

# Traditional Finance to Intelligent Systems of Artificial Intelligence Applications and Emerging Research Frontiers

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## ABSTRACT

**Objective:** The present review addresses the transition from conventional finance to intelligent finance via six inter-related dimensions including financial digitalization, application of AI technologies along the financial value chain, decision-making through AI, value generation, governance issues, and research horizons. **Method:** The present review summarizes empirical data concerning the application of AI in financial forecasting, fraud detection, credit analysis, risk management, investment management, financial reporting, generative AI, and explainable AI. **Results:** The available evidence until 2025 shows that AI is increasingly being adopted in financial services, as reported by Gartner that 59% of finance organizations were using AI in 2025 compared to 37% in 2023. It is shown that AI is evolving finance by going far beyond conventional automation towards prediction and adaptation as well as decision-making. **Novelty:** The review claims that the future of intelligent finance will rely on collaboration between humans and AI.

## INTRODUCTION

The development of financial management has always been based on accounting information, reporting, budgeting, cost management, investment decision-making, risk management, and judgement [1]. Until now, the financial management processes were guided by information from historical records and reports, where managers used such instruments as accounting statements, rules, statistics, and organization's experience in order to evaluate past performance and estimate future conditions [2]. Financial digitalization was a breakthrough that was based on the introduction of enterprise information systems, electronic transactions, cloud computing, integrated databases, reporting, and advanced analytical tools. With the help of these technologies, the speed, accessibility, accuracy, and connectivity of financial information has been improved [3]. Nevertheless, these technologies have not changed the logic of finance, which was traditionally based on the evaluation of historical information and forecasting of future conditions. AI is another breakthrough in finance, which makes the financial systems able to learn, discover relations in data, detect anomalies, forecast events, process unstructured information, and make complex decisions. As a result, development of finance today includes not only the improvement of the speed of financial information delivery but also building the system that is able to analyze and anticipate changes in conditions [4].

AI's adoption in finance is evidence of its increasing significance in this context of transformation. As reported by Gartner, while 58% of finance executives surveyed in 2024 felt that their organizations had adopted AI in the finance area, there was an increase in percentage to 59% of those surveyed in 2025, which followed a more pronounced rise from 37% in 2023. As regards the financial services sector in general, S&P Global found that 54% of the organizations in the financial services industry had implemented AI by January 2025, against 40% at the same point last year [5,6]. It can be concluded that AI is becoming a part of the core operations of financial organizations, and not just a technology-based experiment. The emergence of generative AI has added another dimension to this terrain by allowing finance professionals to interface with massive amounts of documents and data in natural language form, analyze and synthesize, provide assistance in the preparation of reports, and accelerate tasks that require a lot of knowledge [7]. However, mere technological uptake is not an intelligent transformation on its own. Intelligent finance is not only the automation of old processes, but the creation of a new financial architecture [8].

The ongoing transformation may be considered as a natural progression from retrospective financial management towards automated, predictive, adaptive and decision making systems. Classic financial concepts should not be overlooked since accounting standards, internal control, financial governance, financial experts' knowledge, and professional ethics form the basis of intelligent systems [9]. Digitalization has increased access to data, automation has minimized routine tasks, advanced analytics has improved forecast capabilities, and AI has brought learning and pattern recognition into the process of financial decision making. Thus, the most crucial shift here is not the substitution of human financial experts but the redesigning of their role [10]. The future of intelligent finance will, therefore, require finding the proper balance between computational power and human judgment. In this regard, the present literature review analyzes the transformation from classic financial management to intelligent systems considering major AI applications, decision-making with AI, financial value creation, governance and risks, and research frontiers in the sphere of financial management [11,12].

### **Financial Intelligence of Digitalization, Automation and AI**

The evolution of financial intelligence has taken place through several technological stages overlapping each other. Traditional financial processes used extensive manual processing along with predefined financial rules. Subsequent development included incorporation of accounting, purchasing, budgeting and reporting functions in enterprise information systems as illustrated in Figure 1. Next came automation that cut down on repetitive operations such as reconciliation, processing of invoices and regular reporting [13]. With the advent of machine learning, systems able to learn from past data without being fully rule-based appeared. Deep learning, natural language processing and generative AI brought more to it since systems can now work with unstructured data and communicate in natural language. Data related to the recent adoption trends show the

transition from experimentation to the operational phase. Global found out that 54% of financial services firms adopted AI initiatives by January 2025 against 40% last year [14,15]. Recent global research has shown that financial services have penetrated even further into the lives of consumers, with adoption being 81% according to the Cambridge study. While there is certainly a difference in samples and in definition of adoption between these two studies, both show definite upward trend. This process is also indicative of the shift in the nature of the job of the financial professional [3,16]. AI can automate routine processing of the information, making it possible for financial professionals to focus on interpreting the data, assessing scenarios and making decisions. However, financial knowledge and judgment are still crucial since algorithms work under certain economic, regulatory and institutional conditions [18].

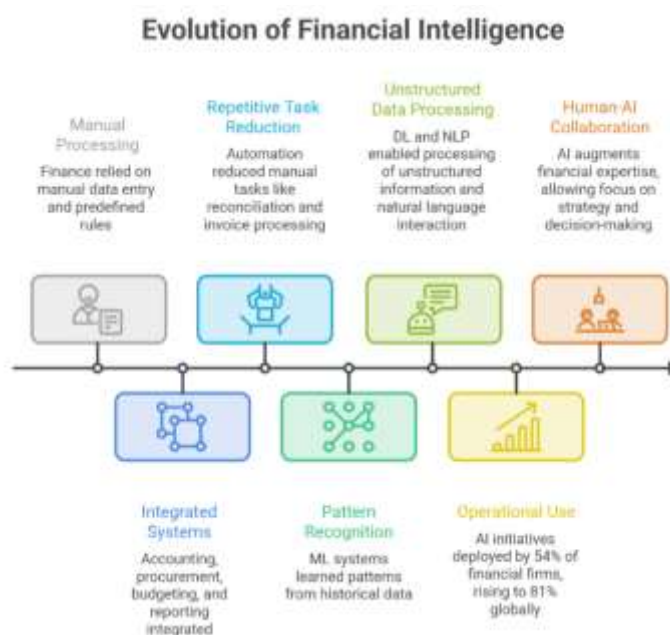


**Figure 1.** Financial Intelligence of Digitalization, Automation and AI

### AI Applications Across the Financial Value Chain

The value chain of finance is changing as a result of artificial intelligence which allows for analysis and decision support throughout such stages as planning, accounting, fraud detection, credit evaluation, investing, customer services, risk management and auditing [19]. Machine learning algorithms have the ability to detect nonlinearities in the data that are related to financial issues whereas anomaly detection is important for the recognition of suspicious transactions and frauds. Besides, predictive analytics enhances forecasting and risk management due to the inclusion of large and varied datasets [20]. According to surveys, 54% of financial-services firms were using AI by January 2025, showing the increasing practical significance of AI as shown in Table 1. Moreover, it is used to combine transactional, market, customer and text data into an integrated analytical framework. This trend will allow the financial organizations to switch from reactive processing towards proactive management. Nevertheless, successful application

of AI is possible only in case of reliable data, proper validation of models, cybersecurity, human control and adequate governance [21].

**Table 1.** Major AI Applications Across the Financial Value Chain

| Financial function | AI application             | Contribution           | Emerging direction          |
|--------------------|----------------------------|------------------------|-----------------------------|
| Financial planning | Predictive analytics       | Improved forecasting   | Scenario intelligence       |
| Accounting         | Intelligent reconciliation | Reduced manual work    | Autonomous workflows        |
| Fraud management   | Anomaly detection          | Faster detection       | Adaptive intelligence fraud |
| Credit management  | ML credit scoring          | Better risk assessment | Explainable AI              |
| Investment         | Portfolio optimization     | Data-driven decisions  | AI-supported management     |
| Customer services  | Conversational AI          | Personalized services  | Generative assistants AI    |
| Risk management    | Predictive modelling       | Early risk detection   | Continuous monitoring       |
| Auditing           | Pattern recognition        | Greater efficiency     | Continuous AI auditing      |

### Prediction to Decision AI-Enabled Financial Value Creation

The major impact of AI on financial management concerns connecting prediction with actual decisions. Classic analytics focuses mostly on explanations of past performance, while predictive AI provides future estimations of the trends in cash-flow dynamics, credit risk, market behaviors, investments, etc. Intelligent systems can expand on such forecasts by making connections between them and optimization, simulation, financial constraints, and managerial goals [22]. Thus, for instance, predictions of cash flows can help in planning for liquidity needs, predictions of credit risks – improve the decisions related to loans, and investment analytics – improve portfolio allocation [23]. It has been shown recently that 44% of CFOs used generative AI in over five finance use cases. The usefulness of AI, however, does not just depend on the accuracy of predictions but also on their implementation, organizational readiness, and the ability to translate analytic results into action. Therefore, finance will move increasingly towards strategic intelligence [17,24].

### Trust, Risk and Governance in Intelligent Finance

As the level of sophistication in financial systems increases, the importance of trust, transparency, and governance increases [25]. AI may affect credit evaluations, fraud detection, investments, and risk management, which implies that any biased or inaccurate outputs of the AI systems may have serious financial impacts as illustrated in Table 2 below. Ability to explain is especially important when dealing with complex models, however, data quality, privacy, cybersecurity, and model stability issues remain extremely important [26]. Algorithmic bias can be used to replicate patterns existing in

the historical financial data while changes in market conditions will decrease the reliability of the model. Responsible use of AI, therefore, demands governance throughout the entire AI life cycle and not just after deployment of AI. The goal of effective intelligent finance is to balance the need for efficiency and analytics of the intelligent financial system with risk mitigation [27].

**Table 2.** Major Governance Challenges and Research Priorities

| <b>Challenge</b>       | <b>Financial implication</b>    | <b>Research priority</b>     |
|------------------------|---------------------------------|------------------------------|
| Explain ability        | Unclear automated decisions     | Interpretable AI             |
| Algorithmic bias       | Unequal outcomes                | Fairness-aware models        |
| Data privacy           | Exposure of sensitive data      | Privacy-preserving AI        |
| Cybersecurity          | AI manipulation and disruption  | Secure AI architectures      |
| Model risk             | Unreliable predictions          | Continuous monitoring        |
| Generative AI errors   | Incorrect financial information | Verification and validation  |
| Autonomous AI          | Excessive decision authority    | Human-in-the-loop governance |
| Regulatory uncertainty | Compliance challenges           | Adaptive AI regulation       |

### Emerging Research Frontiers and Future Directions

New developments in intelligent finance are likely to progress from classical forecasting to more complex systems such as generative, prescriptive, explainable, and autonomous as presented in Figure 2. Generative AI can be used in the areas of accounting, document analysis, knowledge management, and customer engagement, but in the future, it would be necessary to improve the ability to handle numbers, verify sources, protect privacy, and develop models within specific domains [28]. Another area that requires more exploration is the combination of machine learning forecasting and optimization that will enable AI to provide solutions related to asset allocation, liquidity management, capital planning, and scenario analysis [29,30]. Human-AI cooperation and explain ability of algorithms are also critical aspects to explore, especially in the cases when there are financial operations that need to be managed carefully and transparently. Autonomous financial agents may change the treasury, investment and individual finance management processes through observing circumstances and carrying out predefined actions. But controlled autonomy implies transaction limits, human control possibilities, cybersecurity, and accountability [30].

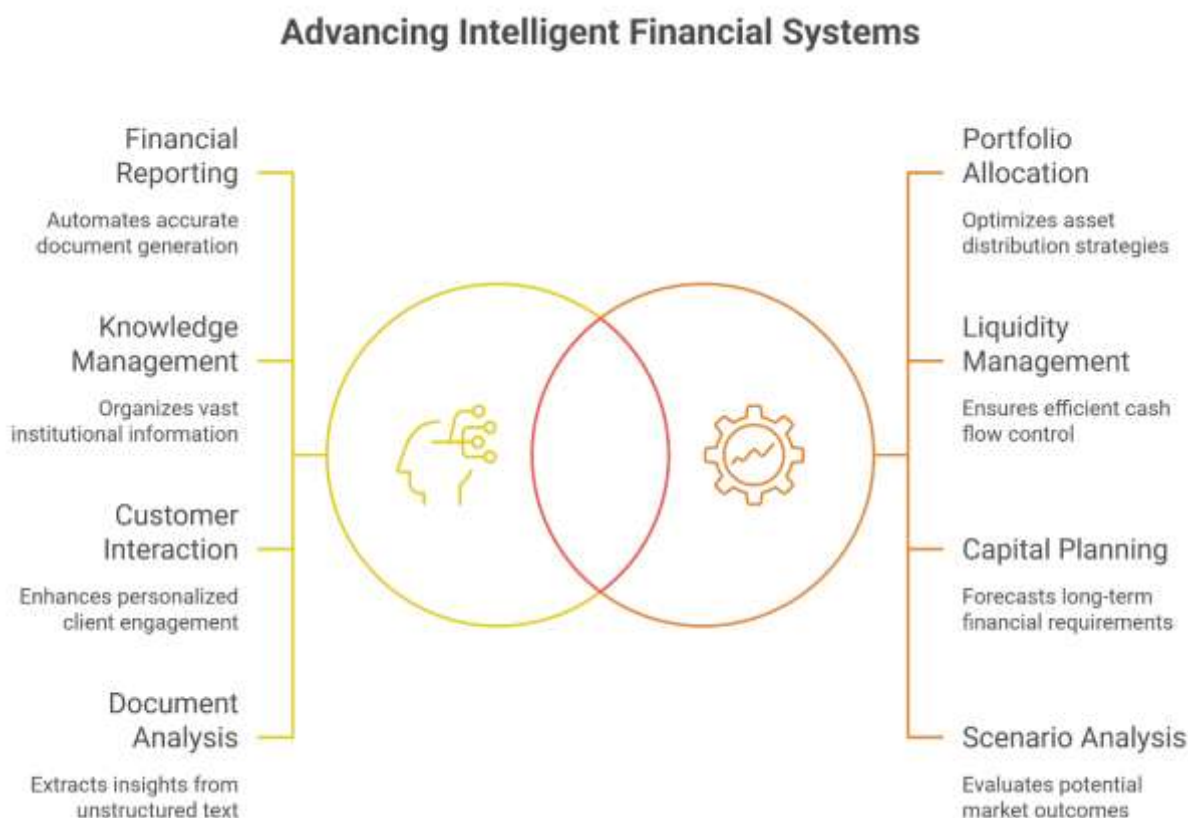


**Figure 2.** Emerging Research Frontiers and Future Directions

## CONCLUSION

**Fundamental Finding:** The shift from traditional finance to intelligent financial systems can be considered as a paradigm change in the field of financial management. While traditional finance laid the basis for accounting, reporting, budgeting, and controls, digitalization enhanced the integration of information and the efficiency of the processes. With AI, these activities can be further developed due to predictive analytics, fraud detection, credit scoring, investment intelligence, automated reporting, and decision support tools. The data which is accessible until 2025 suggests that AI becomes more prevalent in finance despite the unequal distribution of its implementation. **Implication:** This means that future financial systems will need to integrate not only computational intelligence but also the professional knowledge and ethics. **Limitation:** The data which is accessible until 2025 suggests that AI becomes more prevalent in finance despite the unequal distribution of its implementation. **Future Research:** Future research should examine the long-term impact of artificial intelligence integration on financial management efficiency, decision-making accuracy, fraud detection, and organizational performance. Further studies should also investigate the challenges of unequal AI adoption, particularly in terms of technological readiness, professional competencies, ethical considerations, and data security, to develop an inclusive and responsible framework for intelligent financial systems.

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