(REVIEW ARTICLE)

Revolutionizing Finance: The impact of generative AI on Automated Lending

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Abstract

The integration of Generative AI into automated lending represents a transformative paradigm shift in financial services, revolutionizing every aspect of the lending lifecycle. This comprehensive article explores how GenAI technologies are reshaping credit assessment methodologies, enhancing fraud detection capabilities, elevating customer experiences through intelligent automation, and streamlining regulatory compliance procedures. By examining the synergistic deployment of Natural Language Processing, Computer Vision, Machine Learning, Robotic Process Automation, conversational interfaces, blockchain technology, and predictive analytics, it illuminates the path toward a more efficient, secure, and customer-centric lending ecosystem. The analysis further addresses critical considerations regarding ethical implementation, regulatory alignment, and strategic adoption frameworks that financial institutions must navigate to fully capitalize on GenAI's potential while maintaining trust and compliance in an increasingly digital financial landscape.

Keywords: Financial Technology Innovation; AI-Powered Risk Assessment; Automated Compliance; Customer Experience Transformation; Intelligent Fraud Detection

1. Introduction

The financial services industry stands at the precipice of a technological revolution, with Generative AI (GenAI) rapidly transforming the landscape of automated lending. Traditional lending processes—often characterized by manual documentation reviews, time-intensive credit assessments, and fragmented customer experiences—are being fundamentally reimagined through the application of sophisticated AI technologies. The global AI in fintech market size was valued at USD 9.45 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 17.2% from 2023 to 2030, underscoring the accelerating adoption of these technologies across the financial sector [1].

1.1. Transformative Impact on Lending Operations

The implementation of AI-driven systems has revolutionized credit assessment methodologies, enabling financial institutions to evaluate borrower creditworthiness with unprecedented accuracy. AI algorithms can process and analyze vast quantities of structured and unstructured data points, including traditional credit scores, transaction histories, and alternative data sources such as utility payments and rental histories. This comprehensive approach to risk assessment has enabled lenders to expand financial inclusion while maintaining robust underwriting standards. According to research, approximately 20% of previously credit-invisible consumers can now access financial services through AI-augmented lending models that identify creditworthy borrowers' traditional systems would overlook [2].

1.2. Efficiency Gains and Cost Optimization

GenAI technologies have dramatically accelerated lending operations through intelligent automation of document-intensive processes. Natural Language Processing (NLP) capabilities enable automated extraction and verification of

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financial data from diverse document formats, while Computer Vision technologies facilitate identity verification and fraud detection. The automation of these previously manual processes has reduced loan processing times by 60-70% for many financial institutions while simultaneously decreasing operational costs [2]. This efficiency gain extends beyond simple cost reduction, as faster processing times significantly enhance customer satisfaction and competitive positioning in increasingly digital lending markets.

1.3. Evolving Technological Landscape

The technological evolution underpinning the GenAI revolution in lending continues to accelerate, driven by advances in deep learning architectures and their application to financial services. The integration of machine learning with robotic process automation (RPA) creates end-to-end intelligent workflows capable of handling complex lending operations with minimal human intervention. Financial institutions at the forefront of AI adoption are increasingly deploying sophisticated predictive analytics to anticipate market shifts and optimize lending strategies accordingly. According to industry analysis, institutions implementing comprehensive AI strategies in lending operations demonstrate a 35% improvement in loan performance metrics compared to those relying on traditional methodologies [1]. This performance differential illustrates the strategic imperative of AI adoption in modern lending operations.

2. Enhancing Credit Decisioning Through AI-Powered Analytics

The evolution of credit decisioning represents one of the most profound impacts of generative AI on the lending industry, fundamentally transforming how financial institutions assess borrower risk and determine creditworthiness. Traditional credit scoring methodologies are being rapidly supplanted by sophisticated AI-driven approaches capable of processing vastly more complex information landscapes. Financial institutions implementing advanced AI credit models have observed up to 25% increases in accuracy over traditional credit scoring methods, substantially enhancing their ability to distinguish between high and low-risk borrowers across diverse segments [3].

2.1. Beyond Traditional Credit Data

The transformative power of GenAI in credit assessment stems from its unparalleled ability to synthesize insights from heterogeneous data sources. Modern AI credit engines integrate conventional financial histories with alternative data streams—including transaction patterns, utility payment records, rental histories, and digital footprint information—to develop multidimensional borrower profiles. This expanded data universe enables lenders to make more nuanced evaluations, particularly for thin-file or credit-invisible consumers. By leveraging these diverse data sources, AI models can effectively evaluate borrowers who have historically been excluded from traditional financial services, dramatically expanding financial inclusion while maintaining robust risk controls that can reduce default rates by up to 25% [3].

2.2. Real-Time Decisioning Intelligence

Unlike traditional models that operate on historical data with limited contextual awareness, generative AI systems continuously monitor macroeconomic indicators, sector-specific trends, and regional economic conditions to dynamically adjust risk assessments. This adaptive capability proves particularly valuable during economic volatility, as AI systems can identify early warning signals and adjust lending criteria accordingly. The advanced computational capabilities of modern AI frameworks allow for real-time credit decisioning, with leading financial institutions now able to process and approve loans in under 5 minutes compared to the traditional timeline of days or weeks. According to industry research, banks that have implemented AI in their credit decisioning processes have seen operational cost reductions of 20 to 25 percent [4].

2.3. Regulatory Compliance and Model Governance

The regulatory landscape surrounding AI credit decisioning continues to evolve rapidly, creating both challenges and opportunities for lending institutions. Financial institutions must navigate complex requirements regarding adverse action notices, risk model validation, and fair lending compliance within AI contexts. Despite these challenges, regulatory technology solutions utilizing explainable AI have emerged to address these concerns. Advanced model governance frameworks employing interpretable machine learning techniques now provide transparent explanations for credit decisions while maintaining model performance. The implementation of automated compliance monitoring has enabled banks to reduce the time spent on regulatory compliance processes by approximately 30 percent, allowing risk and compliance staff to focus on higher-value activities [4]. These governance frameworks are increasingly critical as institutions deploy more sophisticated AI models across their lending operations.
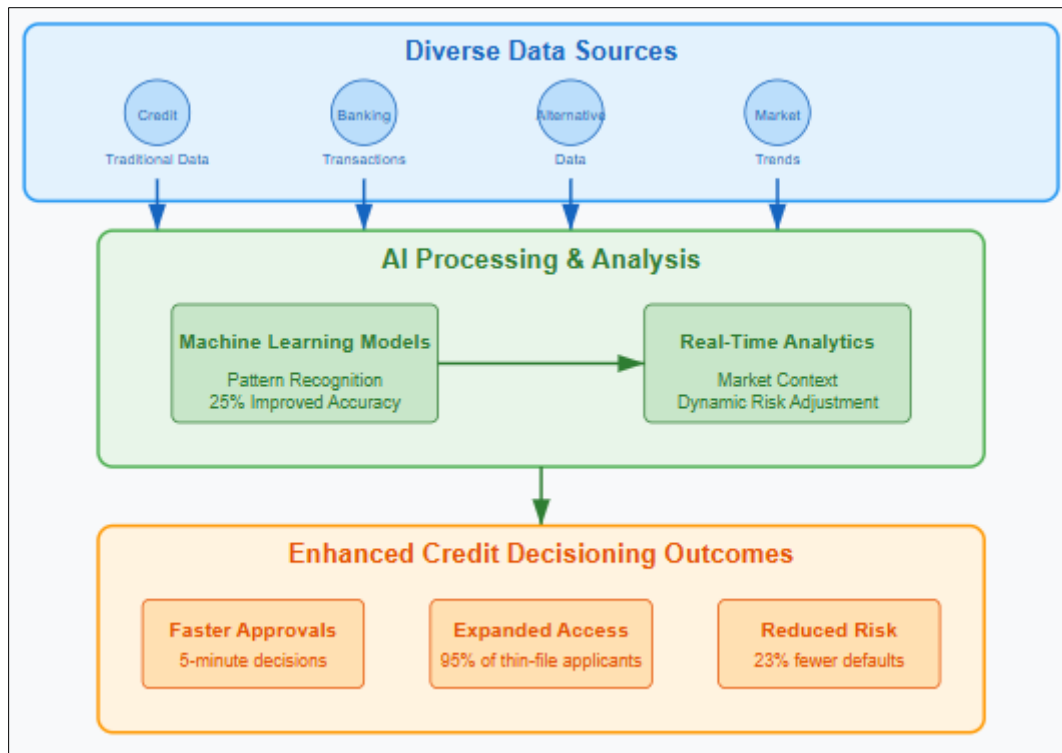
Figure 1 AI-Powered Credit Decisioning Process [3, 4]

3. Fortifying Financial Security: Advanced Fraud Prevention Systems

The lending ecosystem's digital transformation has catalyzed an unprecedented evolution in financial fraud, with threat actors developing increasingly sophisticated methodologies to exploit vulnerabilities across the lending lifecycle. The emergence of synthetic identity fraud, account takeover attacks, and application fraud has created substantial challenges for lending institutions operating in digital environments. Recent industry research indicates that financial institutions implementing advanced AI-driven fraud detection systems have reduced fraud losses by an average of 63%, demonstrating the transformative potential of these technologies in securing lending operations [5].

3.1. Next-Generation Pattern Recognition

The pattern recognition capabilities that distinguish GenAI systems have proven particularly valuable in transaction monitoring applications, enabling financial institutions to identify subtle anomalies indicative of fraudulent activity. Unlike traditional rule-based systems that rely on predefined scenarios, machine learning algorithms continuously analyze thousands of variables across multiple transactions to establish behavioral baselines for individual borrowers and merchant categories. This contextual awareness allows for dramatically more precise fraud detection, with neural network-based detection systems demonstrating significant improvements in accuracy compared to conventional methods. The application of deep learning techniques enables the identification of complex fraud patterns that would remain invisible to traditional rule-based systems, particularly in identifying coordinated fraud networks operating across multiple channels [6].

3.2. Behavioral Biometrics and Advanced Authentication

The integration of behavioral biometrics represents a critical advancement in fraud prevention for lending operations. Contemporary systems analyze numerous subtle interaction patterns—including typing rhythm, mouse movement, and application navigation—to establish unique behavioral signatures for legitimate users. These passive authentication mechanisms operate continuously throughout the lending journey, enabling real-time risk assessment without introducing additional friction. The implementation of behavioral biometrics within lending workflows creates a layered defense system capable of detecting account takeover attempts even when traditional credentials have been compromised. Financial institutions have reported that the incorporation of behavioral biometrics into their authentication frameworks has successfully identified sophisticated fraud attempts that had bypassed traditional security controls [5].

3.3. Explainable AI and Regulatory Compliance

The adoption of explainable AI frameworks represents an emerging priority in fraud prevention, addressing the critical need for transparency in algorithmic decision-making. Unlike traditional "black box" models, explainable AI frameworks provide clear rationales for fraud determinations, supporting both operational requirements and regulatory obligations. These systems generate comprehensive documentation of detection reasoning, enabling efficient case management and regulatory reporting. The integration of explainable AI capabilities enables compliance with evolving regulatory requirements while maintaining detection effectiveness. Recent advancements in this domain have enabled financial institutions to achieve compliance with stringent model governance requirements while preserving the sophisticated pattern recognition capabilities essential to effective fraud prevention. According to industry analysis, approximately 76% of financial institutions are now prioritizing the integration of explainable AI features within their fraud detection frameworks to address growing regulatory scrutiny [6].
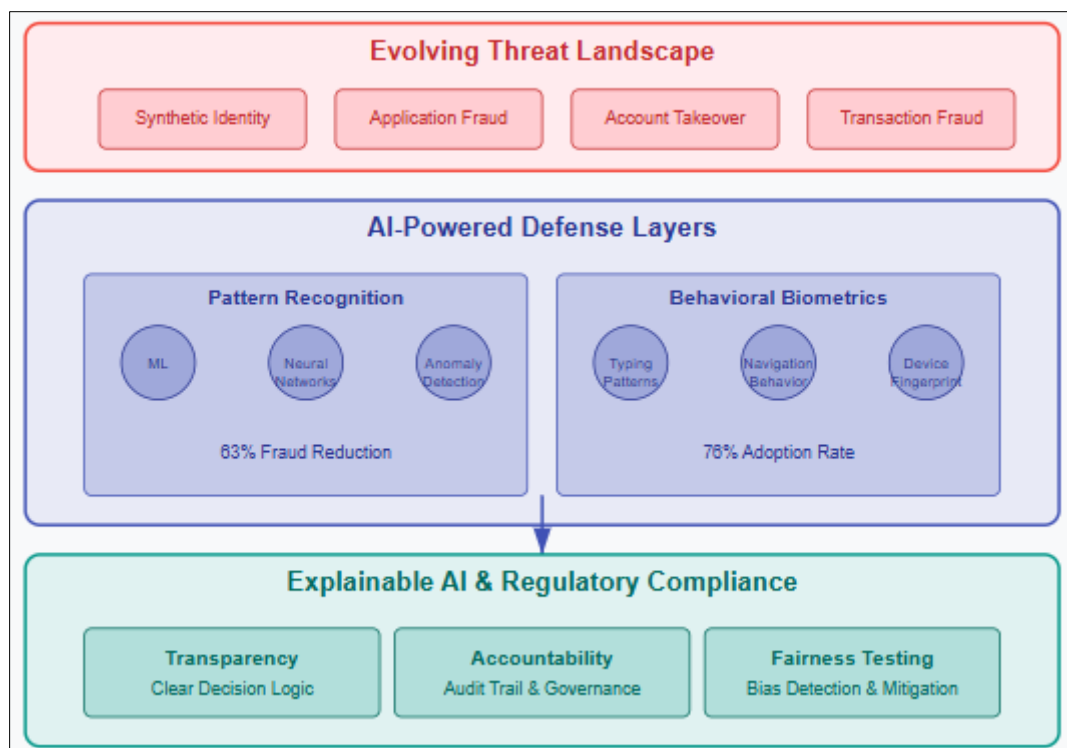

Figure 2 Fortifying Financial Security: Advanced Fraud Prevention Systems [5, 6]

4. Reimagining Customer Experience: Conversational AI and Service Automation

The evolution of customer engagement in lending has been profoundly transformed by the integration of conversational AI technologies, marking a paradigm shift from traditional service models toward sophisticated, personalized digital interactions. This transition has progressed through multiple technological generations—from basic rule-based chatbots with limited capabilities to contemporary conversational agents powered by advanced natural language processing and deep learning architectures. Financial institutions implementing enterprise-grade conversational AI have witnessed significant improvements in operational efficiency while simultaneously expanding service availability. The transformative impact of AI on customer experience is particularly evident in lending operations, where complex processes and documentation requirements have historically created friction points that diminished satisfaction and increased abandonment rates [7].

4.1. Evolution of Intelligent Virtual Assistants

The capabilities of conversational agents in lending environments have evolved dramatically, transitioning from simple scripted interactions to sophisticated dialogue systems capable of understanding context, intent, and sentiment. Modern virtual assistants leverage transformer-based language models to comprehend natural language queries with remarkable accuracy, eliminating the rigid command structures that characterized earlier implementations. These systems can now process multiple intents within a single customer query, enabling more natural conversation flows that mirror human interaction patterns. Research indicates that approximately 79% of banking customers express

greater satisfaction with AI assistants that can maintain contextual awareness throughout complex multi-turn conversations, particularly during loan application processes where information must be gathered incrementally across multiple interactions [8]. This contextual persistence represents a critical advancement in creating seamless customer journeys across increasingly complex lending products.

4.2. Personalization Through Predictive Analytics

The integration of predictive analytics with conversational AI enables unprecedented personalization capabilities throughout the lending lifecycle. By analyzing historical interaction data, transaction patterns, and application behaviors, these systems develop sophisticated customer models that anticipate needs and tailor responses accordingly. This anticipatory approach transforms the customer experience from reactive service provision to proactive engagement based on likely requirements at each journey stage. The implementation of predictive personalization in digital lending channels has demonstrated significant impact on customer engagement metrics, with studies showing that financial institutions employing these techniques experience approximately 34% higher engagement rates compared to those using static interaction models [7]. The resulting experience feels remarkably human despite its algorithmic foundation, creating emotional connections that historically required human intervention to establish and maintain.

4.3. Omnichannel Integration and Journey Continuity

The seamless integration of conversational AI across multiple channels represents a critical advancement in modern lending experiences. Contemporary implementations maintain consistent context and personalization across web interfaces, mobile applications, voice channels, and messaging platforms, enabling customers to transition between channels without losing continuity. This omnichannel coherence eliminates the frustration of repeated information requests and disjointed interactions that plagued earlier digital lending experiences. Research investigating customer expectations in digital banking environments reveals that approximately 68% of customers consider seamless cross-channel experiences a primary factor in selecting and maintaining relationships with financial institutions [8]. The technical implementation of this continuity requires sophisticated customer data platforms that maintain unified profiles accessible to all customer-facing systems, ensuring consistent personalization and contextual awareness regardless of the engagement channel. This integrated approach aligns with evolving customer expectations for frictionless experiences comparable to those offered by leading digital platforms outside the financial services sector.

Table 1 Evolution of Conversational AI in Lending [7, 8]

Generation	Key Capabilities	Customer Impact
First Generation	Rule-based responses, Simple FAQ handling, Limited scripted interactions	24/7 availability for basic inquiries, 30% reduction in simple service calls
Second Generation	Intent recognition, Natural language understanding, Contextual awareness	Personalized recommendations, 55% containment rate for standard inquiries, Reduced abandonment rates
Third Generation	Multi-intent processing, Sentiment analysis, Journey personalization	End-to-end application guidance, 79% customer satisfaction rates, Complex query resolution
Current Generation	Predictive engagement, Emotional intelligence, Omnichannel continuity	Proactive service interventions, 68% preference over human-only channels, Seamless cross-channel experiences

5. Streamlining Operations: Document Processing and Compliance Automation

The integration of Natural Language Processing (NLP) and Computer Vision technologies has revolutionized document processing within the lending ecosystem, transforming what was historically a labor-intensive, error-prone process into a streamlined, highly accurate operation. Modern document intelligence platforms leverage sophisticated deep learning models to extract, categorize, and validate information from diverse document types with minimal human intervention. The global intelligent document processing market size was valued at USD 1.1 billion in 2022 and is expected to expand at a compound annual growth rate (CAGR) of 29.2% from 2023 to 2030, reflecting the accelerating adoption of these technologies across industries including financial services [9]. This rapid market expansion underscores the strategic value these capabilities deliver to lending operations through enhanced efficiency, accuracy, and customer experience.

5.1. Intelligent Document Processing Revolution

The convergence of machine learning, computer vision, and natural language understanding has transformed document-intensive lending workflows by enabling automated extraction and processing of critical information from loan applications, financial statements, identity documents, and property records. Modern intelligent document processing (IDP) systems employ sophisticated neural networks capable of understanding document context and semantics rather than merely recognizing characters or keywords. This contextual understanding enables these systems to accurately extract relevant information even from unstructured documents with varying formats, a capability particularly valuable in lending operations that process diverse documentation from multiple sources. The technology's impact on operational efficiency is particularly significant in mortgage lending, where document-intensive processes have historically created substantial bottlenecks in application processing [9]. The implementation of comprehensive IDP solutions has enabled forward-thinking lenders to dramatically accelerate document-intensive workflows while simultaneously improving accuracy and regulatory compliance.

5.2. Regulatory Compliance Automation

The application of AI technologies to compliance functions represents one of the most significant operational transformations in lending operations. Financial institutions must navigate increasingly complex regulatory requirements including Know Your Customer (KYC), Anti-Money Laundering (AML), and various consumer protection mandates that generate substantial operational burdens when managed through traditional methods. AI-powered compliance solutions integrate multiple components including advanced data analytics, natural language processing, and machine learning to automate the identification, assessment, and management of regulatory risks across lending operations. These systems can reduce compliance costs by approximately 40% while simultaneously improving risk identification and management [10]. The automation of routine compliance tasks enables specialized compliance personnel to focus on complex risk assessments and strategic initiatives rather than data collection and routine monitoring, enhancing both operational efficiency and risk management effectiveness.

5.3. End-to-End Process Integration

The integration of intelligent document processing with automated compliance verification and robotic process automation creates end-to-end digital workflows capable of managing complex lending operations with minimal manual intervention. These integrated systems connect front-end customer interfaces with middle-office processing functions and back-office compliance operations to create seamless information flows throughout the lending lifecycle. The implementation of comprehensive process integration enables financial institutions to achieve straight-through processing rates exceeding 80% for standard lending products, dramatically reducing processing times while improving consistency and compliance [10]. This level of automation fundamentally transforms operational models, enabling financial institutions to achieve scalability and operational resilience that would be impossible with traditional staffing approaches. By reducing manual touchpoints throughout the lending lifecycle, these integrated automation frameworks simultaneously enhance operational efficiency, risk management effectiveness, and customer experience.
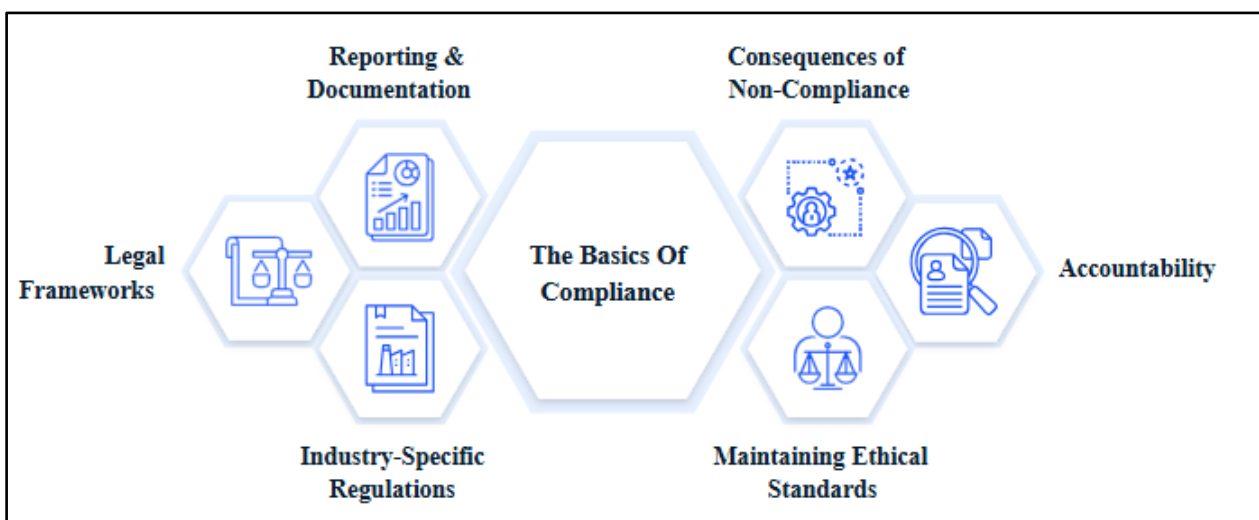

Figure 3 Basics of Compliance [9, 10]

6. The Future Landscape: Integrated AI Ecosystems in Lending

The lending industry stands at the threshold of a fundamental transformation driven by the convergence of multiple AI technologies into comprehensive, interconnected ecosystems. This integration transcends individual point solutions to create intelligent operational frameworks capable of orchestrating complex lending processes across the entire value chain. Forward-thinking financial institutions are implementing these integrated approaches to achieve unprecedented operational synergies. According to industry analysis, financial institutions that have successfully deployed AI technologies have experienced up to 90% cost reduction in certain banking processes, demonstrating the substantial efficiency gains possible through comprehensive AI implementation [11]. These performance improvements are accelerating the transition toward integrated ecosystem approaches rather than isolated technological deployments.

6.1. Convergence of Intelligent Technologies

The true transformative potential of AI in lending emerges when multiple technologies operate in concert rather than isolation. Financial institutions at the forefront of innovation are creating seamless integrations between natural language processing, machine learning, computer vision, and robotic process automation to deliver end-to-end intelligence across lending operations. These integrated ecosystems enable unprecedented personalization of customer experiences while simultaneously enhancing operational efficiency and risk management effectiveness. The application of advanced analytics within these ecosystems facilitates real-time decisioning capabilities that would be impossible with traditional technologies or isolated AI implementations. Industry research indicates that banks implementing comprehensive AI strategies are positioned to realize approximately $1 trillion in additional value annually through enhanced productivity and risk reduction, demonstrating the enormous economic potential of these integrated approaches [11]. This potential value creation is driving accelerated investment in AI capabilities across the financial services sector, with lending operations representing a primary focus area due to the substantial efficiency and risk management opportunities they present.

6.2. Embedded Finance and Seamless Integration

The evolution of lending technologies is increasingly focused on embedded finance models that integrate lending capabilities directly into non-financial platforms and customer journeys. This approach represents a fundamental reimagining of distribution models, enabling financial services to be delivered at the precise moment of customer need rather than through traditional acquisition channels. Modern technology platforms leverage APIs and microservices architectures to create these seamless integrations, with contemporary lending systems designed specifically for embeddability across diverse digital ecosystems. The implementation of embedded lending capabilities has demonstrated a significant impact on both acquisition efficiency and customer experience, with financial institutions reporting substantial improvements in conversion rates and customer satisfaction. Digital lending platforms have enabled lenders to reduce loan processing times from weeks to minutes, dramatically enhancing customer experiences while simultaneously improving operational efficiency [12]. This acceleration of lending processes represents a fundamental competitive advantage in increasingly digital markets where customer expectations for immediacy continue to escalate.

6.3. Ethical Considerations and Responsible Implementation

As AI becomes increasingly central to lending operations, ethical considerations and responsible implementation practices have emerged as critical success factors rather than peripheral concerns. Leading financial institutions are implementing comprehensive governance frameworks that ensure fairness, transparency, and accountability throughout the AI development and deployment lifecycle. These frameworks typically incorporate continuous monitoring for potential bias, explainability mechanisms that provide clear rationales for algorithmic decisions, and robust validation methodologies that ensure both performance and fairness objectives are achieved. The implementation of responsible AI practices involves a multidisciplinary approach that engages stakeholders across technology, business, legal, compliance, and risk management functions to ensure balanced consideration of all relevant perspectives. Organizations that embrace ethical AI implementation report enhanced regulatory relationships, improved customer trust, and reduced operational risk related to algorithmic decision-making. Lenders using AI must ensure their models adhere to standards like the FCRA and Equal Credit Opportunity Act, as AI systems must be transparent and explainable to satisfy both customers and regulators alike [12]. This regulatory emphasis on transparency and fairness is accelerating the adoption of explainable AI approaches across the lending ecosystem.

7. Conclusion

The convergence of Generative AI technologies in automated lending marks a pivotal evolution in financial services that extends far beyond mere operational efficiency. As lending institutions increasingly embrace integrated AI ecosystems combining sophisticated analytics, intelligent automation, and secure transaction frameworks, they position themselves at the forefront of financial innovation while simultaneously addressing longstanding challenges in accessibility, risk management, and customer engagement. This technological transformation, however, necessitates thoughtful consideration of ethical implications, regulatory requirements, and the essential balance between automation and human oversight. Forward-thinking lenders who strategically implement these complementary technologies while maintaining a commitment to responsible AI practices will not only revolutionize their operational capabilities but also forge deeper customer relationships built on personalized service, transparent processes, and enhanced security. The future of automated lending ultimately lies not in technology alone, but in how effectively institutions leverage these powerful tools to create more inclusive, efficient, and trustworthy financial ecosystems that better serve the evolving needs of borrowers in a digital age.

References

[1] Grand View Research, "Artificial Intelligence In Fintech Market Size, Share & Trends Analysis Report By Component, Deployment, By Application, And Segment Forecasts, 2022 - 2030," Grand View Research Market Insights, 2025. [Online]. Available: https://www.grandviewresearch.com/industry-analysis/artificial-intelligence-in-fintech-market-report

[2] Riteshkumar H. Patel, "Artificial Intelligence: A Tool for Enhancement of Lending Facilities in Banking Institutions," ResearchGate, June 2023. [Online]. Available: https://www.researchgate.net/publication/371608745_ARTIFICIAL_INTELLIGENCE_A_TOOL_FOR_ENHANCE MENT_OF_LENDING_FACILITIES_IN_BANKING_INSTITUTIONS

[3] Andrew DeLanzo, "How AI is Transforming Credit Scoring and Underwriting," AI Time Journal, 13 Nov. 2023. [Online]. Available: https://www.aitimejournal.com/how-ai-is-transforming-credit-scoring-and-underwriting/46867/

[4] McKinsey & Company, "Building the AI Bank of the Future," McKinsey & Company, May 2021. [Online]. Available: https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/building %20the%20ai%20bank%20of%20the%20future/building-the-ai-bank-of-the-future.pdf

[5] Yoganandham Govindharaj, "Emerging Trends in Digital Fraud With a Focus on the Rising Threat of Malicious Applications Exploitative Loan Financing and Payment Manipulation in Privacy Security and Consumer Trust," ResearchGate, Dec. 2024. [Online]. Available: https://www.researchgate.net/publication/387190421_EMERGING_TRENDS_IN_DIGITAL_FRAUD_WITH_A_FO CUS_ON_THE_RISING_THREAT_OF_MALICIOUS_APPLICATIONS_EXPLOITATIVE_LOAN_FINANCING_AND_PAYM ENT_MANIPULATION_IN_PRIVACY_SECURITY_AND_CONSUMER_TRUST_-A_THEORETICAL_

[6] Tariqul Islam et al., "Artificial Intelligence in Fraud Detection and Financial Risk Mitigation: Future Directions and Business Applications," International Journal For Multidisciplinary Research, Vol. 6, no. 5, Oct. 2024. [Online]. Available: https://www.researchgate.net/publication/387461566_Artificial_Intelligence_in_Fraud_Detection_and_Financi al_Risk_Mitigation_Future_Directions_and_Business_Applications

[7] Archana Todupunuri, "The Future of Conversational AI in Banking: A Case Study on Virtual Assistants and Chatbots*: Exploring the Impact of AI-Powered Virtual Assistants on Customer Service Efficiency and Satisfaction," IRJEMS International Research Journal of Economics and Management Studies, Vol. 3, no. 10, 10 Oct. 2024. [Online]. Available: https://irjems.org/Volume-3-Issue-10/IRJEMS-V3I10P124.pdf

[8] Joy Akahome and Ida Skubis, "Exploring Transformational Customer Experience in Digital Banking: An Exploratory Study," Scientific Papers of Silesian University of Technology Organization and Management Series, Nov. 2023. [Online]. Available: https://www.researchgate.net/publication/375926739_Exploring_Transformational_Customer_Experience_in_ Digital_Banking_an_Exploratory_Study

[9] Grand View Research, "Intelligent Document Processing Market Size, Share & Trends Analysis Report By Component, By Technology, By Deployment, By Organization Size, By End-use, By Region, And Segment

Forecasts, 2025-2030," Grand View Research Market Analysis, 2025. [Online]. Available: https://www.grandviewresearch.com/industry-analysis/intelligent-document-processing-market-report

[10] Akash Takyar, "AI in Financial Compliance: Applications, benefits, technologies, and solution," LeewayHertz. [Online]. Available: https://www.leewayhertz.com/ai-in-financial-compliance/

[11] Alex Kreger, "The Future of AI in Banking," Forbes Business Council, 20 March 2023. [Online]. Available: https://www.forbes.com/councils/forbesbusinesscouncil/2023/03/20/the-future-of-ai-in-banking/

[12] Nucleus Software, "Embracing the Future: Technology Trends for Modernizing Digital Lending," Nucleus Software Blog, 19 April 2023. [Online]. Available: https://www.nucleussoftware.com/blog/embracing-the-future-technology-trends-for-modernizing-digital-lending/