
PROSPECTS FOR THE USE OF DIGITAL TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE IN CREDIT RISK ASSESSMENT IN COMMERCIAL BANKS

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Abstract

The rapid development of digital technologies has fundamentally transformed the operational environment of commercial banks and significantly influenced approaches to credit risk assessment. In recent years, the increasing complexity of financial markets, the growth of digital financial services, and the expansion of customer data have created both opportunities and challenges for banking institutions. Credit risk remains one of the most significant risks faced by commercial banks, as ineffective borrower assessment may result in increased non-performing loans, reduced profitability, and deterioration of financial stability. Consequently, traditional credit assessment methods based primarily on financial statements, collateral evaluation, and historical credit information are becoming insufficient in a highly dynamic and data-driven financial environment [1].

The digital transformation of the banking industry has enabled financial institutions to utilize innovative technologies such as Big Data analytics, Artificial Intelligence (AI), Machine Learning (ML), Cloud Computing, and Predictive Analytics for more effective credit risk assessment. These technologies provide opportunities to process large volumes of structured and unstructured data, identify hidden relationships among risk factors, and improve the accuracy of borrower evaluation. Unlike conventional credit scoring models, AI-based systems continuously learn from new information and adapt their predictive capabilities according to changing market conditions. As a result, commercial banks can make more informed lending decisions while reducing operational risks and credit losses [2].

One of the key advantages of digital technologies in credit risk management is the ability to incorporate alternative sources of information into the assessment process. Traditional lending decisions are generally based on financial reports, income statements, and previous credit history. However,

modern digital systems can additionally analyze transaction behavior, online payment records, social and commercial interactions, mobile banking activity, and other non-traditional data sources. This approach significantly enhances the quality of risk assessment, particularly for individuals and small businesses with limited formal credit histories. Furthermore, the integration of alternative data contributes to expanding financial inclusion and improving access to credit services for underserved segments of the population [3].

Table 1. Comparative Evaluation of Traditional and AI-Based Credit Risk Assessment Methods

Assessment Criteria	Traditional Credit Assessment	AI-Based Credit Assessment
Data Sources	Financial statements and credit history	Financial, behavioral, transactional, and alternative data
Processing Speed	Several hours or days	Real-time or near real-time
Human Intervention	High	Limited
Risk Identification	Static and historical	Dynamic and predictive
Model Adaptability	Low	High
Accuracy of Forecasting	Moderate	High
Portfolio Monitoring	Periodic	Continuous
Decision-Making Efficiency	Medium	Very High

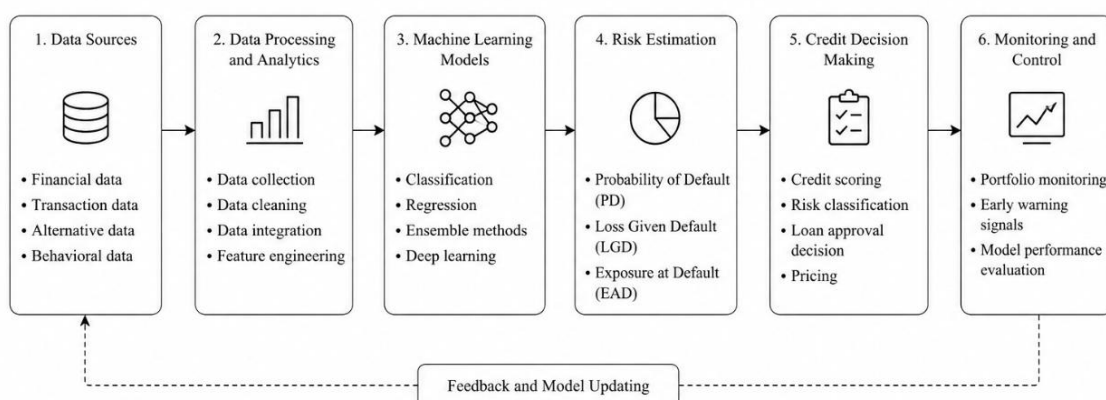
Source: Developed by the author based on international banking practices.

The comparative analysis presented in Table 1 demonstrates that AI-driven credit assessment models significantly outperform traditional methods in several dimensions. In particular, artificial intelligence technologies improve prediction accuracy, reduce processing time, and enhance portfolio monitoring capabilities. Machine learning algorithms can identify patterns associated with potential defaults long before financial difficulties become evident through conventional indicators. Consequently, banks are able to implement preventive measures and strengthen portfolio quality more effectively [4].



The application of machine learning techniques has become one of the most promising directions in modern credit risk management. Machine learning models analyze large datasets and automatically identify complex relationships among variables that may not be detected through traditional statistical methods. Popular algorithms such as Decision Trees, Random Forest, Gradient Boosting, Neural Networks, and Support Vector Machines are increasingly used by commercial banks to estimate default probabilities and classify borrowers according to their risk profiles. Research indicates that machine learning models often demonstrate superior predictive performance compared to conventional credit scoring approaches, particularly in volatile economic environments [5].

In addition to improving credit assessment accuracy, artificial intelligence also contributes to the automation of lending processes. AI-powered systems can perform preliminary borrower evaluation, verify customer information, calculate risk scores, and generate lending recommendations with minimal human intervention. This automation reduces operational costs, accelerates loan approval procedures, and improves customer experience. Moreover, automated systems minimize the likelihood of human error and increase the consistency of credit decisions across different customer segments.



Source: Developed by the author based on Basel Committee recommendations and international banking practices.

Figure 1. AI-Driven Credit Risk Assessment Framework

Figure 1 illustrates the integrated process through which artificial intelligence supports credit risk assessment in commercial banks. The framework begins with the collection of customer information from multiple data sources. After processing and analysis through machine learning

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Date: 30th May 2026

Website: <https://eglobalcongress.com/index.php/egc>

ISSN (E): 2836-3612

models, key credit risk indicators such as Probability of Default (PD), Loss Given Default (LGD), and Exposure at Default (EAD) are estimated. These indicators provide a quantitative basis for credit classification and lending decisions, thereby improving the effectiveness of risk management mechanisms.

Despite numerous advantages, the implementation of artificial intelligence in credit risk assessment also presents several challenges. Data quality and availability remain critical concerns, as inaccurate or incomplete information may reduce model performance. Furthermore, the increasing use of automated decision-making systems raises issues related to transparency, explainability, and regulatory compliance. Financial institutions must therefore ensure that AI models operate within appropriate governance frameworks and comply with legal and ethical requirements. In addition, cybersecurity risks associated with digital platforms require continuous monitoring and investment in information security infrastructure.

The future prospects for the application of digital technologies and artificial intelligence in commercial banking are highly promising. The continued development of cloud computing, open banking ecosystems, real-time data processing technologies, and advanced predictive analytics is expected to further enhance credit risk assessment capabilities. Commercial banks that successfully integrate these technologies into their risk management frameworks will be better positioned to improve portfolio quality, reduce non-performing loans, and strengthen long-term financial sustainability.

In conclusion, digital technologies and artificial intelligence are reshaping the traditional paradigm of credit risk assessment in commercial banks. Their ability to process vast amounts of information, improve predictive accuracy, and support data-driven decision-making creates significant opportunities for enhancing banking efficiency and financial stability. Therefore, the broader adoption of AI-driven risk assessment models should be considered a strategic priority for commercial banks seeking to remain competitive in the rapidly evolving digital economy.

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ISSN (E): 2836-3612

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