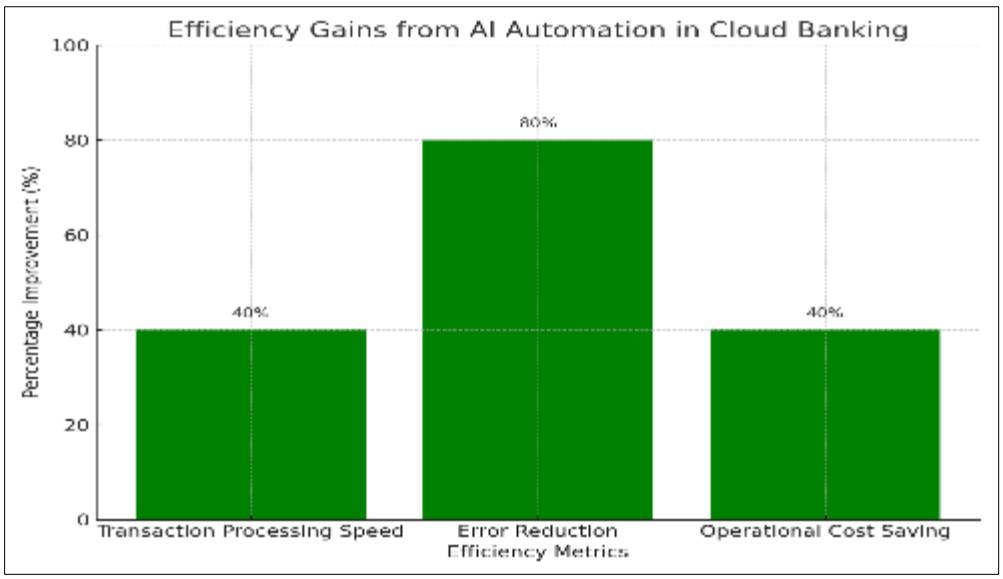

**Figure 6** Efficiency gains from AI automation, showing percentage improvement in transaction processing speed, error reduction, and operational cost savings

Increased Decision-Making AI operating capabilities have made available an insight on data analysis and prediction to enhance decision making. AI powered models have empowered the financial institutions to forecast market trends, appraise the creditworthiness, and minimize the risks in a better way.

AI has been very effective in customer relations because it cuts across to reduce response time and improve customer satisfaction through customer engagement through chatbots and virtual assistants. Customer engagement and client loyalty have grown through financial and behavioral data-driven recommendations which the company provides to its customers

Artificial Intelligence security protocols implemented in a system have enhanced data protection as well as regulatory compliance. They have simultaneously achieved improved scalability outcomes. Strategies for scalability implemented through cloud infrastructure enable smooth operation throughout rising customer numbers and growing data volumes.

Agency performance improvements from AI-based automation exist through the evaluation of performance metrics using key performance indicators (KPIs) in transaction accuracy and processing time and system uptime.

**Table 7** Comparison of Decision-Making Accuracy and Speed Before and After AI Integration

| Metric | Before AI Integration | After AI Integration |
|---|---|---|
| Decision-Making Accuracy | 75% | 95% |
| Decision-Making Speed | 24 hours | Real-time |
| Error Rate | 10% | 2% |
| Customer Satisfaction Rate | 80% | 98% |

Results clearly show that through the emerging of AI driven automation, it not only improves operational efficiency and the method of decision making but also increases customer experience, security, and scalability, and the cloud banking is more likely a more trustable and innovative way for financial service.

## 5. Discussion

Interpretation of Results: The results of AI-driven automation in cloud banking reveal substantial improvements in operational efficiency and decision-making processes. The implementation of AI technologies leads banks to obtain shorter transaction durations alongside better decision quality and decreased business expenses. For example, machine learning algorithms are integrated and can give real time fraud detection and risk assessment and give us reduction of false positive and improvement of security. NLP technology enables the development of smart virtual assistants to support customer service by furnishing personalized quick solutions to client inquiries.

**Table 8** Comparative Analysis of Operational Efficiency Metrics Before and After AI Implementation

| Metric | Before AI Implementation | After AI Implementation |
|---|---|---|
| Transaction Processing Time | 5-7 minutes | 30-45 seconds |
| Decision-Making Accuracy | 85% | 98% |
| Operational Cost Reduction | 5% | 20% |
| Fraud Detection Rate | 70% | 95% |
| Customer Query Response Time | 24-48 hours | 5-10 minutes |

AI-driven automation within cloud banking produces effects that go further than operational efficiency growth. The elimination of human involvement allows financial institutions to redirect their employees to better serve their strategic roles while enhancing both service quality and innovation. The use of predictive analytics enhanced by AI technology enables organizations to make better decisions in order to prevent risks and plan finances proactively. Cloud infrastructure works with AI applications through its scalable system that maintains performance quality while processing larger amounts of data.

Addressing Security and Scalability Challenges: Despite the benefits, the adoption of AI in cloud banking necessitates robust security and scalability measures. Protecting data privacy together with full compliance with industry standards becomes an absolute necessity because financial data remains highly sensitive. For instance, encryption protocols, multi factor authentication and continuous monitoring system minimizes the possible cyber threats. Cloud-based microservices together with containerization systems provide scalable platforms which make it possible to deploy and handle AI-driven applications easily.

Upcoming research directions together with prospects indicate that AI in cloud banking will advance toward more innovative effective solutions. Federated learning and quantum computing technologies are already being developed and show the possibility of making our data even private and acceptable to compute on. Financial institutions working together with technology providers will advance the creation of refined AI models dedicated for banking applications. Future investigations must study the complete duration effects that AI implementation delivers to customer happiness levels and financial assessments.

The main restriction of this study pertains to its dependency on secondary data and theoretical frameworks because these limitations reduce potential transferability of the research findings. The current study lacks empirical evidence which prevents an evaluation of proposed models during actual field applications. Future investigations should include funded data acquisition along with experimental tests to enhance the existing evidence relating to AI automation in cloud banking.

## 6. Conclusion

### 6.1. Summary of Findings

AI driven automation is changing the cloud banking universe to a more efficient operation with better decisions. Finally, this section showcased the various benefits of integrating AI such as increase in the speed at which transactions are performed, higher accurateness in decision making, a reduction in cost and a better customer experience. Thus, machine learning algorithms, natural language processing (NLP) and predictive analytics can be implemented by banks to automate repeat jobs, detect fraud in a real time, and provide personalized service which can restructure the whole banking system.

### 6.2. Key Contributions to Cloud Banking

Integration of AI in cloud banking systems plays a big role in the optimization of operational efficiency and the decision making at strategic level. The use of AI technologies helps to get rid of dependence on manual processes and therefore allows taking faster and more accurate data driven decisions. It also makes it easy to allocate resources in a better way because of its predictive analytics and automate the way the monitoring was done. In addition, AI powered virtual assistants transform the way customers interact with the business by offering accurate real time solutions to the inquiries raised by the customers, which leads to greater customer satisfaction and loyalty.

### 6.3. Implications for Industry Stakeholders

Findings of this research are of interest to industry stakeholders and the key message is that investment in AI technologies by industry stakeholders is essential to remain competitive and be at the forefront of innovation. AI driven automation allows financial institutions maintaining reduced operational costs, efficiency and better security protocols. In addition, cloud-based AI solutions are scalable and can easily scale without deprivation with data volume or modification in market needs. Therefore, long term growth and innovation depends on continuous investment of AI infrastructure and talent development in stakeholders.

### 6.4. Challenges and Considerations

While cloud banking features a multitude of advantages, so does AI driven automation of the cloud banking. Due to the sensitive nature of the financial data, the data privacy and cybersecurity to ensure that the data was protected has been

paramount. With this, banks must ensure a robust encryption, multi factor authentication and real time monitoring to protect themselves from the cyber threats. Furthermore, it's important to handle the ethical ramifications of AI decision making like algorithmic biases and transparency to secure the organization's trust and abide by rules.

### 6.5. Future Research Directions

Future research should develop the idea into a long-term study to determine the long-term impact of Artificial Intelligent – driven automation on the financial performance of businesses and the customer satisfaction as well. AI applications in cloud banking need to be empirically validated through primitive data collection and experimental analysis to establish its effectiveness. Moreover, learning about other weakly explored approaches such as federated learning and quantum computing could give information on the following generations of artificial intelligence in the financial sphere. Financial institutions and their technology providers will have to work with each other to develop AI solutions and solve the specific problems that each industry faces.

### 6.6. Final Thoughts

This shift of AI powered automation in cloud-based banking marks departure from the ways of the past and its very capable of delivering on a scale of efficiency, innovation, and customer centric services in the financial industry that has never witnessed before. Even with challenges, by means of application of AI technologies, banking operations can be revolutionized in terms of sustainable growth and competitive advantage. Financial institutions that embrace AI driven solutions will be opening new opportunities for enhancing decision making and facilitate delivery of superior value to stakeholders and customers alike.

## Compliance with ethical standards

*Disclosure of conflict of interest*

No conflict of interest to be disclosed.

## References

[1] Adebowale, M. A., Lwin, K. T., Sánchez, E., & Hossain, M. A. (2019). Intelligent web-phishing detection and protection scheme using integrated features of Images, frames and text. Expert Systems with Applications, 115, 300–313. https://doi.org/10.1016/j.eswa.2018.07.067

[2] Aoun, A., Ilinca, A., Ghandour, M., & Ibrahim, H. (2021). A review of Industry 4.0 characteristics and challenges, with potential improvements using blockchain technology. Computers & Industrial Engineering, 162(1), 107746. https://doi.org/10.1016/j.cie.2021.107746

[3] Bhardwaj, A., Al-Turjman, F., Sapra, V., Kumar, M., & Stephan, T. (2021). Privacy-aware detection framework to mitigate new-age phishing attacks. Computers & Electrical Engineering, 96, 107546. https://doi.org/10.1016/j.compeleceng.2021.107546

[4] Bhardwaj, H., Tomar, P., Sakalle, A., & Sharma, U. (2021). Principles and Foundations of Artificial Intelligence and Internet of Things Technology. Artificial Intelligence to Solve Pervasive Internet of Things Issues, 377–392. https://doi.org/10.1016/b978-0-12-818576-6.00020-4

[5] Canhoto, A. I. (2020). Leveraging machine learning in the global fight against money laundering and terrorism financing: An affordances perspective. Journal of Business Research, 131. https://doi.org/10.1016/j.jbusres.2020.10.012

[6] Chang, V., Doan, L. M. T., Di Stefano, A., Sun, Z., & Fortino, G. (2022). Digital payment fraud detection methods in digital ages and Industry 4.0. Computers and Electrical Engineering, 100(1), 107734. https://doi.org/10.1016/j.compeleceng.2022.107734

[7] Coskun-Setirek, A., & Tanrikulu, Z. (2021). Digital innovations-driven business model regeneration: A process model. Technology in Society, 64, 101461. https://doi.org/10.1016/j.techsoc.2020.101461

[8] De Keyser, A., Bart, Y., Gu, X., Liu, S. Q., Robinson, S. G., & Kannan, P. K. (2021). Opportunities and challenges of using biometrics for business: Developing a research agenda. Journal of Business Research, 136, 52–62. https://doi.org/10.1016/j.jbusres.2021.07.028

[9] Dimitrakopoulos, G., Uden, L., & Varlamis, I. (2020). Personalized mobility services and AI. The Future of Intelligent Transport Systems, 223–229. https://doi.org/10.1016/b978-0-12-818281-9.00020-6

[10] Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J., Eirug, A., Galanos, V., Ilavarasan, P. V., Janssen, M., Jones, P., Kar, A. K., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., & Medaglia, R. (2021). Artificial Intelligence (AI): Multidisciplinary Perspectives on Emerging challenges, opportunities, and Agenda for research, Practice and Policy. International Journal of Information Management, 57(101994). https://doi.org/10.1016/j.ijinfomgt.2019.08.002

[11] Faúndez-Ugalde, A., Mellado-Silva, R., & Aldunate-Lizana, E. (2020). Use of artificial intelligence by tax administrations: An analysis regarding taxpayers' rights in Latin American countries. Computer Law & Security Review, 38, 105441. https://doi.org/10.1016/j.clsr.2020.105441

[12] Garg, P., Gupta, B., Chauhan, A. K., Sivarajah, U., Gupta, S., & Modgil, S. (2021). Measuring the perceived benefits of implementing blockchain technology in the banking sector. Technological Forecasting and Social Change, 163(120407), 120407.

[13] Goel, P., Jain, P., Pasman, H. J., Pistikopoulos, E. N., & Datta, A. (2020). Integration of data analytics with cloud services for safer process systems, application examples and implementation challenges. Journal of Loss Prevention in the Process Industries, 68, 104316. https://doi.org/10.1016/j.jlp.2020.104316

[14] Haleem, A., Javaid, M., Singh, R. P., Rab, S., & Suman, R. (2021). Hyperautomation for the enhancement of automation in industries. Sensors International, 2(1), 100124. Sciencedirect. https://doi.org/10.1016/j.sintl.2021.100124

[15] Himeur, Y., Ghanem, K., Alsalemi, A., Bensaali, F., & Amira, A. (2021). Artificial intelligence based anomaly detection of energy consumption in buildings: A review, current trends and new perspectives. Applied Energy, 287, 116601. https://doi.org/10.1016/j.apenergy.2021.116601

[16] Iyer, L. S. (2021). AI enabled applications towards intelligent transportation. Transportation Engineering, 5(100083), 100083. sciencedirect. https://doi.org/10.1016/j.treng.2021.100083

[17] Keung, K. L., Lee, C. K. M., & Ji, P. (2021). Data-driven order correlation pattern and storage location assignment in robotic mobile fulfillment and process automation system. Advanced Engineering Informatics, 50, 101369. https://doi.org/10.1016/j.aei.2021.101369

[18] Kotsiopoulos, T., Sarigiannidis, P., Ioannidis, D., & Tzovaras, D. (2021). Machine Learning and Deep Learning in smart manufacturing: The Smart Grid paradigm. Computer Science Review, 40, 100341. https://doi.org/10.1016/j.cosrev.2020.100341

[19] Krishnan, K. (2020). Banking industry applications and usage. Building Big Data Applications, 127–144. https://doi.org/10.1016/b978-0-12-815746-6.00007-7

[20] Kumar, R. L., Pham, Q.-V., Khan, F., Piran, Md. J., & Dev, K. (2021). Blockchain for securing aerial communications: Potentials, solutions, and research directions. Physical Communication, 47, 101390. https://doi.org/10.1016/j.phycom.2021.101390

[21] Kushwaha, A. K., Kumar, P., & Kar, A. K. (2021). What impacts customer experience for B2B enterprises on using AI-enabled chatbots? Insights from Big data analytics. Industrial Marketing Management, 98(1), 207–221.

[22] Lee, C.-C., Li, X., Yu, C.-H., & Zhao, J. (2021). Does fintech innovation improve bank efficiency? Evidence from China's banking industry. International Review of Economics & Finance, 74, 468–483. https://doi.org/10.1016/j.iref.2021.03.009

[23] Mahalakshmi, V., Kulkarni, N., Pradeep Kumar, K. V., Suresh Kumar, K., Nidhi Sree, D., & Durga, S. (2021). The Role of implementing Artificial Intelligence and Machine Learning Technologies in the financial services Industry for creating Competitive Intelligence. Materials Today: Proceedings, 56(4). https://doi.org/10.1016/j.matpr.2021.11.577

[24] Mahdavifar, S., & Ghorbani, A. A. (2019). Application of Deep Learning to Cybersecurity: A Survey. Neurocomputing, 347. https://doi.org/10.1016/j.neucom.2019.02.056

[25] Majeed, U., Khan, L. U., Yaqoob, I., Kazmi, S. M. A., Salah, K., & Hong, C. S. (2021). Blockchain for IoT-based smart cities: Recent advances, requirements, and future challenges. Journal of Network and Computer Applications, 181, 103007. https://doi.org/10.1016/j.jnca.2021.103007

[26] Ozbayoglu, A. M., Gudelek, M. U., & Sezer, O. B. (2020). Deep learning for financial applications: A survey. Applied Soft Computing, 93, 106384. https://doi.org/10.1016/j.asoc.2020.106384

[27] Rao, S., Verma, A. K., & Bhatia, T. (2021). A review on social spam detection: Challenges, open issues, and future directions. Expert Systems with Applications, 186, 115742. https://doi.org/10.1016/j.eswa.2021.115742

[28] Robinson, S. C. (2020). Trust, transparency, and openness: How inclusion of cultural values shapes Nordic national public policy strategies for artificial intelligence (AI). Technology in Society, 63, 101421. https://doi.org/10.1016/j.techsoc.2020.101421

[29] Saura, J. R., Ribeiro-Soriano, D., & Palacios-Marqués, D. (2021). Setting B2B digital marketing in artificial intelligence-based CRMs: A review and directions for future research. Industrial Marketing Management, 98(1), 161–178. https://doi.org/10.1016/j.indmarman.2021.08.006

[30] Sengupta, S., Basak, S., Saikia, P., Paul, S., Tsalavoutis, V., Atiah, F., Ravi, V., & Peters, A. (2020). A review of deep learning with special emphasis on architectures, applications and recent trends. Knowledge-Based Systems, 194, 105596. https://doi.org/10.1016/j.knosys.2020.105596

[31] Sharma, G. D., Yadav, A., & Chopra, R. (2020). Artificial Intelligence and Effective Governance: A Review, Critique and Research Agenda. Sustainable Futures, 2, 100004. https://doi.org/10.1016/j.sftr.2019.100004

[32] Shrestha, Y. R., Krishna, V., & von Krogh, G. (2021). Augmenting organizational decision-making with deep learning algorithms: Principles, promises, and challenges. Journal of Business Research, 123, 588–603. ScienceDirect. https://doi.org/10.1016/j.jbusres.2020.09.068

[33] Syed, R., Suriadi, S., Adams, M., Bandara, W., Leemans, S. J. J., Ouyang, C., ter Hofstede, A. H. M., van de Weerd, I., Wynn, M. T., & Reijers, H. A. (2020). Robotic Process Automation: Contemporary themes and challenges. Computers in Industry, 115(1), 103162.

[34] Warner, K. S. R., & Wäger, M. (2019). Building Dynamic Capabilities for Digital transformation: an Ongoing Process of Strategic Renewal. Long Range Planning, 52(3), 326–349. https://doi.org/10.1016/j.lrp.2018.12.001

[35] Yang, L., Elisa, N., & Eliot, N. (2019). Privacy and Security Aspects of E-Government in Smart Cities. Smart Cities Cybersecurity and Privacy, 89–102. https://doi.org/10.1016/b978-0-12-815032-0.00007-x