Unleashing the Power of AI in Financial Services: Opportunities, Challenges, and Implications

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Abstract*: The financial services industry is experiencing a profound transformation driven by the rapid adoption of artificial intelligence (AI). This paper explores the opportunities, challenges, and implications of unleashing the power of AI in financial services. AI technologies offer significant benefits, including cost reductions, enhanced productivity, improved customer service, and the development of innovative financial products and services. The market for AI in finance is projected to grow from $7.3 billion in 2021 to $22.6 billion by 2026, with the global AI market size expected to reach $1.85 trillion by 2030. Despite the promising opportunities, the implementation of AI in finance presents several challenges. These include ensuring data privacy and security, addressing ethical concerns, managing regulatory compliance, and mitigating algorithmic bias. Financial institutions must develop robust AI governance frameworks to navigate these complexities and ensure the responsible use of AI. The implications of AI adoption are significant, with AI expected to create over $140 billion annually in value in banking by 2025. Moreover, 89% of financial institutions plan to increase their AI spending in the coming years, highlighting the growing importance of AI in the industry. By strategically leveraging AI technologies, financial institutions can gain a competitive edge, increase market share, and improve profitability. This paper concludes that while AI presents transformative opportunities for financial services, success will depend on effectively addressing the associated challenges. The future of finance is intertwined with AI advancements, making it crucial for stakeholders to embrace and strategically implement these technologies to unlock their full potential*

Keywords: Artificial intelligence (AI),Financial services, Fintech, Market prediction

I. INTRODUCTION

The world of finance is undergoing a remarkable transformation with the emergence of decentralized finance (DeFi). Built on the principles of blockchain technology, DeFi aims to revolutionize traditional financial systems by offering transparent, inclusive, and autonomous solutions to individuals around the globe. In this rapidly evolving landscape, the integration of artificial intelligence (AI) has the potential to unlock unprecedented opportunities and reshape the future of decentralized finance.AI, with its ability to analyze vast amounts of data, identify patterns, and make intelligent predictions, can empower DeFi platforms to optimize their operations, enhance security measures, and provide personalized services to users. From automated trading algorithms and risk assessment models to fraud detection systems and smart contract auditing, the applications of AI in DeFi are vast and promising.Fintech and artificial intelligence (AI) have been close allies for years, with AI already making its mark in various aspects of the financial services industry. According to Precedence Research, the global Generative AI in banking and finance market size was estimated at $712.4 million in 2022 and it is expected to reach around $12,337.87 million by 2032, poised to grow at a CAGR of 33% during the forecast period from 2023 to 2032.While AI has already found its place in the operations of 90% of fintech companies, the financial services sector is undergoing a significant technological revolution. Both traditional financial institutions and fintechs are now shifting their focus from AI-driven cost reduction to leveraging its capabilities for revenue generation. This shift brings forth distinct AI strategies, where traditional institutions improve existing products and services by partnering with fintechs, while fintechs drive innovation and digital transformation through AI.[1]

1.1 AI AND FINANCE INDUSTRY

Artificial Intelligence (AI) is revolutionizing the finance industry, transforming the way financial institutions operate and providing new opportunities for innovation and growth. With the ability to analyze vast amounts of data, make predictions, and automate decision-making, AI is being used to improve fraud detection, credit scoring, investment management, customer service, and risk management in the finance industry. As AI technology continues to evolve and mature, it is becoming an increasingly important tool for financial institutions looking to stay competitive and provide better services to their customers. In this context, this essay will explore the role of AI in revolutionizing the finance industry, examining its impact on different aspects of finance and the opportunities and challenges it presents.

AI is now being used in real-world use cases after moving past its experimental phase. Banks are deploying AI bots to automatically identify borrower risk and onboard new clients. To find inefficiencies in the process, they are employing deep learning, pattern matching, and computer vision. Among many other use cases, AI-based anti-money laundering technologies are assisting them in preventing fraud. One of the biggest and most significant businesses in the world, the financial sector has always been at the forefront of innovation. From the usage of calculators and spreadsheets to more sophisticated tools like financial modelling software and trading algorithms, the use of technology in finance has developed dramatically over time. Artificial intelligence is the most recent technological innovation to shake up the financial sector. To automates operations, gather insights, and make better decisions, artificial intelligence (AI) in finance uses sophisticated analytics and machine learning techniques.[2] To evaluate huge amounts of financial data, find trends, and make forecasts, algorithms and models are used. AI in finance can completely change how financial organisations run, increase productivity, and offer clients better services showing in Fig.1 AI in finance.
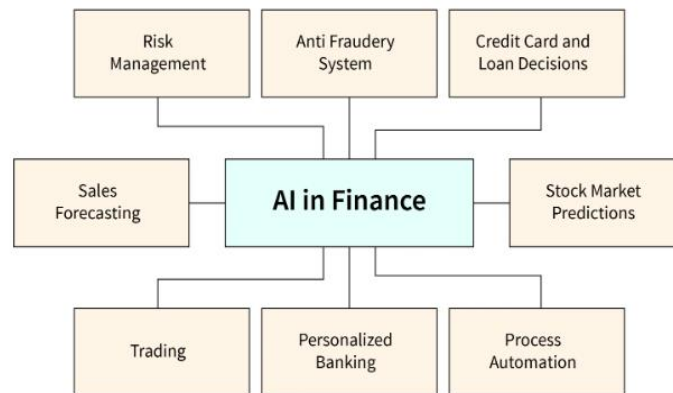

Fig.1 AI in finance

1.2 ROLE OF AI IN FINANCE INDUSTRY

Here are some of the main roles of AI in finance:

- **Fraud Detection:** AI can be used to analyze large volumes of financial data and identify patterns and anomalies that may indicate fraud. Machine learning algorithms can learn from historical data to detect fraudulent transactions in real-time, reducing the risk of financial losses for banks and other financial institutions.
- **Credit Scoring:** AI can help banks and lenders to assess creditworthiness more accurately and efficiently. By analyzing a range of data sources, including financial records, credit history, and social media activity, AI algorithms can predict the likelihood of default and assign a credit score accordingly.
- **Investment Management:** AI can be used to automate investment decisions, analyzing market data and using machine learning algorithms to make predictions about future market trends. This can help to optimize investment portfolios, reduce risk, and increase returns.
- **Customer Service**: AI-powered chatbots can be used to provide customer service 24/7, answering common queries and resolving issues without the need for human intervention. This can improve customer satisfaction and reduce the workload on customer service team.AI is playing an increasingly important role in the finance

industry, providing new opportunities for fraud detection, credit scoring, investment management, customer service, and risk management. As AI technology continues to evolve, it is likely to become an even more integral part of the finance industry, driving innovation and transforming the way financial institutions operate. This blog will talk about how AI has transformed finance industry and is leading the financial sector. Showing in fig.2
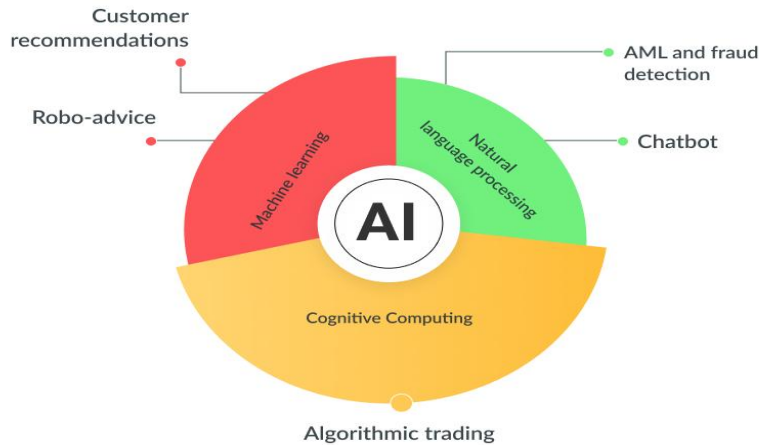

Fig.2 application of AI in fiancé industry

1.3 HOW CAN FINANCIAL INSTITUTIONS LEVERAGE AI BY PARTNERING WITH FINTECHS?

AI has become a widespread technology within the financial services industry. Major organisations like JPMorgan Chase have invested hundreds of millions of dollars in AI and have seen significant returns on their investments. In fact, JPMorgan Chase spent $12 billion on technology in 2021 alone. AI adoption is not limited to large institutions, as a 2022 report by NVIDIA revealed that over 75% of companies in various financial sectors, including capital markets, investment banking, retail banking, and fintech, utilize AI in the form of machine learning, deep learning, and high-performance computing. This indicates the pervasive nature of AI within the industry.[4]

- **Governance**: Accessing AI including LLM's and apps is controlled and auditable through the off-estate Sandbox Environment.
- **Security Constraint**: Third-party off estate environments enables secure and controlled access to technology that is restricted within the bank's environment.
- **Data Sharing**: With anyone can leverage statistically accurate synthetic datasets to evaluate AI without leaking sensitive information.
- **Accuracy & Validity**: Opportunity and access to multi-vendor comparisons using the same dataset to compare the output without leaking sensitive data, on boarding the vendor or accessing it via the bank.
- **Fit to business need**: Banks can validate multiple vendors off estate against the same KPI's as well as deploy and train LLM's within an air gapped environment.
- **Scalability**: Scalability and stress testing of the application can be evaluated iteratively off estate by increasing the data input. Use Case scalability can be evaluated through repeated experiments varying the data type and theme of questioning.
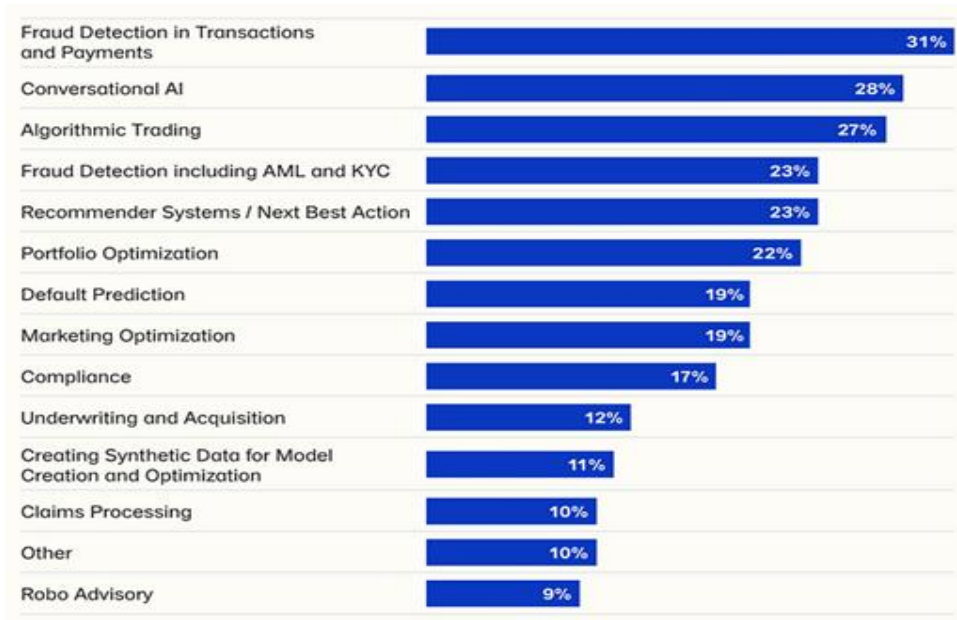
Fig. 3 AI used by finance industry

AI has the potential to unleash transformative power within the financial sector. It can revolutionize the delivery of financial advice, enhance fraud detection and AML efforts, and enable financial institutions to modernize their infrastructure. However, the journey towards realizing its full potential requires managing risks, addressing data protection concerns, and ensuring safe and responsible adoption. By navigating these challenges, the financial sector can harness the benefits of generative AI while safeguarding the interests of all stakeholders involved, ultimately driving innovation and shaping the future of financial services. fig.showing the AI used by finance industry showing in Fig. 3 AI used by finance industry

II. REAL-TIME USE CASES OF AI IN FINANCE

AI has the potential to transform the financial services industry for the better. It can help improve efficiency, cut costs, and make processes easier for customers and employees.

From chatbots and digital assistants to fraud detection and risk management, AI is streamlining various processes and making them more efficient.

1) Fraud detection: AI help financial institutions detect fraud by analyzing patterns in customer data. By looking for anomalies like account activity, transaction history, and even social media activity, AI can flag potentially fraudulent activity for improved investigation.

2) Personalized Customer service: AI provides more personalized customer service. By understanding a customer's individual needs and preferences, AI-powered chatbots and virtual assistants can provide a more tailored customer experience.

3) Claims Processing: AI streamlines the process by automatically verifying information and routing claims to the correct department. NLP algorithms extract & analyze information from claim forms/supporting documents. It enables faster & accurate claim adjudication.

4) Marketing: AI targets customers with personalized offers and advertisements. It boosts marketing efforts by using predictive analytics and preferences to deliver personalized marketing campaign. It improves conversion rates and customer retention.

5) Portfolio management: AI for financial operations solutions helps investment managers decide where to allocate capital. It optimizes investment strategies and generate insights for making informed decisions. It continuously monitors portfolios and rebalance assets as per market conditions.

6) Risk management: AI can assist financial institutions in managing risk by identifying trends and patterns in data that humans might miss. Using historical data and machine learning, AI can help predict future risks to mitigate them.

7) Regulatory compliance: AI can be used to help financial institutions comply with regulations such as know-your-customer (KYC) and anti-money laundering (AML) rules.

Despite its potential, AI adoption in financial services has been slow due to various challenges, including data quality issues and a lack of understanding of how AI drives business value.

However, things are starting to change. Several financial institutions are beginning to experiment with AI, and there are signs that AI adoption will increase in the coming years.

Future of AI in Finance

The future of AI in financial services is inspiring. With the rapid development of AI technology, financial institutions are looking to adopt AI in various ways to improve their operations and better serve their customers.[5] Here are some of the ways AI is expected to impact financial services in the futures showing in Fig. 4 Future of AI in Finance.

Fig.4 Future of AI in Finance

- **Smarter Fraud Detection:** AI can help financial institutions detect and prevent fraud more effectively. For example, machine learning algorithms can be used to identify patterns of fraudulent behavior.
- **Automated Financial Advisors:** AI can be used to provide automated financial advice to customers. For example, Robo-advisors can provide portfolio recommendations based on a customer's risk tolerance and investment goals.
- **Enhanced Risk Management:** AI can help financial institutions manage risk more effectively. For example, machine learning algorithms can identify potential risks and opportunities in real-time.
- **Improved Lending decisions:** AI can help financial institutions make better lending decisions by using data to assess a borrower's creditworthiness.
- **Automated Compliance Management:** AI can automatically track regulatory requirements and ensure compliance at all times.
- **New Products and Services:** Finally, AI-powered products such as Robo advice platforms, virtual bank tellers, chatbots, and smart advisors are expected to disrupt the traditional banking sector over the next few years.

III. GENERATIVE AI

The Generative AI in Financial Services Market reached a valuation of 847.2 Million in 2022 and is expected to grow at a CAGR of 28.1% from 2022 to 2032, surpassing USD 9,475.2 Million by 2032.Generative AI has become an invaluable asset in the financial industry for enhancing processes such as fraud detection, risk analysis, investment prediction and customer service. One major benefit of generative AI is its ability to quickly analyze large datasets & recognize patterns humans might miss -helping financial institutions make more informed decisions and reduce risk. Adopting Generative AI into financial applications and satisfying demand for accurate and dependable services has propelled its rapid adoption. IBM Corporation, Microsoft Corporation, and Amazon Web Services are major players in

this generative AI financial services market and invest heavily in R&D to advance their capabilities and expand market share.

Key Takeaway:

By type, in 2022, the generative ai in financial services market was dominated by the solutions segment due to extracting accurate & complete data from a large amount of data.

By application, the forecasting & reporting segment dominated the largest market share in application analysis

By deployment mode, the on-premises segment dominated the largest market share

In 2022, **North America** dominated the market with the highest revenue share of 40%.

APAC is anticipated to have the highest CAGR among all the regions.

APAC is expected to grow at a greater pace owing to the rapid adoption of digital payment systems & the increased penetration of internet-based services.

Factors affecting the growth of Generative AI in Financial Services Market

There are several factors that are affecting the growth of generative AI in financial services industry. These include:

- **Data Accessibility:** Generative AI relies on accessing large data sets. Without enough quality data or having enough of it at hand, its use becomes significantly limited and could interfere with the development and adoption of Generative AI models.
- **Regulatory environment:** Financial services are heavily regulated, and any new technologies including Generative AI must adhere to regulatory requirements. This may affect its adoption and implementation timeline.
- **Cost:** Generative AI solutions can be expensive to develop and deploy, especially for smaller Financial Services firms with tighter budgets. Cost can act as an impediment to adoption and implementation.
- **Trust and transparency:** Black-box models can be difficult to interpret, which requires financial services companies and customers alike to have confidence in them and understand how their data will be utilized. A lack of trust could hinder adoption and implementation.
- **Skilled workforce:** To effectively develop and deploy Generative AI models, skilled labor is needed. Unfortunately, however, there is a shortage of people possessing the necessary skills for creating these models which could impede adoption and implementation processes.
- **Competition:** Financial services are a highly competitive industry and businesses must stand out to be successful. Generative AI may offer companies an edge but if other firms adopt similar models this advantage could quickly fade.

Top Trends in Global Generative AI in Financial Services Market

One of the latest trends in the generative AI market for financial services is the use of machine learning (ML) and natural language processing (NLP) in order to create more advanced bots. These AI-powered tools improve customer service through a reduction in response times & personalization of interactions with customers. Another trend is using generative AI to develop predictive models for credit risk assessment & fraud detection. These models can analyze a large amount of data in order to provide more accurate forecasts. Explainable AI (XAI), or AI systems that can explain their decisions, is gaining in popularity in the financial services industry. This is important for building trust and reducing the risk of unfair or biased results. The use of generative AI is also increasing in algorithmic trading; as financial institutions try to develop more advanced trading strategies.[6]

Market Growth

The market for Generative AI in Financial Services will grow rapidly in the next few years. This growth is driven by the increasing adoption of AI and the growing availability and volume of data as Financial Services companies strive to improve their efficiency, lower risk, and offer better customer experience. The models can be used to analyze large amounts of data & identify patterns and insights which can help inform decisions. The models can automate processes

and free up employees' time to focus on more complex work. Financial Services companies are investing more in AI-based fraud detection, risk assessment, investment prediction, and customer service. Financial Services companies are also expected to benefit from the development of advanced Generative AI models such as Natural Language Generation and Image Recognition.

Regional Analysis
North America will be the leading region in the global generative AI in financial services market with a market share of 40%. It is also estimated to have a CAGR of 29.6% over the forecast period. The region's dominance is due to the strong emphasis placed on R&D-derived innovations in developed economies such as the US and Canada. These countries have the fastest-developing and most competitive AI technology for financial services. Many startups and emerging companies are also providing AI services to the financial sector. Asia Pacific is estimated to register the highest CAGR between 2022 and 2032. This growth is attributed to the rapid adoption of digital payment systems & the increased penetration of internet-based services.
Scope of the Report

Market Drivers
The financial services industry is increasingly requiring accurate and efficient services. Generative AI is able to analyze large amounts of data in order to identify patterns & anomalies. This allows financial institutions to reduce risk and make better decisions. The increased availability of data and advances in machine learning algorithms have made generative AI an even more powerful tool for financial applications. The growing popularity of mobile banks & the need for more personalized and faster customer service has led to an increase in the demand for chatbots powered by generative AI. Brightwell Payments, Inc., a financial services company in the United States released ARDEN in May 2022. This financial solution allows money to be transferred securely anywhere in the world. This AI-powered engine protects the financial assets and cardholders of fintech. These factors, along with others are driving the growth of the generative AI industry.

Market Restraints
Despite the growing adoption of generative AI in the financial services market, numerous factors limit growth. One of the biggest problems is the lack of trust in AI-powered decision-making, especially in sensitive financial fields like fraud detection & risk assessment. AI algorithms can be difficult to understand and if not designed and tested correctly they can lead to unfair and biased outcomes. The high cost to implement generative AI could be prohibitive for smaller financial institutions. The regulatory landscape of AI in finance is constantly evolving which can cause uncertainty and compliance issues. The lack of AI professionals who have the necessary skills and the possibility that AI will replace jobs in the financial sector are all factors that could slow down adoption.

Market Opportunities
Two of the main growth factors are the increasing availability of data and the demand for more precise financial services. This trend will continue as financial institutions strive to improve their fraud detection & risk management capabilities along with customer service. The use of generative artificial intelligence is expected to surge as more investors seek data-driven insights to make informed investment decisions. Another growth opportunity is the adoption of AI-powered chatbots & virtual assistants in financial services. These can provide faster and more personalized customer service. As the regulatory landscape of AI in finance becomes clearer, new opportunities will arise for generative AI products to help financial institutions meet regulatory needs more efficiently.

IV. FINANCE LEADS ALL SECTORS IN AI ADOPTION
Surveys show finance leading all sectors in AI adoption and benefits. Most firms now use AI across critical functions, with significant gains in efficiency, costs, and customer experience.[7]

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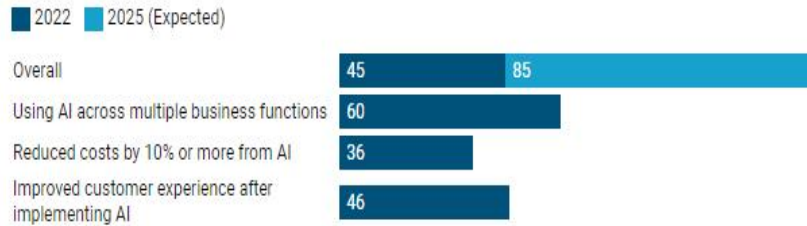
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445

Fig. 5 AI adoption in the finance

AI adoption in finance has rapidly increased, with 60% of financial institutions using AI across multiple business functions. AI adoption jumped from 45% in 2022 to 85% expected by 2025.

- AI adoption in the finance industry jumped from 45% in 2022 to 85% expected by 2025, with 60% using AI across multiple business functions.
- 36% of financial services executives have used AI to reduce costs by 10%.
- 46% of financial services firms saw improved customer experience after implementing AI. [3]
- The global AI software market revenue grew from $10.1 billion in 2018 to over $50 billion in 2022, showing rapid mainstream adoption.

The AI Finance Market Surges to $20 Billion

The multibillion-dollar AI in finance market has seen exponential growth, led by AI software solutions. North America leads adoption, though global integration is accelerating.[8-9]

Table 1the AI finance market is projected to grow from $341.8 billion in 2021 to over $900 billion by 2026, with an 18.6% CAGR. EMEA is projected to account for over 200 billion by 2026.

Table 1 AI Finance Market Growth Projections

Market Segment	2021 Market Size	Projected Market Size	Projected Year	CAGR (%)
Overall AI Finance Market	$341.8 billion	$900 billion	2026	18.6%
EMEA AI Finance Market	N/A	$200 billion	2026	N/A

Table 2 AI in Finance Market Size Projections

Market Segment	2021 Market Size	Projected Market Size	Projected Year	CAGR (%)
AI in Finance	$7.3 billion	$22.6 billion	2026	25.7%
AI in Banking	$6.8 billion	$27 billion	2027	N/A

Table 3 Market Share and Composition

Segment	Year	Market Share / Composition
North America	2021	40% of AI in Finance
AI Solutions vs Services	2021	77.6% Solutions

Table 2 and 3 summarize the key data points regarding the growth and projections of the AI finance market.

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- The AI in finance market size is projected to grow from $7.3 billion in 2021 to over $22.6 billion by 2026, exhibiting a 25.7% CAGR. The AI in the banking market alone is expected to grow from $6.8 billion in 2022 to over $27 billion by 2027.
- North America accounted for 40% of AI in finance market share in 2021.
- AI solutions comprised 77.6% of the market compared to services in 2021.

AI Boosts Efficiency through Automation

By taking over time-intensive manual work, AI enables financial firms to cut costs, speed up processes, and focus employees on strategic roles.

Table 4 AI Impact on Operational Costs and Productivity in Finance

Metric	Impact/Improvement	Description
Operational Costs Reduction	22-25%	AI automates processes and reduces errors
Productivity Improvement	30-50%	AI frees employees for higher-value work
Automated Tasks	Data entry, document processing, compliance	Tedious tasks that can be automated with AI

This table 4 summarizes vital data on how AI drives significant efficiency improvements in the finance industry. AI solutions can reduce operational costs by 22-25% on average, improve productivity by 30-50%, and automate tedious tasks like data entry and document processing.

AI can reduce operational costs in finance by 22-25% on average by automating processes and reducing errors.

AI improves productivity in financial institutions by 30-50%, freeing employees for higher-value work.

Tedious tasks like data entry, document processing, and compliance checks can be automated with AI.

AI Drives Growth in Financial Services

According to PwC, AI adoption provides financial institutions competitive advantages by enabling enhanced offerings, improved insights, and higher efficiency.

Table 5 Business Leader Perspectives on AI in Finance

Metric	Percentage	Description
Increase in Market Share	75%	Business leaders say AI helps increase market share
Development of New Products/Services	63%	Business leaders say AI enables new product/service development
Profitability Improvement	15%	AI-driven companies are more profitable than competitors on average

These table 5 summarize the key data points related to the perspectives of business leaders on the

A table summarizes vital data on how AI drives growth for financial services companies.

- 75% of business leaders say AI is helping them increase market share.
- 63% say AI enables them to develop new products and services.
- AI-driven companies are 15% more profitable than competitors on average.

"AI is poised to transform businesses with capabilities like predicting customer behavior, personalizing recommendations, streamlining operations, and automating repetitive tasks," according to the article" Introduction to AI Software for Businesses" from Software Oasis.

The Future of Finance in AI

The rapid pace of AI integration in finance shows no signs of slowing down. As the technology matures, its transformative impact on financial services will continue accelerating.

Table 6 Rapid Growth in AI Adoption and Value Creation

Metric	Value/Percentage	Time Frame	Description
AI Adoption Growth	270%	Over 4 years	Expected growth in AI adoption
Business Value from AI	Over $2 trillion	N/A	Expected business value delivered by AI
Global AI Market Size	$1.85 trillion	By 2030	Predicted global AI market size
Increase in AI Spending by Financial Institutions	89%	Next 2 years	Financial institutions planning to increase AI spending
Annual Value Creation in Banking	Over $140 billion	By 2025	Expected annual value creation by AI in banking

This table 6 summarizes the key data points related to the rapid growth in AI adoption and its value.

Table depicting rapid growth in AI adoption and value creation. AI adoption is predicted to grow 270% over four years. The global AI market size will reach $1.85 trillion by 2030. 89% of financial institutions plan to increase AI spending, and AI is expected to create over $140 billion annually in banking by 2025.

- AI adoption growth of 270% over four years is expected, and AI is expected to deliver over $2 trillion in business value.
- The global AI market is predicted to reach $1.85 trillion by 2030, a 9x increase from 2023.
- 89% of financial institutions plan to increase AI spending in the next two years.
- AI is expected to create over $140 billion of value annually in banking by 2025.

V. CONCLUSION

Unleashing the power of AI in financial services presents a transformative opportunity for the industry. The integration of AI technologies offers numerous benefits, including significant cost reductions, enhanced productivity, improved customer service, and the creation of new financial products and services. Financial institutions leveraging AI can gain a competitive edge, increase market share, and improve profitability. The rapid growth in AI adoption, predicted to increase by 270% over the next four years, underscores the pivotal role AI will play in shaping the future of finance. However, alongside these opportunities come substantial challenges. Ensuring data privacy and security, addressing ethical concerns, managing regulatory compliance, and mitigating the risks of algorithmic bias are critical issues that need to be addressed. Financial institutions must invest in robust AI governance frameworks and continuously monitor AI systems to ensure they operate transparently and fairly. The implications of AI adoption in financial services are profound. AI is expected to create over $140 billion annually in value in banking by 2025 and contribute to a global AI market size of $1.85 trillion by 2030. With 89% of financial institutions planning to increase AI spending, the industry is poised for rapid innovation and transformation. However, success will depend on navigating the complex landscape of technological, ethical, and regulatory challenges.

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