Sarcouncil Journal of Engineering and Computer Sciences

ISSN(Online): 2945-3585

Volume- 04| Issue- 11| 2025

Research Article **Received:** 25-09-2025| **Accepted:** 20-10-2025 | **Published:** 02-11-2025

AI-Driven Enterprise Systems Modernization in the Financial Sector

Praveen Kumar Guguloth

State University of New York at Binghamton, USA

Abstract: This article is a complete discussion of the groundbreaking role of artificial intelligence in modernizing enterprise systems in the financial services industry. It explores how financial institutions can, systematically, convert their old monolithic systems to new, modern AI-driven systems that respond to the urgent issues in the industry. The article outlines an organized framework that consists of architectural transformation, intelligent capability integration, and constant intelligence implementation. It breaks high-value applications such as fraud detection, customized banking experience, regulatory compliance, and micro-frontend solutions. The article offers a roadmap to achieve successful modernization through a thorough analysis of implementation methodologies, such as domain-driven decomposition, strategic capability prioritization, parallel architecture implementation, MLOps infrastructure, and organizational transformation. At the end of the article, best practices analysis is provided in data quality, regulatory compliance, security, and talent development, with mitigation strategies suggested on the basis of industry best practices. This is a multi-faceted solution that meets technological and organizational aspects of modernizing the enterprise, offering a systematic way of advancing financial institutions in AI-based change processes.

Keywords: Enterprise Systems Modernization, Financial Technology Transformation, Artificial Intelligence Integration, Micro-Frontend Architecture, Regulatory Technology Compliance.

INTRODUCTION

The financial services industry is operating within a context characterized by heightened regulatory pressures, shifting customer expectations, and accelerating technological evolution. Obsolete enterprise infrastructure that typically comes in the form of monolithic systems developed before the cloud computing paradigm also represents a significant liability to the operations of institutions. As noted in a study by IBM, such rigid systems present significant hindrances to innovation, as financial institutions are unable to keep up with quickly evolving marketplace conditions while ensuring stability of foundational financial infrastructure (Finn, T. & Downie, A).

Current studies show that banks and other financial companies with legacy enterprise architectures have greater operational expenses, longer time-to-market for introducing new services, and lower customer satisfaction ratings than banks that have comprehensively modernized. The analysis by Salesforce on AI adoption in banking shows that banks that have implemented AI-facilitated modernization efforts successfully gain an enormous competitive advantage, especially in the delivery of customer experiences and operational effectiveness (Salesforce,).

IBM research shows that modernization projects create quantifiable value through a variety of dimensions, such as strengthened regulatory compliance capabilities, enhanced customer engagement metrics, and substantial cost savings through the automation of operations (Finn, T. & Downie, A). The technical intricacy of traditional banking systems creates challenges that are distinctive in nature, with most institutions having to deal with complex ecosystems of interconnected applications built over several decades with different technologies.

Technical debt incurred over decades of incremental system changes has built up an unsustainable weight. IBM's industry analysis of the financial services sector shows that modernization strategies emphasizing incremental, value-based transformation over high-risk "big bang" replacements generally result in better outcomes (Finn, T. & Downie, A). These methods allow institutions to stay operationally stable while incrementally building capabilities through cloud migration, API-driven integration, and targeted AI implementation.

According to Salesforce research, competitive stress from fintech startups and changing expectations from customers have sped up transformation timelines in the industry (Salesforce,). Today's consumers increasingly anticipate frictionless and personalized experiences akin to those offered by technology platforms across other industries. This has put huge pressure on established financial institutions to increase digital capabilities while ensuring trust and security.

Salesforce analysis of the adoption of AI in banking points out that successful banks and other

***Corresponding Author:** Praveen Kumar Guguloth

DOI- https://doi.org/10.5281/zenodo.17508139

institutions focus on data integration and data governance as core components of their transformation agendas (Salesforce,). Artificial intelligence applications are only as effective as the access to complete, high-quality data—a shared resource still scattered among different systems in most financial institutions.

AI-DRIVEN MODERNIZATION FRAMEWORK

The migration from traditional financial systems to AI-powered enterprise architectures must take the form of a systematic process involving architectural redesign, infrastructure redesign, and intelligent capability integration. Financial institutions that adopt end-to-end modernization paradigms attain considerable improvement in operational effectiveness and customer experience realization using disciplined transformation strategies (Chlouverakis, K., & Rawal, A.2024). The paradigm has three core pillars that, when combined, make it possible to realize the full potential of AI capabilities in enterprise financial systems.

Architectural Transformation

The banking sector is shifting towards cloud-native, micro-frontend architecture to phase out the monolithic legacy systems. This architectural redesign is a paradigm shift at its core, where the design of the system is based on the business capabilities and not the technical aspects, resulting in increased adaptability and speed of innovation. As the analysis by The Digital Fifth proves, contemporary banking architectures should enable traditional financial capabilities as well as new digital capabilities through elastic integration patterns (The Digital Fifth, 2025).

This design practice focuses on decoupled service parts that adopt domain-driven design concepts to divide business capabilities into autonomously deployable services. The Digital Fifth's exploration of enterprise architecture in digital banking emphasizes how component-based architectures allow for distinct capabilities within financial institutions to be developed at varying speeds based on business requirements without affecting critical operations (The Digital Fifth, 2025). API-first integration patterns bring about the enforcement of standardized interfaces among system components that make integration with specialized AI services simpler.

Event-driven processing architectures allow real-time data streams to deliver up-to-date operational information to AI systems for ongoing analysis. Real-time data processing, as reported by EY's end-to-end assessment of AI transformation in financial services, is a key enabler for successful AI deployment, especially for fraud detection and market surveillance use cases (Chlouverakis, K., & Rawal, A.2024). The micro-frontend solution is tailored to the user experience layer, where specialized AI-driven interfaces are seamlessly plugged into the larger application environment without necessitating total system replacement.

Intelligent Capability Integration

The enterprise architecture has been modernized with AI capabilities in multiple functional domains to weave an inclusive intelligence fabric within the organization. Capability integration is cited by EY as a key differentiator between organizations realizing transformative AI results and those seeing little value from their spend (Chlouverakis, K., & Rawal, A.2024).

Predictive analytics engines incorporate machine learning models that examine customer trends, market trends, and operational tendencies and use this information to predict results with much greater accuracy than those of conventional methods. Natural language processing systems apply sophisticated language models for customer communication, document inspection, and automatic reporting, which EY suggests are especially groundbreaking for compliance and customer service operations (Chlouverakis, K., & Rawal, A.2024).

Computer vision modules utilize visual recognition systems for identity authentication, document processing, and physical security. Reinforcement learning solutions use adaptive decision-making algorithms to implement trading operations, portfolio management, and risk balancing. The architectural evaluation of the Digital Fifth lays stress upon the fact that these sophisticated AI features should be integrated in a unified architectural framework guaranteeing proper access to data, security controls, and integration with core banking operations (The Digital Fifth, 2025).

Continuous Intelligence Framework

Contemporary financial enterprise systems apply feedback mechanisms, allowing constant improvement of AI performance to deliver value over the long term beyond the initial deployment. EY's study on AI maturity among financial services recognizes continuous learning

Publisher: SARC Publisher

capabilities as the defining feature of companies that are able to deliver sustainable competitive advantage with AI (Chlouverakis, K., & Rawal, A.2024).

Real-time performance monitoring tools and systems to quantify and tune AI model performance in production. A/B testing infrastructure regularly tests substitute algorithms and methods to optimize results. The Digital Fifth's enterprise architecture research highlights that efficient banking architectures need to enable experimental methodologies supporting continuous innovation while ensuring the stability necessary for mission-critical financial operations (The Digital Fifth, 2025).

Model governance solutions maintain the explainability, audibility, and regulatory conformity of AI decision-making. EY's in-depth evaluation of AI in financial services draws attention to governance as increasingly vital as regulatory approaches mature to respond to the particular challenges posed by automated decision systems in financial environments (Chlouverakis, K., & Rawal, A.2024). These governance features become ever more vital differentiators as regulatory examination of AI in financial services continues to increase.

Table 1: Components of the AI-Driven Financial Enterprise Modernization Framework (Chlouverakis, K., & Rawal, A.2024; The Digital Fifth,)

Framework Pillar	Key Components	Benefits
Architectural Transformation	Cloud-native architecture, Micro-frontend design, Decoupled service components, API-first integration, Event-driven processing	Increased adaptability, Innovation velocity, Business-aligned capabilities, Simplified integration, Real-time operations
Intelligent Capability Integration	Predictive analytics engines, Natural language processing, Computer vision components, Reinforcement learning systems	Enhanced forecasting accuracy, Automated document processing, Improved security verification, Optimized decision-making
Continuous Intelligence Framework	Real-time performance monitoring, A/B testing infrastructure, and Model governance systems	Optimized model performance, Continuous improvement, Regulatory compliance, Explainable AI decisions

APPLICATIONS IN FINANCIAL ENTERPRISE SYSTEMS

The combination of AI in modernized enterprise structures supports various high-value purposes across financial institutions, creating breakthrough capabilities that provide quantifiable business outcomes. An extensive review published in Nature's Scientific Reports illustrates that financial institutions adopting integrated AI initiatives gain significantly improved customer outcomes and operational performance than financial institutions that are adopting stand-alone technology improvements (Vuković, D. B. *et al.*, 2025).

Automated Fraud Detection and Prevention

Rule-based fraud detection systems of the traditional kind have poor false positive rates and poor capability to identify new fraud patterns. AI-based fraud detection systems consider transaction patterns, customer behavior, and context data to identify suspected fraudulent activities much more accurately.

As per research in Nature, neural network models specifically for temporal pattern discovery in financial transactions exhibit 73% higher sensitivity to subtle fraud signals than traditional rule-based systems (Vuković, D. B. *et al.*, 2025). These systems continuously evolve to handle new fraud methods using supervised and unsupervised learning techniques, allowing financial institutions to continue to be protected from changing criminal tactics.

The architectural deployment generally involves stream processing of transaction information via technologies such as Apache Kafka, which supports the real-time analytical functions necessary for successful fraud prevention. As indicated by the report from EY, real-time analytics is a key capability for contemporary financial institutions dealing with complex financial crime threats (Chlouverakis, K., & Rawal, A.2024). Real-time feature extraction and scoring with purpose-built AI accelerators facilitates millisecond-scale decision-making necessary for transaction authorization processes. Integrating case management systems for human processing of high-risk transactions provides robust human-machine collaboration models that

Publisher: SARC Publisher

tap into complementary capabilities. Continuous model update based on verified fraud outcomes provides adaptive protection against new threats.

Delivery of Personalized Banking Experience
Banks increasingly compete on customer experience over just financial products. Recommendation engines powered by AI scrutinize customer financial behaviors, life events, and signals of preference in order to give highly personalized advice and product recommendations.

These systems most often utilize customer data platforms that consolidate information from across product silos, which Nature's study points out as being integral to successful personalization strategies (Vuković, D. B. *et al.*, 2025). Machine learning algorithms determine life events and financial requirements, facilitating proactive interaction at points of critical decision-making. Natural language generation platforms provide individualized communications that far surpass conventional segmentation methods in terms of both engagement and conversion rates. Reinforcement learning algorithms maximize receptivity through timing and channel selection while minimizing perceptions of over-communication on the customer side.

Regulatory Compliance and Risk Management
Financial institutions are subject to far-reaching regulatory needs that require advanced risk evaluation and compliance tracking. AI systems augment these capabilities by utilizing automated processes that increase the efficiency and effectiveness of compliance activities.

EY's detailed evaluation of AI deployment in financial services points to how these systems facilitate automated regulatory reporting by pulling needed information out of operational systems with less human effort and greater accuracy (Chlouverakis, K., & Rawal, A.2024). Natural language processing of regulatory reports detects compliance requirements with considerably greater accuracy than manual processes. Continuous transaction monitoring maintains anti-money laundering compliance through advanced pattern recognition features. Predictive risk modeling detects developing compliance risks prior to their appearance as regulatory problems.

Scalable Micro-Frontend Solutions
The user experience layer is especially challenging in financial enterprise modernization since institutions will have dozens or hundreds of customer and internal applications. Micro-frontend architectures nicely mitigate this complexity with componentized solutions for user interface creation.

In Nature's assessment of technology change in banking, institutions leveraging micro-frontend architectures exhibit quantifiably greater agility in reacting to shifting market conditions (Vuković, D. B. *et al.*, 2025). These architectures break down monolithic user interfaces into independent, deployable components, allowing specialized teams to build AI-powered experiences without reliance on core systems. This design enables gradual modernization instead of high-risk "big bang" replacements, meaning it greatly decreases implementation risk. The architecture maintains uniform experiences on multiple delivery channels, resolving the key challenge of omnichannel delivery in contemporary financial services.

As EY's study suggests, financial institutions that use new front-end architectures gain quicker time-to-market for new features and increased developer productivity relative to those with legacy monolithic interfaces (Chlouverakis, K., & Rawal, A.2024). These performance benefits yield quicker innovation cycles at the same time, as well as lower development costs, providing huge competitive benefits in fast-changing marketplace settings.

Table 2: High-Value AI Applications in Financial Enterprise Systems (Chlouverakis, K., & Rawal, A.2024; Vuković, D. B. *et al.*, 2025)

Application Area	Key Features	Primary Benefits
Fraud Detection & Prevention	Neural networks for pattern recognition, Stream processing technology, Real-time feature extraction, Human-machine collaboration	73% higher sensitivity to fraud signals, Continuous adaptation to new fraud tactics, Millisecond-scale decision-making, Adaptive protection
Personalized Banking Experience	Customer data platforms, ML for life event identification, Natural language generation, Reinforcement	Consolidated cross-product information, Proactive engagement at decision points, Improved engagement/conversion metrics,

Publisher: SARC Publisher

	learning	Optimized communication timing
Regulatory Compliance & Risk Management	Automated regulatory reporting, NLP for document processing, Continuous transaction monitoring, Predictive risk modeling	Reduced manual effort, Higher compliance accuracy, Enhanced AML capabilities, Early threat detection
Micro-Frontend Architecture	Componentized user interfaces, Independent deployability, Progressive modernization, Omnichannel consistency	Increased organizational agility, reduced dependencies on core systems, Lower implementation risk, and Consistent multi-channel experience

IMPLEMENTATION METHODOLOGY

Effective AI-facilitated modernization of financial enterprise systems needs a systematic implementation methodology that strikes a balance between innovation and the operational stability needs of financial institutions. As per Prosci's in-depth analysis of digital transformation in financial services, organizations that adopt systematic change management methodologies have much higher success rates than those embarking on technology-driven approaches without paying attention to the human aspects (Prosci, 2025).

Domain-Driven Decomposition

The modernization process starts with a structured examination of the enterprise architecture from a domain point of view, distinguishing bounded contexts that embody business capabilities that are not fragmented. The examination leads to the breaking down of monolithic systems into services for business domains instead of technical pieces.

Prosci's study illustrates that financial institutions utilizing domain-focused design principles obtain greater system cohesion and reduced cross-system dependencies than when strictly adhering to technical decomposition methods (Prosci, 2025). The domain-driven method ensures system boundaries coincide with inherent business partitions, forming more stable interfaces among components and allowing greater organizational autonomy. Hexaware's evaluation of enterprise modernization frameworks establishes that organizations defining domain-aligned system boundaries significantly lower development coordination expenses and enhance feature delivery speed (Hexaware, 2025).

Prioritization of Strategic Capability

Financial institutions should prioritize efforts at modernization according to business value, technical feasibility, and risk factors. Lower-risk, high-value capabilities tend to comprise early modernization targets that show value while developing organizational capability.

Hexaware's studies show that those financial institutions that have rolled out systematic capability prioritization approaches realize greater return on modernization investment than institutions going after opportunistic strategies (Hexaware, 2025). Successful prioritization weighs a number of variables like near-term business value, architectural importance, and organizational readiness. Prosci's studies suggest that successful modernization programs follow by initiating capabilities with visible business results while creating groundwork models for follow-on initiatives (Prosci, 2025).

Parallel Implementation Architecture

Instead of trying full replacement of older systems, effective modernizations tend to adopt a pattern of parallel architecture. Hexaware names this as a key framework for modernization, and it minimizes the risk of implementation while allowing ongoing business operations during the transformation process (Hexaware, 2025).

The parallel pattern uses several synchronized components in which new functionality is built on the new architecture, while the legacy system continues to run throughout the transition. Integration layers bridge modern and legacy elements using standardized interfaces that hide implementation details. Data synchronization processes guarantee consistency between environments to support progressive movement of business operations. Prosci research illustrates that financial institutions adopting parallel architecture patterns minimize modernization risk while achieving accelerated time-to-value compared to replacement strategies (Prosci, 2025).

MLOps Infrastructure Setup

Specialized infrastructure is needed for AI development, testing, deployment, and monitoring. Financial institutions need to set up machine learning operations (MLOps) practices that meet fundamental requirements for sustainable AI deployment.

Publisher: SARC Publisher

Hexaware informs us that organizations with end-to-end MLOps practices have much higher model success rates and shorter deployment cycles than companies that rely on ad-hoc methods (Hexaware, 2025). Practices include model development and versioning systems that preserve complete lineage for all deployed models. Feature store implementations ensure consistent data access between development and production environments, minimizing data inconsistency issues that are the root cause of model failures. Testing and validation frameworks for AI components guarantee model performance and safety before deployment.

Deployment pipelines maintain model integrity across the shift from development to production environments. Prosci's study identifies that systems monitoring and identifying model drift and performance issues are an essential differentiator between financially sustainable and transient AI implementations in financial services (Prosci, 2025).

Organizational Transformation

Effective enterprise modernization involves evolving organizational forms and practices that go beyond changes in technology. Financial institutions need to adopt new capabilities aligned with contemporary architectural design and AI-enabled operations.

Prosci's research suggests that organizations having systematic change management programs that cover technology and organizational aspects realize much better success rates than those that concentrate entirely on technical deployment (Prosci, 2025). Such programs build cross-functional teams aligned to business domains instead of technical specialties, which allows more autonomy and end-to-end ownership. Site reliability engineering practices offer specialized skills for controlling complex distributed systems with high reliability requirements.

Data science skills need to be incorporated with the classical software engineering groups in order to support close cooperation through the AI lifecycle. Hexaware's study illustrates that governance frameworks for dealing with the special challenges of AI systems are one key success factor for financial institutions deploying smart capabilities (Hexaware, 2025). Such frameworks need to support innovation enablement while applying suitable risk management to systems with autonomous degrees not found within classical applications.

Table 3: Implementation Methodology for AI-Driven Financial Systems Modernization (Prosci, 2025; Hexaware, 2025)

Methodology Phase	Key Components	Benefits
Domain-Driven Decomposition	Business-aligned system boundaries, Cohesive bounded contexts, Service orientation	Improved system cohesion, reduced cross-system dependencies, enhanced organizational autonomy
Strategic Capability Prioritization	Business value assessment, Technical feasibility analysis, Risk evaluation	Higher ROI on modernization, Visible early business outcomes, Foundation for subsequent initiatives
Parallel Implementation Architecture	Simultaneous legacy/modern operations, Integration layers, Data synchronization	Minimized implementation risk, Continuous business operations, Accelerated time-to-value
MLOps Infrastructure Establishment	Model development & versioning, Feature store implementation, Testing frameworks, Monitoring systems	Higher model success rates, Reduced data inconsistency issues, Faster deployment cycles, and Early detection of model drift
Organizational Transformation	Cross-functional teams, Site reliability engineering, Integrated data science capabilities, Governance frameworks	End-to-end ownership, Improved reliability management, Enhanced collaboration, Balanced innovation, and risk

CHALLENGES AND CONSIDERATIONS

Financial sector modernization using AI-powered enterprise modernization is fraught with major challenges that need to be addressed methodically. As per Scalefocus studies, financial institutions using systematic methods of resolution of such challenges have much higher success rates for their modernization activities compared to organizations trying out ad-hoc methods (Scalefocus, 2024).

Publisher: SARC Publisher

Data Quality and Integration

AI systems inherently rely on quality, accessible data. Banks usually grapple with several major data challenges that affect the effectiveness of modernization. Based on Zendata's detailed survey of enterprise AI architecture in financial services, organizations that adopt systematic data governance programs see dramatically improved AI model performance than those that utilize fragmented methods (Pappu, N. 2025).

Data fragmentation among legacy systems is a major challenge, with Zendata's study emphasizing that the average financial institution has several discrete data stores with related information domains (Pappu, N. 2025). Fragmentation presents major impediments to applying enterprise-wide AI solutions. Differences in data definitions and structures compound integration efforts, with terms and representations differing across systems deployed across varying technology periods. Historical data quality problems that affect the training of models usually go unnoticed until attempts at AI implementation, resulting in project delays and performance restrictions that come as a surprise.

Real-time data access constraints are another serious challenge, with Scalefocus research showing many banks and other financial institutions being unable to deliver the fast access to operational data needed for successful real-time decision-making (Scalefocus, 2024). Successful modernization initiatives adopt data mesh architectures that address data as a product with defined ownership, quality control, and access patterns. This architecture style, where the responsibility for the data is distributed to domain teams instead of being centralized within specialized data organizations, has shown much greater data quality results in financial services deployments.

Regulatory Compliance

Banks are based on complex regulatory systems that place particular demands on AI systems, with challenges not faced by companies in more lightly regulated sectors. Zendata's analysis of regulatory issues in banking AI suggests that compliance factors pose a top priority concern to bank executives deploying intelligent systems (Pappu, N. 2025).

Such regulatory structures define requirements for explainability in automated choices, specifically for credit, insurance, and investment suggestions that have a material effect on customers. Scalefocus analysis reveals that institutions applying end-to-end explainable AI systems shorten the time required for regulatory approvals versus black-box implementations (Scalefocus, 2024). Testing for biases and ensuring fairness has become a key regulatory area of focus, with explicit requirements and developing standards to prevent discriminatory effects from automated systems.

Model documentation and validation standards broaden generic requirements for finance models to new AI methodologies with specialized validation techniques. Change management controls over AI systems have to deal with the ongoing learning character of most smart applications, posing governance issues not encountered by conventional systems with deterministic responses. Such regulatory implications have major implications for the approach to implementation and technology choice during the modernization process.

Security and Privacy

Financial information is a major target of malicious users, necessitating strong security controls for AI systems beyond the usual application security controls. Scalefocus's assessment of banking AI application cybersecurity risks identifies that smart systems bring with them distinct security threats that need tailored protection strategies (Scalefocus, 2024).

Successful deployments have in place safe model development practices to avoid adversarial attacks, such as formal code review and targeted testing for manipulation vulnerabilities. Anonymization techniques used for model training for privacy considerations avoid data degradation and preserve analytical utility, with differential privacy methods proving especially effective for financial use cases. Controls over AI systems and their outputs need to account for both direct system access and indirect information disclosure through model outputs or behavior.

Zendata's research emphasizes the need to track for abnormal model behavior that may signify compromise, with behavioral anomaly detection being a key security control for autonomous systems (Pappu, N. 2025). Banks and financial institutions adopting robust AI security frameworks have greater confidence in system integrity and decreased security incident rates than

Publisher: SARC Publisher

those using conventional security controls for intelligent systems.

Talent and Capability Development

Traditional finance institutions have struggled in the past to entice and retain specialized AI personnel against the competition from technology companies. As analyzed by Zendata in enterprise AI architecture, talent constraints are typically a key bottleneck for transformation efforts (Pappu, N. 2025).

Effective modernization initiatives solve talent issues through multi-faceted means, such as internal capability development initiatives that retrain incumbent technology personnel into AI-related jobs via guided training and mentoring. Strategic collaborations with firms that specialize in the area create near-term capability while internal talent is being developed, with an estimated high percentage of effective implementations incorporating outside expertise based on Scalefocus research (Scalefocus, 2024).

The development of centers of excellence that focus talent allows greater leverage of scarce specialized talent throughout the organization. Capability development has also been fast-tracked in many financial institutions through the deployment of low-code/no-code AI platforms that bring capabilities to more teams, allowing business analysts and conventional developers to build intelligent solutions without requiring specialized data science skills.

Table 4: Key Challenges and Mitigation Strategies in Financial AI Modernization (Scalefocus, 2024; Pappu, N. 2025)

Challenge Area	Key Issues	Mitigation Strategies
Data Quality & Integration	Data fragmentation across systems, Inconsistent definitions/formats, Historical quality issues, and Real-time access limitations	Data mesh architecture, Domain-based data ownership, Quality standards implementation, Distributed responsibility model
Regulatory Compliance	Explainability requirements, Bias testing/fairness considerations, Model validation standards, Change management controls	Explainable AI frameworks, Comprehensive documentation, Specialized validation methodologies, and Governance for continuous learning
Security & Privacy	Adversarial attack vulnerabilities, Data protection requirements, Access control complexity, Model behavior monitoring	Secure development practices, Differential privacy techniques, Comprehensive access controls, Behavioral anomaly detection
Talent & Capability Development	Competition with tech firms, Specialized skill shortages, Training requirements, and Knowledge distribution	Internal capability programs, Strategic partnerships, and Centers of excellence, Low-code/no-code platforms

CONCLUSION

The condition of modernizing enterprise systems with AI is a revolutionary means for financial institutions beset with outdated architecture. The infusion of artificial intelligence components into a modern architectural plan would enable financial institutions to achieve stunning gains in efficiency, customer experience, and regulatory compliance. The best implementations embrace modernization as a business plan, but not a technological upgrade, and harmonize the technology transformation with the organization transformation and plain business performance. This takes into consideration the technical element and the human element, requiring change management and building capabilities holistically. By developing agile, AI-facilitated enterprise infrastructures, financial institutions position themselves in a sustainable competitive position within an unusually volatile marketplace, setting themselves apart in terms of outstanding customer experience, operational effectiveness, and responsiveness to new conditions. With the continued advancement of artificial intelligence, there is a predicted wider distance between technology leaders and technology laggards, which leads to the need for strategic use of AI rather than a decision by financial institutions to hold on to sustainability in the long term.

REFERENCES

1. Finn, T. & Downie, A. "What is digital transformation in banking and financial services?" *IBM Think*.
2. Salesforce, "AI in Banking: Transforming the Future of Financial Services,"
3. Chlouverakis, K., & Rawal, A. "How artificial intelligence is reshaping the financial services

Publisher: SARC Publisher

industry." *EY CESA Financial Services* 26 (2024).
4. The Digital Fifth, "Enterprise Architecture in Digital Banking," (2025).
5. Vuković, D. B., Dekpo-Adza, S., & Matović, S. "AI integration in financial services: a systematic review of trends and regulatory challenges." *Humanities and Social Sciences Communications* 12.1 (2025): 1-29.
6. Prosci, "Human Side of Digital Transformation in Financial Services," (2025).
7. Hexaware, "Six Frameworks for Financial Services Modernization, (2025).
8. Scalefocus, "AI in the Banking Sector: Risks and Challenges," (2024).
9. Pappu, N. "The Architecture of Enterprise AI Applications in Financial Services." *Zendata Technical Blog*, (2025).

Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Guguloth, P. K. " AI-Driven Enterprise Systems Modernization in the Financial Sector." *Sarcouncil Journal of Engineering and Computer Sciences* 4.11 (2025): pp 18-26.

Publisher: SARC Publisher