

REGIONAL COLLEGE OF MANAGEMENT AND ENTREPRENUERSHIP

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“ROLE OF ARTIFICIAL INTELLIGENCE IN INVESTMENT BANKING”

POST GRADUATE DIPLOMA IN MANAGEMENT

BY

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DECLARATION BY THE STUDENT

I, **RATHNAKUMARI NARAYANAPARAPU** the undersigned, hereby declare that the project report entitled “**ROLE OF ARTIFICIAL INTELLIGENCE IN INVESTMENT BANKING**” is the result of the project work carried out by me under the guidance of Professor **SOURISH BANDYOPADHYAY** in partial fulfilment for the award of **POST GRADUATE DIPLOMA IN MANAGEMENT** by **AICTE**.

I also declare that this project is the outcome of my own efforts and that it has not been submitted to any other university or Institute for the award of any other degree or Diploma or Certificate.

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GUIDE CERTIFICATE

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This is to certify that the 3rd Semester Project report entitled **“ROLE OF ARTIFICIAL INTELLIGENCE IN INVESTMENT BANKING”** is an original work of **RATHNA KUMARI NARAYANAPARAPU** bearing Registration No **143680802404** and is being submitted in partial fulfilment for the award of Post Graduate Diploma In Management under **“REGIONAL COLLEGE OF MANAGEMENT AND ENTREPRENEURSHIP”** The report has not been submitted earlier either to this any University/institution for the fulfilment of the requirement of any course of the study. **RATHNA KUMARI NARAYANAPARAPU** is guided by Professor **SOURISH BANDYOPADHYAY** who is the Guide as per the regulations of **REGIONAL COLLEGE OF MANAGEMENT AND ENTREPRENEURSHIP**.

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ABSTRACT

Artificial intelligence (AI) is the act of instructing a computer, robot, or other object to behave in a smart human way. AI is the study of how the human mind works, how it learns, how it makes decisions, and how it provides outputs. This study is dealing with the idea of AI in the banking system, how it has changed banking, and how it influences human labour.

We all are aware that humans make mistakes, but as technology evolves, there is a lack of talented employees to control automation. Certain process and manual tasks that were formerly undertaken by individuals are being replaced by automated machines powered by technology.

AI helps banks manage high-speed, record-level data and get valuable insights. This report provides an overview of current AI applications in the banking industry and how they are changing the nature of banking in India. The banking sector is making considerable transformation at a fast rate.

Since AI in banking apps isn't only used in retail banking, banks may use it to provide frictionless, 24/7 interactions with customers. All other banking markets, including backend and mid office of investment banking, may benefit from AI.

Ultimately, the significance of AI to the sector will be assessed on the extent that this innovation delivers sustained operating margin uplift.

CHAPTER-1

INTRODUCTION

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1.1 INTRODUCTION

In the last decade India has witnessed a wave of technological disruptions that have been facilitated by our advanced IT sector and the demographic potential in the country. This has made India the world's second largest digital ecosystem with over 700 million internet users. It has been estimated that this number will increase to 829 million by 2021, with the number of smartphones doubling to approximately 800 million in this period. The rapid pace of digital adoption in India has come about thanks to a mix of factors: the government's commitment to digitising key facets of the economy, innovations in the private sector, and investments to stimulate the use and access of the internet.

Investment Banks are adopting computer programs to enhance capabilities of business by the implementation of sophisticated artificial intelligence to curb fraudulent practices, improve customer response, offer standard customer service, enable virtual assistant to offer real time solutions, digital documentation etc. The paradigm shift in banking and financial services has strategically focuses on transformational changes in 2018. Improved infrastructure, data mining etc. have redefined the banking operations with the help of machine intelligence. They are applying big data analysis to collect information about their customers like income, work profile, personal details, and credit worthiness to offer various banking products through ATMs like loan facility. The user has to accept the terms and conditions post verification through registered mobile number.

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Artificial Intellect (AI) is a simulation of artificial cognition that aids in the development of intelligent automating tasks more efficiently. Based on the facts it is supplied with, AI operates like a human brain that can reason and make more accurate decisions. Artificial intelligence (AI) is becoming increasingly common in today's business. It is utilized in a variety of sectors, including the financial business. The financial institution employs artificial intelligence in a novel method that saves time and money. Banks utilise algorithms to provide an efficient finding that improves customer service and sales performance, resulting in increased revenues. Machine learning and deep learning are two types of AI that assist to reduce inaccuracies caused by psychological and emotional elements. One of the AI's most significant duties is to relay crucial data from multiple sources and to draw conclusions. For instance, IPsoft, the world's largest enterprise AI company, has developed Amelia, a humanoid (robot) assistant. It's the most human-like AI partner in the business. Amelia's capacity to learn, mix, and advance over time has been praised by the firm. Clients' demands and requirements may be completely understood by AI.

Amelia can be taught to recognise words and phrases in over 100 different languages. Artificial Intelligence is the world's fastest-growing technology. One of the first industries to adopt artificial intelligence will be banking. Machine intelligence is referred to as artificial intelligence. Artificial intelligence and large data, sophisticated statistics, and machine learning skills are used to evaluate bank financial transactions for learning, issue solving, and decision-making.

Artificial intelligence (AI), often known as "machine intelligence," is intelligence demonstrated by machines that differ from human intelligence. Artificial intelligence is a term that is frequently used to characterise robots that are associated with the human brain, such as "learning" and "problem-solving."

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Artificial Intelligence (AI) is already here and shaping the wider world banks operate in. In automotive, Tesla and others delivered AI technology for sophisticated driver-assist functions, with an eventual end goal of autonomous vehicles operating on public roads.

1. The life sciences industry has been realizing value from AI for drug research and new molecule discovery, as it can draw insights from massive data sets faster, process data and automate workflows more efficiently, and convert insights into actions to improve business performance – from molecule to market.
2. In public safety and security, for example in the United Kingdom, London's Metropolitan Police has trialled live facial recognition (LFR)³ cameras in specific areas, to accelerate identification of individuals the police are looking for.

Within this evolving societal context, AI is not new to the banking and capital markets (B&CM) sector. It has been in production for years in specific functions, including algorithmic trading and trade surveillance.

But the arrival of Generative AI (GenAI) marks a new era, exploding the number of potential use cases and putting benefits in the hands of the workforce.

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1.2 NEED OF THE STUDY

AI is the collection of data, algorithms, and computing power to enable machines to emulate human capabilities and act with higher levels of intelligence. The ability to learn from patterns in text, speech, images, videos and any other data to provide recommendations has made AI ubiquitous in research and industry, including financial services. Some of the use cases leveraging capabilities of AI in financial services are (i) anomaly detection to flag abnormal data patterns, (ii) recommendations for relevant alternatives based on future predictions, (iii) translation across languages, (iv) optimization (e.g., tuning the cooling temperature based on power consumption in a data centre), (v) fraud detection and risk management and (vi) digitization and automation of services.

AI now allows banks to tackle challenges of scale in a way that, previously, would have required many extra staff. If a particular

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function in a bank could be done better or faster by adding one hundred extra trained staff, it's likely that AI can be transformative for that function. AI offers vast additional operational capacity, at low marginal cost compared to hiring the equivalent processing capacity as staff.

But more than that, the game in which players are competing will likely change. AI is on the threshold of a paradigm shift. Through the work we do with banks around the world we see leading innovators already making the step from AI as an 'instrument of strategy' (i.e., accelerating delivery of today's business plan) to a 'determinant of strategy', where tomorrow's business is planned around new AI capabilities. JP Morgan Chase, which topped Evident Insights AI Index (which benchmarks how ready banks are for the incoming wave of transformation that AI will bring) for a second year, sees the transformational impact that AI can have and plans to spend \$1 billion or more a year on AI capabilities.

Money laundering has been a major challenge for the financial services and banking industry faced at the global level. AI has proved to be crucial silver lining to overcome this issue. The technology allows the bank to prevent potential money laundering activity by analysing internal, publicly available and transactional data within customer's wider network. Some of the techniques applied as combating measures includes machine learning, deep learning, data mining and analytics etc.

The ability of implementing AI in banking can get away from the below pain points.

a) Risk Assessment: Large volumes of complex data are involved in due diligence, risk assessment, monitoring that facilitates effective lending practices.

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b) Financial Landscape: AI enables the firms to learn and adapt to changing environment, inputs various changes in the area of finance and banking system.

c) Value addition: Automotive repetitive tasks handled by humans are replaced which has reduced the cost and increased the accuracy levels and speed adding great value to the customers.

“Artificial intelligence will likely determine the banking and capital markets sector’s winners and losers in the coming five years. The journey has already started.”

1.3 OBJECTIVES

Artificial Intelligence, Blockchain, and Internet of Things are emerging technologies that are impacting various aspects of human life. These technologies have the potential to disrupt the way we interact with each other, operate our businesses, and even how governments work for their citizens.

Amongst these, AI is probably the most ubiquitous and disruptive in nature.

The use of AI by organizations and governments, and its deployment in improving customer experience, operational efficiency, fraud detection and cybersecurity is on the rise across the world.

Although the adoption of AI varies significantly across geographies, there are pockets of industries even within the developed countries that are increasingly adopting AI to better service their customers and bring in efficiencies of scale.

One such industry that has embraced AI across geographies is banking. Developing AI infrastructure in India is a key priority for the Indian Government.

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The Indian Government's NITI Aayog (a policy resource centre) formulated the 'National Strategy for AI' in 2018. The strategy seeks to position India as a global leader in AI. This is one of the many initiatives launched by the Indian Government to channel and utilize the potential of AI for India.

Outlining the vision and importance of development of AI for India, Prime Minister Narendra Modi remarked, "We need to make artificial intelligence in India and make artificial intelligence work for India." As India progresses in its economic journey and aims to become a USD 5 trillion economy by 2024, it will require infrastructure to scale up and support this growth.

Financial infrastructure will play a fundamental role in this process given India's policy objective of financial inclusion and the banking sector will be an integral part in this journey. The government has stated that for banks to fulfil India's growing needs, they must harness technologies such as AI and big data. Banks and financial institutions stand to benefit significantly from AI.

Whether to improve overall customer experience, take more informed decisions on credit underwriting, detect frauds and defaults early, improve collections or increase employee efficiency, AI has the potential to transform India's banks.

As AI makes inroads into several hitherto untraversed domains, its definition gets blurred.

An important objective of this report is to demystify the concept of AI and explain its close relationship with data science. Further, this report explains the applicability of AI to banks in India and recommends steps that could be taken to make them ready to embrace the changes that AI can bring.

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Although the concept of AI has been around for centuries, it was not until the 1950s when its true possibility was explored. A generation of scientists, mathematicians, and philosophers all had the concept of AI but it was British polymath Alan Turing who suggested that if humans could solve problems and make decisions by using available information and reason, then machines could do it too.

Although Turing outlined machines and how to test their intelligence in his paper Computing Machinery and Intelligence in 1950, his findings did not advance.

“AI now allows banks to tackle challenges of scale in a way that, previously, would have required many extra staff.”

1.4 SCOPE OF THE STUDY

The Applications of AI in Investment Banking

It looks like the Investment Banking industry will never be the same with AI solutions already covering the essential parts of this domain, helping banks to deliver highly personalized, secure, and sophisticated services. Below are some of the most prominent applications of AI in investment banking.

- **Risk Management**

With the help of advanced AI models, it is possible to unleash the capabilities of predictive analytics and based on historical data analysis forecast risks that might occur. For investment banks, it means having the ability to anticipate:

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- Market fluctuations
- Credit defaults
- Operational risks.

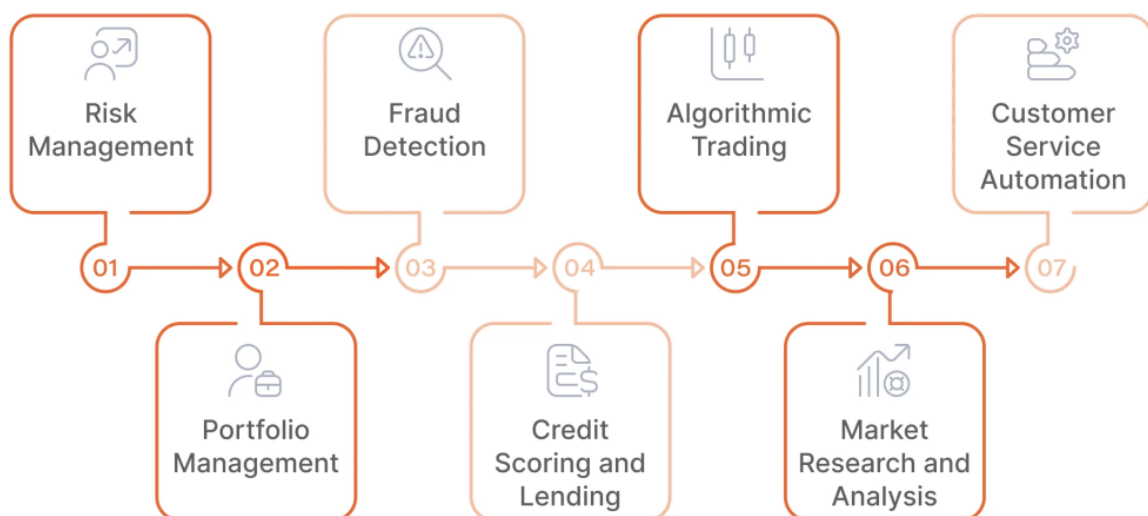
To top that off, modern AI systems offer proactive risk management, achieved by continuous monitoring of transactions and changing.

Machine Learning helps to personalize client interactions for investment banking and significantly boosts customer experience across various touchpoints. Robotic Process Automation truly shines here, as chatbots work great for in g market conditions.

Customer Service Automation

creasing worker productivity due to managing basic inquiries, and guiding customers by sharing information. With advanced virtual assistants, it is possible to provide more sophisticated services, like highly personalized financial advice based on individual data.

The Applications of AI in Investment Banking



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AI applied: A Portugal based institution has deployed an AI-powered converter tool that converts software code from legacy COBOL-based systems to their target Oracle platform to accelerate a core platform modernization program. The large language model (LLM) based converter automatically generates functional documentation of the legacy COBOL code and creates a target metadata schema to accelerate the technical specification and build of the new data platform.

A second use case is the ability for GenAI to consume millions of lines of legacy code that is undocumented, and rapidly extract business rules/requirements to accelerate modernization. Deloitte practitioners are already leveraging these capabilities to accelerate client's transformations and modernize our own products internally.

various proprietary GenAI tools are being deployed in compliance teams to summarize large sets of documentation issued by government and regulators. This rapidly makes the key takeaways and major insights available to compliance teams and business staff in frontline roles.

Legal outcomes prediction. A Middle-East based bank is trialling a GenAI tool based on past contracts and litigation outcomes. The tool examines the contracts and other documentation involved in legal disputes and helps the legal team better predict likely outcomes of legal matters, as well as highlight potential risks in new contracts.

“An important point is that we do not see AI displacing humans from the workforce at large scale.”

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Portfolio Management

Numerous success stories have proven that AI-driven Portfolio Management delivers higher precision and deeper customization, compared to traditional approaches, eliminating the chances of human error. The most important aspects we should mention are:

- **Robo-Advisors:** AI systems that create and automatically manage investment portfolios customized to individual client goals and risk tolerances.
- **Optimization Algorithms:** With the help of AI, it is possible to optimize asset allocation and rebalance strategies to ensure the highest ROI.

Personalized Strategies: Machine Learning algorithms are capable of offering personalized investment strategies based on rigorous analysis of huge amounts of data.

Personal agent focuses on productivity

AI assist 10-20% potential Executive and specialist roles e.g. functional leaders, top levels of management

Human strengths:

- Emotional intelligence
- Creativity
- Strategic planning
- Persuasion and negotiation
- Motivational leadership
- Ethical judgement and integrity

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Machine strengths:

- Analyse data and generate content
- Schedule meetings
- Provide real-time assistance and suggestions on document.

Specialist agent focus on improving quality

AI augmentation 20-50% potential Those with domain knowledge e.g. investment manager, underwriters, relationship/account managers.

Human strengths:

- Relationship management
- Negotiation
- Domain knowledge and experience
- Story-telling and making insights relevant
- Critical thinking

Machine strengths:

- Speed in insight gathering
- Error checking and validation exercises
- Trend spotting and simple graph design
- Trading algorithms
 - Predictive analytics
- Routine forecasting

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Transforming process focus on cost reduction

AI automation 50-80% potential Customer facing and support roles e.g. contact centre agents, central services.

Human strengths:

- Problem solving and decision making
- Compassion
- AI ethics and regulation
- AI-Human task management

Machine strengths:

- Fraud detection and prevention
- Data categorization
- Quicker processing times
- Language translation
- Voice and text sentiment analysis

CHAPTER -2

LITERATURE REVIEW

2. LITERATURE REVIEW

In recent years, using AI for literature reviews has gained significant importance in academic research. Specifically, AI tools have revolutionized how scholars and students explore various sources, offering cutting-edge capabilities to fine-tune search terms and sift through full-text articles with ease.

For instance, AI-powered suggestions help researchers identify relevant scholarly articles and research papers, streamlining the development of a thorough literature review. Tools like SEMANTIC SCHOLAR and CONNECTED PAPERS provide insightful citation contexts and connect related research which saves time and adds detail and precision in summarizing the breadth of existing knowledge.

The intersection of AI and literature has gained significant attention in recent years. Research has shown that AI-generated creative writing has the potential to produce coherent and engaging stories, as demonstrated by Goodwin's (2018) novel "1 the Road" and Nagy's (2018) short story "Amnesia". Studies have also explored the use of AI in generating poetry, with Liu (2019) demonstrating the ability of neural networks to produce creative and meaningful poems.

Furthermore, AI has been used to generate dialogue for characters, with Zhang (2020) showing that neural networks can produce realistic and engaging dialogues. Additionally, Lee (2020) has explored the use of AI in generating entire scripts, highlighting the potential of machine learning algorithms to produce coherent and engaging scripts.

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However, the ethical implications of AI-generated creative writing have also been raised, with Bostrom (2019) highlighting the need for further research into the potential risks and benefits of AI-generated content.

Moreover, the use of AI-generated content in education has been explored, with Kim (2020) discussing the potential benefits and drawbacks of using AI generated content in educational settings.

Dr Agalya VT Raj states, *“AI is important to strike a balance between human creativity and technological advancements to ensure that AI generated literature does not replace works created by humans”*.

David Herman states, “Narrative Theory and the Cognitive Sciences connect between narratology and cognitive science, providing a historical overview and emphasizing cognitive narratology.

The volume discusses the cautious application of cognitive science to narrative theory, highlighting challenges in accessing cognitive processes and the need for empirical validation.

Narrative theory- fiction self, applications and challenges of AI in literary analysis and generation, AI-assisted writing for enhancing productivity and creativity, and challenges and opportunities of integrating AI into literary studies.

Overall, the literature suggests that AI-generated creative writing has the potential to produce high-quality content, but further research is needed to fully explore its capabilities and limitations.

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Chatbot use instances on banking systems are ranked primarily based totally on client experience. Practical/Theoretical implications: Based at the entire image of AI integration with banking operations, evolving Indian banks should recognition at the maximum famous use-instances to draw customers.

The correlation among Chatbot use-instances can also additionally gain the installed Indian banks to similarly amplify business.

As discussed in (Board, 2017) the loss of interpretability or “auditability” of AI and gadget getting to know techniques may want to come to be a macro-stage danger. Similarly, a significant use of opaque fashions can also additionally bring about unintentional consequences.

As with any new product or service, there are vital problems round suitable danger control and oversight. It might be vital to evaluate makes use of AI and gadget getting to know in view in their dangers, which include adherence to applicable protocols on information privacy, behaviour dangers, and cybersecurity.

CHAPTER -3

RESEARCH METHODOLOGY

3. RESEARCH METHODOLOGY

3.1 SOURCE OF DATA:

One cannot think about Artificial Intelligence without thinking about data, as data is an essential part of AI. In order for an AI algorithm to output any prediction, it has to be fed with large volumes of data. Apart from its use in predictive analytics, data has become a key input driving growth, enabling businesses to extract valuable insights and improve the decision-making process.

Data as a general concept, refers to the fact that some existing knowledge of information is represented or coded in some form suitable for valuable usage or processing. In this article, we explain the different types of data and data sources companies can leverage to implement Artificial Intelligence and improve the decision-making process.

An important point is that we do not see AI displacing humans from the workforce at large scale. Rather that AI augments the workforce and drastically scales up processing capacity and quality. The role of the human workforce will naturally shift to a higher level, with a greater focus on design, oversight and exceptions management, as well as having more bandwidth for the relationship-based, customer-facing roles where human emotional intelligence is vital.

Across financial services (FS) sectors, we are seeing the green shoots of AI value being realized. Bloomberg was among the first to announce training their own model, with Bloomberg GPT providing a means for users to query and interact with complex financial data using natural language.

To analyse, present, and interpret information from the data, there has to be a process of gathering and sorting the data. There are different methods to gather data, all of which fall into two categories: **primary data source** and a **secondary data source**.

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3.1.1 PRIMARY DATA

The term primary data refers to the data originated by a researcher himself, while secondary data is the already existing data collected by agencies and organizations for the purpose of conducting an analysis. Primary data sources can include surveys, observations, questionnaires, experiments, personal interviews, and more. The data from ERP (Enterprise Resource Planning) and CRM (Customer Relationship Management) systems can also be used as a primary source of data. In this project questionnaire method for survey is used for collection of primary data.

3.1.2 SECONDARY DATA

On the contrary, secondary data sources can be government publications, staging websites, publications from independent research labs, journal articles, etc. The transformed "raw" data set into another format, in the process of data wrangling, can also be seen as a secondary data source.

Secondary data can be a key concept in terms of data enrichment when the primary source data is not solid enough with information, and it can improve the precision of the analysis by adding more attributes and variables to the sampling.

3.2 SAMPLING

Data sampling is a statistical analysis technique used to select, process, and analyse a representative subset of a population. It is also used to identify patterns and extrapolate trends in an overall population.

With data sampling, researchers, data scientists, predictive modelers, and other data analysts can use a smaller, more

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manageable amount of data to build and run analytical models.

This allows them to more quickly produce accurate findings from a statistical population. For example, if a researcher wants to determine the most popular fruit in a country with a population of 100 million people, they would select a representative sample of N (e.g., 1000, 10,000).

3.2.1 SAMPLING TECHNIQUE

In Statistics, the sampling method or sampling technique is the process of studying the population by gathering information and analysing that data. It is the basis of the data where the sample space is enormous.

There are several different sampling techniques available, and they can be subdivided into two groups. All these methods of sampling may involve specifically targeting hard or approach to reach groups.

3.3 WHAT IMPACT CAN AI HAVE IN THIS INDUSTRY?

- The recent B&CM industry hype around AI could appear as the latest fad – another topic attracting much discussion but not ultimately leading to sustained operating margin uplift. Most banks have invested in strategic innovations in recent years as cloud, data and digitization technologies have advanced.
- Not all banks have yet achieved material improvement to their bottom line from these investments, particularly where they bolted new systems and capabilities on to existing technology estates, introducing additional cost and complexity without decommissioning legacy components.

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- However, the banks that have learned how to deliver innovation in their organization will continue to outperform with AI, i.e., “the winners will keep on winning”.
- Successful cloud, data, analytics and digitization initiatives have provided the foundational capabilities for AI. Successful innovators can achieve a 5-15% improvement in cost income ratio over the next five years.
- AI will likely now act as the conduit that accelerates business impact and magnifies value realization. We look at this more closely later in this paper.
- Ultimately, the significance of AI to the sector will be assessed on the extent that this innovation delivers sustained operating margin uplift.
- Here we consider the “size of the prize” given a typical cost to-income ratio profile today and expected AI benefit themes. We see potential for a 5-7% positive contribution in 2-3 years, and 10-15% in 5-7 years.
- This view considers a wide range of banks, and smaller, more nimble organizations including those with currently high cost-income-ratios (CIRs) would find greater opportunity to achieve the higher end of this 5-15% range of improvement.

3.3.1 Where will the benefits come from?

AI, including GenAI, can bring advantages such as:

- Increased efficiency – automate repetitive tasks, freeing human resources for more complex, creative or customer facing engagement.
- Improved accuracy – process vast amounts of data with greater precision and fewer errors than humans, leading to more accurate predictions and outcomes.

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- Enhanced personalisation – analyse customer preferences and behaviours to create tailored experiences, improving customer engagement.
- Predict trends – make data driven decisions, detecting trends and predicting changes in the market.
- Creativity – new possibilities to create new possibilities for products, services and business models fostering innovation and growth.
- Cost savings – streamlining operations, reducing errors, and enabling better decision-making, AI can help save costs and allocate resources more effectively.
- Protection – improving the effectiveness of financial crime and loss prevention capabilities.
- Accessibility – Make the services more accessible and affordable.

However, given AI risks and the evolving regulatory landscape, AI without appropriate human supervision may not be suitable for:

- Critical, fast-moving operations where timely human supervision/intervention is not yet feasible.
- Customer/staff facing activities requiring human emotional intelligence (EQ).
- Regulatory-sensitive activities. We see three key modes for achieving value through AI, all of which combine AI and human strengths:
 - A focus on productivity through personal agents.
 - A focus on improving quality and process performance through specialist agents.
 - Large scale re-imagining of end-to-end processes using the multi-modal capabilities of AI. The persona of core “agent

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modes” in which humans and AI interact to implement the operating improvements that can deliver financial impact.

- We stress the point that the benefit in all three modes comes through combining human and AI strengths, not through large scale replacement of humans with AI. Institutions should develop and strengthen the human skills to allow for adoption and value realization.
- These modes will be leveraged in creating value across the financial institution.

“GenAI is predicted to be the start of a new era for AI. The technology will continue to evolve with focus on multi-modal communication and intelligence built into human interactions.”

A “marginal gains” approach to deploying many productivity improvements across the human workforce. At the most basic level, this will include automation of repetitive tasks such as data entry and analysis, search and query, draft production of many varieties of operational content (meeting minutes, communications) and summarizing large documentation.

This is the type of “text and images” productivity support perhaps most associated with GenAI, particularly among newer users.

However, we see that the art of the possible is rapidly expanding, with more specialist acceleration use cases including data governance and management, data quality and remediation, model development and analytics. Workforce acceleration will likely require widespread uplift in workforce skills with AI in the same way as staff previously became proficient in typing, spreadsheets and calendar management and other functions which historically were performed by specialist resources only

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3.3.2 EVOLUTION OF AI

John McCarthy and Marvin Minsky, considered founding fathers of AI, defined it as “the science and engineering of making intelligent machines” along with a group of researchers in 1956 at Dartmouth College in United States. This group of researchers were attempting to make machines use language, form concepts and solve problems without human intervention. The AI movement began with major design goals to teach and enable machines to:

- i. reason and perform sophisticated mental tasks,
- ii. identify objects, people, and languages so they can interact with the real world as humans do,
- iii. plan and navigate the world around them so they can autonomously move around by navigating themselves,

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- iv. process natural language so they can understand language and interpret conversations and perceive the way humans do using five senses. Nobel Laureate and Turing Award Winner Herbert Alexander Simon defined Machine Learning (ML) as: “A process by which a system improves performance from experience.

Machine Learning is concerned with computer programs that automatically improve their performance through experience.”

Geoffrey Hinton, inventor of learning models, said about AI, “Modern AI is modelled after ideas about how the brain works.

The way the brain works is, you have a big network of brain cells, an input comes in and stuff goes on and then you get an output and the output you get depends on the connection strengths between the brain cells.

If you change those connection strengths, you change the output you will get for each input. The way AI now works is instead of programming the computer you show it lots of examples it changes the connection strengths and it learns to produce the right answers without you ever programming.” However, the absence of the amount of data apart from computing power required for AI disrupted its progress, leading to an AI winter. This has changed since the early 2000s following the dot-com bubble, with AI being increasingly harnessed in multiple fields, driven by innovation through the convergence of various factors such as

- (i) the unprecedented availability of big data,
- (ii) powerful and enhanced computing,
- (iii) uninterrupted mobile connectivity,
- (iv) cheaper internet, and
- (v) improvements in ML algorithms.

These have enabled AI technologies to be easily embedded and made portable, while managing data within the cloud. Several

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breakthrough developments in AI over the decades have been supported by algorithms that were developed many years prior to the actual achievement.

The average time from when an AI algorithm was first planned to the time a discovery took place has been recorded as 18 years.

This new phenomenon can be called new AI clearly differentiating the symbolism that was the fulcrum of the traditional AI. The timeline of developments in AI is depicted in.

3.4 MARKET ANALYSIS AND INCOME GROWTH ANALYSIS

1. New capabilities for growth:

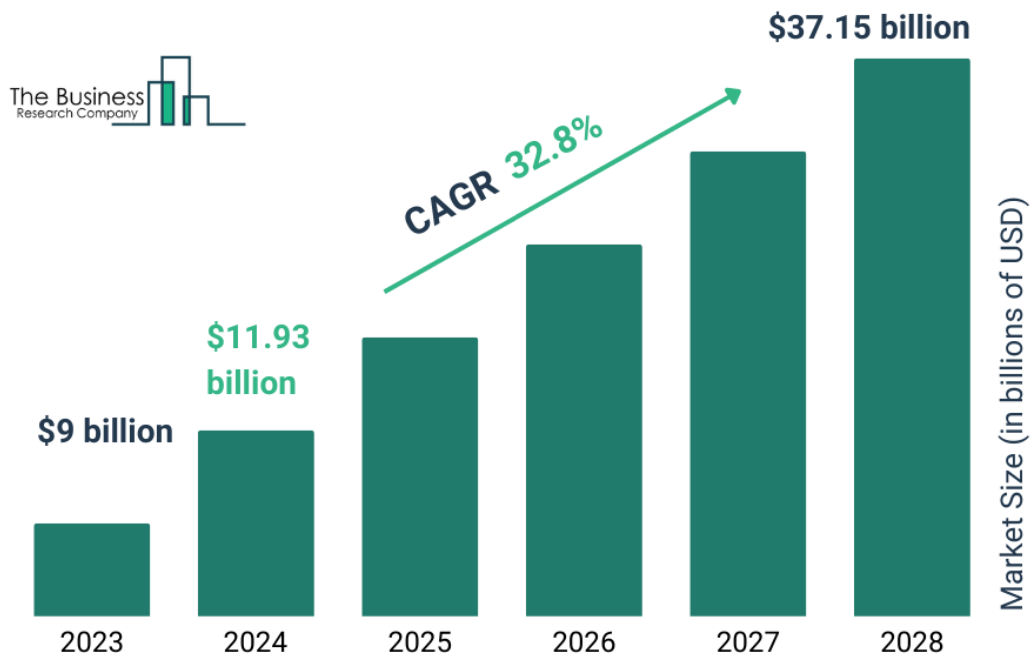
We see that banks will invest in revenue generating capabilities across business lines, including:

a. Insight-driven pricing: Real-time customization of pricing (e.g., preferential lending rates) to make highly competitive offers to target customers based on enhanced measurement of their credit risk.

b. Hyper-personalized marketing: Improved conversion rates based on insightful identification of individual prospect and customer/client needs, and highly-tailored communication.

c. Next generation trading algorithms: Trading income uplift from enhanced market insight and automated trading decision.

AI In Banking Global Market Report 2024



2. Customer experience and retention:

AI-powered digital agents (e.g., chatbots) can reduce customer wait times by addressing an increasing range of complexity of customer requests.

While certain customer journeys (e.g., those associated with large transactions, bereavement etc.) must remain as person to-person interactions, the improved responsiveness of digital customer service agents can improve customer experience and retention rates. Increasingly, the quality of AI interaction with humans will improve as AI technology develops—adjusting the AI agent’s behaviour according to the behaviour/emotions of the customer.

The AI in banking industry is expected to keep growing too, as it’s projected to reach **\$64.03 billion by 2030**.

CHAPTER – 4

LIMITATIONS

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4.1 How AI is uncovering new opportunities in investment banking?

More revenue and lower overhead are exciting outcomes to see on a balance sheet, but AI is also supporting front office teams by helping find new opportunities in investment banking.

The primary function of artificial intelligence is data analysis. The human brain can only analyse a small amount of data, and that's part of what makes us so bad at predicting the future or keeping up with shifting consumer preferences.

AI still has a long way to go before it can solve all of your pipeline problems, but it's still making positive outcomes more likely.

Here are three main areas experts focus on when using AI to create new opportunities in investment banking:

- **Personalizing client service**

Conversational AI, or chatbots, are one way to deliver personalized customer service in investment banking at scale.

Chatbots use natural language processing to understand the needs of the customer and deliver the same kind of response a customer service agent would.

That said, **chatbots aren't yet widely used in banking**—they currently make up only 13.5% of the AI vendor product offerings in the industry, and even the most advanced iterations are only handling basic requests. This is because natural language processing is still in its infancy. As it turns out, personalized service with a robot is really hard to execute.

Still, some firms are making exciting advancements with internal investments in conversational AI. JPMorgan Chase, for

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example, developed their Contract Intelligence (COIN) chatbot to analyse legal documents.

As compared to manual legal review of 12,000 commercial credit agreements in 360,000 hours, COIN reviewed the same amount of information in mere seconds without error.

- **Predicting investment risk and new markets**

We mentioned before that JPMorgan Chase was leading the way in 2017 with the development of its LOXM algorithm, which conducted buying and selling activities across its equities business.

The firm has since been publishing more research on a simulator it created “to assess the effect a market maker can have on equality of outcomes for consumer or retail traders.” Introducing machine learning to the risk assessment process empowers teams to make more accurate decisions, faster.

This is because machine learning analyses large swaths of data to monitor the market so it can eventually understand what causes stock prices to rise and fall.

With enough of this data, artificial intelligence can more accurately predict outcomes humans may not have considered. With AI-driven risk assessment, firms will be able to:

- Reduce trader errors
- Trigger trades at the best possible price
- Recommend products based on personal risk tolerance
- Customize portfolios based on personal investment values

While no one investment bank seems to be doing this well with artificial intelligence at the moment, investments in AI fraud detection could pave the way for more exciting use cases in trading.

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For example, Teradata helped Danske Bank improve their fraud detection process by removing 60% of their false positives per day, which allowed them to improve real fraud detection by 50%.

Fraud detection is the most widely used application of artificial intelligence in banking right now, and what investment banks learn from AI fraud detection will likely transfer to more accurate market predictions and risk assessment functions. But more research and development is needed before AI is used more broadly in those areas.

- **Making it easier to leverage relationships**

One of the most exciting ways artificial intelligences can help investment banks uncover new opportunities is through relationship management. This is because the most powerful tool in any investment banker's toolbox is their personal network.

If LinkedIn has taught us anything it's that the more your network grows, the more unwieldy it can become. If it's been years since an old colleague introduced you to that one person at the company you're reaching out to, but you can't remember their name (or anything else about them) off the top of your head, you can't use that information to grow your business.

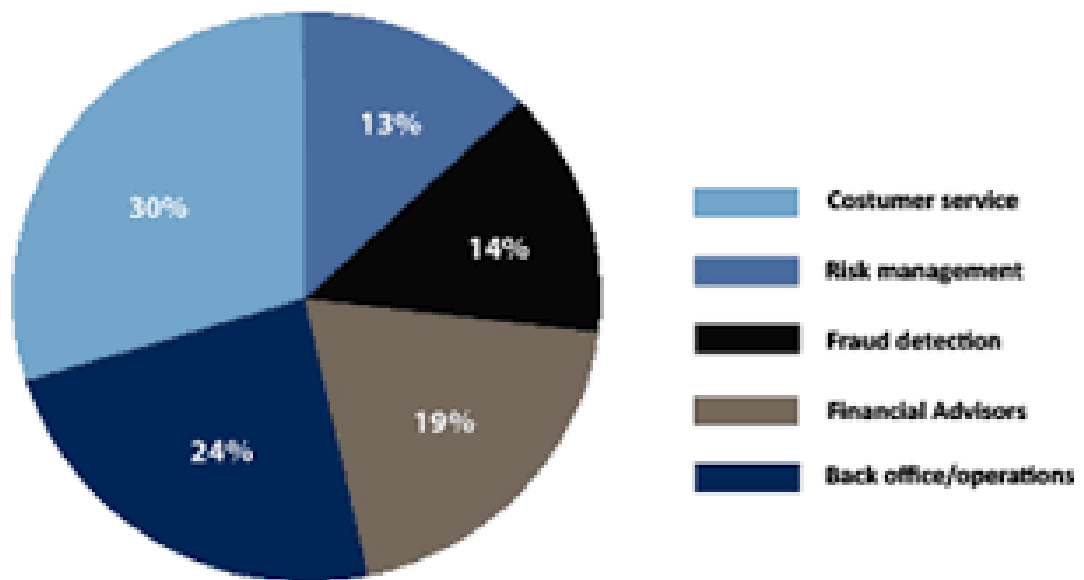
4.2 TABLE

TOP 10 BANKS USING AI

1)JPMorgan Chase	A leader in AI innovation
2)Capital One	A leader in AI development and data engineering talent
3)Royal Bank of Canada	A leader in AI-specific research citations, patent citations, and participation in academic conferences
4)Wells Fargo	A top bank using AI
5)UBS	A top bank using AI
6)CommBank	An Australian bank that broke into the top 10
7)Goldman Sachs	A bank that is experimenting with generative AI
8)ING	A bank that is experimenting with generative AI
9)Citigroup	A top bank using AI
10)DBS	A top bank using AI

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4.3 CHART



INFERENCE:

It shows that how much AI can be used for different sectors if AI was implemented in banking industry.

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4.4 KEY TECHNICAL FOUNDATIONS

- **Cloud**

where done well, has delivered readily-scalable computing power and accessible data provisioning, that abstracted data away from the complexity of legacy architectures while reducing total cost ownership of the IT estate. It also forced banks to learn how to assess and manage the risks associated with introducing third-party dependencies to the infrastructure supporting core business processes.

- **Automation**

Put in place the governance and risk management capabilities to oversee automated operations.

- **Data governance**

May have been implemented initially for compliance purposes but has established the organizational accountabilities, policies, quality improvement methods and understanding of organizational data assets to provide trusted datasets as inputs to AI use cases.

- **Digital banking**

It has evolved customer expectations to be more comfortable with self-service, real-time, insight-driven and reduce reliance on bank staff for many interactions, while streamlining key front-to-back processes e.g., client onboarding, loan fulfilment.

- **Governance**

Putting in place sufficient oversight to adequately assess and mitigate the spectrum of risks, without unduly constraining delivery.

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- **Culture**

Benefits are well communicated business function owners expect to embrace emerging technology to improve process performance.

- **Idea to value**

strong processes are embedded to generate ideas for value delivery from innovation, assess feasibility and investment case, rapidly deliver the best ideas into production and scale.

- **Talent**

Hiring and learning/development approaches that build adequate skills and capacity.

- **Partnerships**

Engaging with the wider market ecosystem, forming partnerships with technology and service providers best placed to assist delivery.

4.5 What is special about generative AI and where is this technology heading?

GenAI is a branch of AI currently attracting much attention, as it allows for the generation of increasingly sophisticated content (e.g., text, code, audio, images, videos, processes) based on algorithms that imitate existing content, using statistical predictions learned from large sources.

The fast-improving apparent quality of this content suggests that GenAI can play a large role in business functions traditionally considered to require solely human intelligence.

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GenAI rapidly generates sophisticated content, based on vast bodies of source information, designed to imitate what a skilled human being could produce.

This could be for example summarizing large volumes of documentation, writing an opinion piece, developing software code, producing images/video to a given specification, preparing a sales presentation or defining rules to measure data quality.

GenAI is about more than just text:

Gen AI is capable of working with multiple “modalities” of content, with the ability to process one modality as input and generate another as output.

Gen AI is able to produce sophisticated content output including software code, PowerPoint presentations and three dimensional (3D) models.

“GenAI is predicted to be the start of a new era for AI. The technology will continue to evolve with focus on multi-modal communication and intelligence built into human interactions.”

What is it good at?

- Tasks that a human would do far slower, generating content based on research, or vast amounts of information.
- Spotting trends or anomalies across large datasets at speed, that a human may miss.
- Augmenting human teams to accelerate output of a function or expand coverage.

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- Producing specialist content on demand – e.g., images, video, 3D models.
- Increasing customization, i.e., with GenAI effective scale, supports “segment of one” in customer relationship management.

What are the limitations?

- It is just imitating human output by predicting statistically what human generated content would look like based on vast volumes of previously published content.
- It cannot “sanity-check” or challenge the output (although other forms of AI can do this).
- It can construct statements that may appear plausible but are simply untrue (known as hallucinations).
- It can be biased, amplifying the inherent biases in source content.
- It depends heavily on quality of source content.
- Large computing power required leading to potentially greater carbon emissions associated with AI.
- No EQ – does not adapt interaction with human beings based on emotions of the human user.

In future developments, we see AI evolving to display improved apparent EQ with humans, responding appropriately to facial and speech cues to become increasingly suitable in customer service agent roles.

Where will GenAI go from here? GenAI will continue to evolve. We see three themes of increasing maturity:

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1. General intelligence: the mimicry of human thinking will likely mature to include reasoning, making new inferences and predictions based on complex inputs. It will start to form perspectives and views that challenge human thinking. Currently GenAI focusses on distilling, summarizing and producing human-like content.

2. Expanded modalities: the available combinations of input/output modalities will increase, with greater sophistication in the production of specialist output such as financial engineering constructs, systems architecture design, audit opinions and risk control assessments.

3. Artificial EQ: interactions will become more human-like, developing the ability to change tone and respond appropriately to human emotions. This will be particularly impactful, making AI suitable for an increasing number of human-facing use cases.

What risks must be managed and how?

Key risks in many ways, deployment of AI to scale up operations raises similar enterprise risks as outsourcing to a third party. The role of bank staff changes to one of definition, governance and accountability, rather than direct execution of the process in question. The bank is accepting a certain level of increased risk (requiring mitigating controls) for the benefits that come from increased processing capacity and lower cost.

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Key risks that should be addressed include the following:

Misuse of AI: incidents involving malicious actors are a real threat. For example, where deepfake techniques have been used to successfully imitate a customer, gaining access to their account commit fraud. Deepfake in this case is an artificial, AI-generated video or sound recording designed to convincingly appear authentic.

Environmental impacts: Greater use of AI will naturally require greater computing power, in turn leading to greater energy consumption in the data centres. This is a competing factor against industry net zero commitments and climate change impact disclosure and reporting requirements.

Amplification of biases: Underlying datasets contain inherent biases that will be amplified once the models are trained on them, potentially exacerbating any discriminations based on gender, race and other characteristics. This could expose banks to litigation and/or regulatory consequences.

CHAPTER – 5

FINDINGS & CONCLUSION

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5. FINDINGS & CONCLUSIONS:

FINDINGS:

- All major banks now use chatbots to tell customers how to manage their investment portfolio using AI, ML, and predictive analysis. The bots analyse the customer's previous investments, salary, and spending patterns to suggest the best possible investment strategies.
- In 2018, Goldman Sachs acquired personal finance app Clarity Money. Spanish bank BBVA partnered with Google to use recurrent neural networks for personal finance management.
- Generative AI is driving a profound transformation in financial services, fostering innovation and streamlining operations.
- With its broad applications, artificial intelligence is enhancing customer service, boosting risk management and reshaping capital markets.
- Balancing the opportunities and challenges of AI, the banking sector is on a strategic journey toward an AI-enabled future.
- The evolution of AI in banking has been nothing short of revolutionary, moving from foundational concepts to the creation of sophisticated, innovative applications.
- The first stage involved the application of AI in data analytics and back-end processes to minimize paperwork and enhance productivity.
- The utilization of algorithms that are AI-based in trading changed the way people analyse the market and come up with strategies to trade.
- AI models were adopted in risk assessment to deliver intricate ways of analysing risks and preventing them.

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- Generative AI can easily process a lot of market data to create an effective trading plan. Through machine learning algorithms, investment banks can better anticipate market movements and manage their trades. This minimizes their dependence on conventional methods and assists firms in coping with the dynamic market environment.
- Implementing AI improves relations between a company and its customers by offering individualized recommendations and assistance.
- AI chatbots and virtual assistants are useful in answering clients' questions, providing financial advice, and processing transactions. This results in a better client experience and, therefore, enhanced satisfaction through the provision of solutions to the particular needs of the client.

Conclusion:

Artificial Intelligence is not just a buzzword but a transformative force in the banking industry. From improving customer service with chatbots to safeguarding your finances from fraud, AI is reshaping the way banks operate. As we move forward, the collaboration between AI and blockchain technology promises even more exciting developments.

So, whether you're checking your account balance, seeking investment advice, or applying for a loan, remember that AI is working behind the scenes to make your banking experience smoother and more secure.

Artificial intelligence is changing the game in investment banking. It brings huge benefits like better productivity and smarter decision-making. Generative AI helps banks automate tasks, making things more efficient. It also helps people do their jobs better.

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The adoption of AI does come with risks like legal issues. But the advantages are greater. Investment banks that use AI are setting up for a future where AI is key. Bankers who learn about AI and improve their skills will succeed.

AI has truly transformed the investment banking world. It enables banks to do things better and faster. For bankers, AI opens doors to many opportunities. As more banks use AI, those who are skilled in it will stand out. They will find great career paths in the industry.

Safe to say the future of AI in shaping investment strategies is quite exciting. While AI can do some pretty amazing things like processing big data accurately, quickly, and in real-time, it should be noted that it is not something that replaces human advisors. In fact, since AI can automate tedious tasks, it gives human financial advisors the time and energy to focus on higher-level strategic thinking. It is a tool that works best alongside a qualified financial advisor.

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