

What will ChatGPT Revolutionize in Financial Industry?

Abstract

The introduction of the open AI chatbot ChatGPT in November 2022 has generated widespread excitement around Generative Artificial Intelligence (AI). While researchers have explored ChatGPT's ability to produce content and respond to inputs, our study takes a different approach and investigates its use cases in the financial industry. We aim to understand what ChatGPT offers to the financial industry and how it differs from existing banking and financial chatbots. By focusing on ChatGPT's potential in finance, we hope to spark discussions about its applications in other domains and explore the possibilities of a larger revolution in the future.

Keywords: ChatGPT; Finance; Open AI, Chatbot

JEL Codes: D8; G2; O14

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1. Introduction

Chatbots, also known as conversational agents, are computer programs that are designed to simulate conversation with human users. The history of chatbots dates back to the 1960s when the concept of artificial intelligence (AI) first emerged. One of the earliest chatbot programs was ELIZA, which was developed in the 1960s by computer scientist Joseph Weizenbaum at MIT. ELIZA was designed to simulate a therapist and was based on pattern matching and natural language processing (Switzky, 2020). In the 1970s, other early chatbot programs were developed, including PARRY, which was designed to simulate a paranoid patient, and Racter, which was one of the first chatbots to be commercialized. In the 1990s, the development of the internet and the World Wide Web led to a renewed interest in chatbots (Adamopoulou & Moussiades, 2020). This period saw the emergence of web-based chatbots, which were designed to provide customer service and support on websites.

In the 2000s, advances in natural language processing and machine learning led to the development of more advanced chatbots, which were able to understand and respond to more complex human inputs. Today, chatbots are used in a wide range of industries, from customer service and e-commerce to healthcare and finance. They are also increasingly being integrated into messaging platforms, such as Facebook Messenger and WhatsApp, as well as virtual assistants, such as Amazon's Alexa and Google Assistant. Overall, the history of chatbots has been a long and varied one, starting with simple programs that could only respond to a limited set of inputs, to advanced Generative AI-powered chatbots that can understand and respond to a wide range of human inputs. ChatGPT is the latest and most powerful open AI chatbot released in November 2022 and is available to everyone.

Due to the very high popularity and usage of ChatGPT in a very short span of time, it has become a hot topic in the latest World Economic Forum (WEF) in 2023. The pros and cons of ChatGPT were discussed for the financial industry. Tech giants from Accenture, IBM and Qualcomm present in a panel discussion focused around technology for resilient world took account the advent of ChatGPT and discussed its use cases and impact for society and businesses (World Economic Forum, 2023b). In a session at the Annual Meeting in Davos, Satya Nadella, Chairman and CEO, Microsoft told Klaus Schwab, Founder and Executive Chairman, WEF, “a golden age of AI is

under way and will redefine work as we know it” (World Economic Forum, 2023a). Technology firms and venture capital firms are making plans in this generative AI technology and ChatGPT. For instance, reports are claiming that Microsoft is planning to invest \$10 billion in the technology behind ChatGPT (BW Businessworld, 2023).

ChatGPT is based on a large language model and has more than 175 billion communication parameters which make this AI chatbot stronger than all existing chatbots. ChatGPT helps in response to queries, prediction of conversation behavior and unique engagement experience. A study claimed that this chatbot is a multitasking tool as it does not provide you with the answer to a particular query it also asks follow-up questions to give more clarified answers. The authors tested ChatGPT in terms of asking complex programming-related puzzle-based questions such as to Spotify the errors in the code. They reveal that it took only 3 minutes that ChatGPT accurately highlighted and spotted the errors that solved the programming problem immediately (Chatterjee & Dethlefs, 2023).

2. A Brief on Studies on ChatGPT

After the advent of ChatGPT in November 2022, the number of studies on ChatGPT are increasing. Majority of those researches focuses on writing of abstracts and literature review and comparing the output of ChatGPT from human writing in general (Frye, 2022; Gao et al., 2022) and in different disciplines such as education (Zhai, 2022), healthcare, medicine & biological sciences (Ayдын & Karaarslan, 2022; Patrick Cahan & Treutlein, 2023; Mann, 2023), law (ChatGPT & Perlman, 2022; Choi, Hickman, Monahan, & Schwarcz, 2023). A comparative study on the knowledge and ability of interpretation between ChatGPT and medical students was done in South Korea. They did a comparison by administering the exam of Parasitology to both medical students and ChatGPT. They found that medical students perform better in terms of knowledge and interpretation ability in the examination than ChatGPT. One observation was that there was a relationship between correct answers to knowledge questions and acceptable explanations (Huh, 2023). Other studies used the same approach but focus on other fields such as law (Bommarito & Katz, 2022).

ChatGPT is really a gold coin for students irrespective of the discipline and field. This open AI chatbot provides exhaustive answers to queries and the quality of answers has been recorded to a high acceptance rate. One of the great excitement for students using ChatGPT is that the provided

answers have not been captured by any kind of plagiarism checker software such as Turnitin. This is actually a point of worry for academicians, especially for teachers. A major impact will be seen on online exams especially exams from home rather than online exams in a formal setting where there is the possibility to avoid cheating through ChatGPT. There is a set of studies who discuss the exam integrity and challenges for universities in detecting plagiarism from essays produced by ChatGPT (Armstrong, 2023; Frye, 2022; Hsu, 2023; Ryznar, 2020). There is a study on ethical dimensions of using ChatGPT in academic writing (Jabotinsky & Sarel, 2022).

There is another set of studies done based on the conversation with ChatGPT on different topics such as biological stem cells (P Cahan, Reports, & 2023, 2023), law (Choi et al., 2023), psychology (Uludag, 2023), and compute science (Chatterjee & Dethlefs, 2023).

A study on ChatGPT for finance research published in Finance Research Letters use an approach of writing a full paper rather than focusing on abstract writing and literature review. The study found that there are obvious advantages of using ChatGPT in terms of idea generation and data identification but this chatbot is weaker in terms of producing a comprehensive literature review and developing efficient and suitable testing framework (Dowling & Lucey, 2023). Another study the potential applications of Natural Language Processing (NLPs) in finance using ChatGPT. Authors used ChatGPT for writing this whole paper as they only organize and provided appropriate inputs to it (Zaremba & Demir, 2023). One more study found done on analyzing the output of ChatGPT on topics of crowdfunding, alternative finance and community finance and then comparing them with academic writings (Wenzlaff & Spaeth, 2022).

3. Methodology

To our knowledge, the available research has not touched upon the applications of ChatGPT beyond content writing and academic writing. The objective of this study is to discuss the applications of ChatGPT in financial industry and provide the answers of following 10 questions:

1. What are the existing chatbots and their functions in financial industry?
2. What ChatGPT offers for financial industry?
3. Why financial industry should use ChatGPT?
4. How ChatGPT is different than existing banking and finance chatbots?
5. How ChatGPT will deal with cybersecurity risk and data protection?

6. Do regulations will allow financial institutions to use ChatGPT?
7. Which tasks ChatGPT can perform in stock market and asset management?
8. How ChatGPT can do stock price prediction?
9. How ChatGPT is different than financial robo-advisors?
10. What will be the impact of ChatGPT in financial industry?

For this purpose, we used conversation approach with ChatGPT as it is used in previous studies for other objectives. Moreover, we interpret output of ChatGPT using academic literature on banking and finance chatbots, views articles on use of ChatGPT in financial industry.

Existing Chatbots in Financial industry

Chatbots in finance industry are AI-powered virtual assistants that interact with customers via text or voice and provide financial services. These chatbots can help banks and other financial institutions offer 24/7 customer service, automate repetitive tasks, and improve the customer experience. Some common applications of chatbots in finance include: account management, customer service, and investment advice. Overall, chatbots in finance help companies reduce costs, improve efficiency, and enhance the customer experience. These are just a few examples of how chatbots are being used in the financial industry to provide customers with convenient and efficient services.

1. HSBC's Amelia: A virtual assistant that can help customers with account management, money transfers, and investment advice.
2. Chase's COiN: A chatbot that helps customers with account inquiries, card activation, and fraud alerts.
3. Citi's virtual assistant: A chatbot that helps customers with account management, balance inquiries, and bill payments.
4. Bank of America's Erica: A virtual financial assistant that helps customers manage their accounts, pay bills, and make budget plans.
5. Capital One's Eno: A chatbot that helps customers check account balances, view transactions, and receive fraud alerts.

6. Ally Assist: A virtual assistant offered by Ally Bank that helps customers with account management, bill payments, and investment advice.
7. TD Ameritrade's AI-powered chatbot: A virtual assistant that provides real-time market insights and investment recommendations.
8. American Express's virtual assistant: A chatbot that helps cardholders manage their accounts, track rewards, and get customer service.
9. Fidelity's virtual assistant: A chatbot that helps customers with investment advice, account management, and research.

What ChatGPT offers for financial industry

Banking and financial institutions are deploying technologies to provide agile services and financial solutions to the customers. Many banks around the globe have chatbots for answering the queries of customers. But those are programmed within the single institution information.

We asked ChatGPT what it offers to financial institutions. ChatGPT response is:

As a language model developed by OpenAI, ChatGPT can offer several benefits to the financial industry, such as:

1. Customer service automation: ChatGPT can handle a large volume of customer inquiries and provide accurate, personalized responses 24/7.
2. Investment advice: ChatGPT can provide financial advice to customers based on market data, investment portfolios, and customer preferences.
3. Fraud detection: ChatGPT can analyze customer transactions and detect suspicious activity in real-time, reducing the risk of fraud.
4. Knowledge management: ChatGPT can store and retrieve a vast amount of financial information and regulations, providing accurate answers to customer inquiries.
5. Personalized marketing: ChatGPT can analyze customer data and provide personalized marketing recommendations, improving the effectiveness of financial institutions' marketing campaigns.

By using ChatGPT, financial institutions can reduce costs, improve efficiency, and enhance the customer experience. ChatGPT can also be integrated with other AI technologies to provide more advanced financial services.

Source: Output from ChatGPT

This response shows that ChatGPT offers a bundle of services to financial industry as it listed five core functions that ChatGPT can perform for financial industry. As it is known that financial institutions such as banks, asset management firms and insurance are using their in house programmed and third party chatbots to perform these tasks.

Gaurav Samdaria, chief business officer of Perfios, a financial data analysis company, said: “With time, banks will look forward to using ChatGPT in specific and core sections of their operations. Once the wider tech community starts incorporating ChatGPT in their products, banks will start using the chatbot”¹.

Different studies have analyzed the users’ behavior and perception toward using financial and banking chatbots. One of the major concerns from the users found by those studies is the lack of

¹ <https://www.moneycontrol.com/news/business/mc-explainer-how-can-banks-use-chatgpt-9901901.html>

efficiency of the chatbot as they faced difficulties to communicate through chatbots (see: Trivedi 2019; Mogaji et al. 2021). A study unveils that the staff at financial institutions in South Korea are sceptical about accuracy and technical maturity of their financial chatbots (Jang, Jung, & Kim, 2021). Next question we asked is Why financial institutions should use ChatGPT?



Financial institutions use ChatGPT for several reasons, including:

1. Improved customer experience: ChatGPT can provide 24/7 customer service, handling a large volume of customer inquiries and providing accurate and personalized responses. This enhances the customer experience and reduces customer wait times.
2. Cost savings: ChatGPT can automate routine tasks and handle customer inquiries more efficiently than human customer service representatives, reducing operating costs for financial institutions.
3. Increased efficiency: ChatGPT can handle customer inquiries and provide accurate responses in real-time, improving the overall efficiency of the financial institution.
4. Personalized services: ChatGPT can analyze customer data and provide personalized recommendations and advice, improving the relevance of financial services to individual customers.
5. Fraud detection: ChatGPT can analyze customer transactions and detect suspicious activity in real-time, reducing the risk of fraud and financial losses for financial institutions.
6. Compliance: ChatGPT can store and retrieve a vast amount of financial regulations and ensure that financial institutions are in compliance with applicable laws and regulations.

Financial institutions can leverage ChatGPT to improve their operations, enhance the customer experience, and increase the efficiency and effectiveness of their services. By using ChatGPT, financial institutions can remain competitive in the rapidly evolving financial services market.

Source: Output from ChatGPT

The response from ChatGPT is actually what we can expect from an AI based tool. The claims from ChatGPT are what the proponents of digital finance and Fintech enumerate such as cutting costs, better customer experience and increased efficiency. But the worth importance point here is that ChatGPT is well aware of compliance with financial regulations and laws that is a line of difference between ChatGPT and existing chatbots which are programmed with limited answers to frequently asked questions only.

The follow up question we asked is how ChatGPT is different than the existing chatbots used in financial industry?



ChatGPT is different from existing chatbots in the financial industry in several ways:

1. Natural language understanding: ChatGPT uses advanced natural language processing (NLP) algorithms to understand and respond to customer inquiries in a conversational manner, providing a more human-like experience.
2. Knowledge base: ChatGPT is trained on a large corpus of text, providing it with a vast amount of knowledge and the ability to answer a wide range of customer inquiries.
3. Continual learning: ChatGPT is capable of continually learning from new data, improving its responses over time and ensuring that it provides the most accurate and up-to-date information.
4. Customization: ChatGPT can be fine-tuned to specific domains, such as finance, to provide more relevant responses to customer inquiries.
5. Integration: ChatGPT can be easily integrated with existing financial systems and technologies, such as customer relationship management (CRM) systems and fraud detection systems, providing a more comprehensive solution.

Overall, ChatGPT provides a more advanced and sophisticated solution for financial institutions compared to traditional chatbots, offering improved customer service, increased efficiency, and reduced costs.

Source: Output from ChatGPT

This response from ChatGPT is actually a challenge to the existing financial industry chatbots, as it is offering unique features such as conversational behavior of ChatGPT, constant learning and understanding of respondents' queries. On technical end, ChatGPT does claim to be a customized solution for financial industry and it has feature of interoperability. The limited set of studies on ChatGPT found a few claims such as constant learning feature, knowledge base feature and customization are true (Alawi, 2023; Marchi & Sampieri, 2023). A study conforms that AI-based chatbots have power to overcome the hurdles faced by the practitioners if they are trained on a large set of data and advanced NLP algorithms (Kecht, Egger, Kratsch, & Röglinger, 2023).

While using chatbots in financial industry, one of the major concerns arises is the maturity of chatbots in terms of cybersecurity vulnerabilities. We asked ChatGPT how it dealt with this issue.



Dealing with cybersecurity risks is a critical concern for financial institutions using chatbots. ChatGPT, as a language model developed by OpenAI, follows best practices in terms of data security and privacy to minimize such risks. Some of the ways ChatGPT addresses cybersecurity risk are:

1. Data encryption: ChatGPT uses encryption to protect customer data in transit and at rest, reducing the risk of data breaches.
2. Access control: ChatGPT has strict access control policies to ensure that only authorized individuals have access to customer data.
3. Continuous monitoring: ChatGPT uses monitoring and auditing tools to detect and prevent potential security incidents, such as unauthorized access or malicious activity.
4. Regular security updates: ChatGPT is updated regularly to address any known security vulnerabilities and improve its security posture.
5. Compliance with industry standards: ChatGPT follows industry standards and regulations, such as PCI DSS and HIPAA, to ensure that customer data is handled in a secure and compliant manner.

By following these security measures, ChatGPT minimizes the risk of cybersecurity incidents and helps financial institutions protect their customers' sensitive information.

Source: Output from ChatGPT

This shows that ChatGPT has a strategy to tackle with cybersecurity risks. Moreover, it has concerned about protection of customers' data as the fifth point in its response it clearly claims to be compliant with industry standards and regulations.

Now, this question has brought us to an intriguing question: Do financial regulations will allow to use ChatGPT in financial industry?



The use of ChatGPT, or any other AI technology, in the financial industry is subject to a number of regulations, depending on the jurisdiction and type of financial service provided. Financial regulators, such as the SEC, FINRA, and the FCA, have issued guidance on the use of AI in finance, emphasizing the importance of ensuring that AI technologies are used in a manner that protects consumers and maintains the integrity of the financial system.

Financial institutions using ChatGPT, or any other AI technology, must comply with applicable regulations, including those related to data protection, privacy, and security. They must also ensure that their use of AI does not result in discriminatory or biased outcomes.

In general, the use of AI in finance is becoming increasingly common, and regulators are taking steps to promote innovation while also ensuring that financial institutions are using AI technologies in a responsible and ethical manner.

It is important for financial institutions to consult with legal and regulatory experts to ensure that their use of ChatGPT complies with applicable regulations and standards.

Source: Output from ChatGPT

This response shows that ChatGPT is familiar about different financial regulations. However, it is not sure about permission of its own usage in financial industry. Additionally, it suggests to consult with legal expert in this regard. This may be considered as its limitation or prudential measure.

To get more insights about applications of ChatGPT, we asked Which tasks ChatGPT can perform in stock market and asset management?



ChatGPT can perform the following tasks in stock market and asset management:

1. Stock price prediction
2. Market sentiment analysis
3. Portfolio optimization
4. Risk management
5. Investment recommendations
6. Financial news summarization
7. Data analysis and visualization.

Source: Output from ChatGPT

This output shows that ChatGPT is able to perform those function which existing financial robo-advisors are performing. This is possible in a sense that robo-advisors are also a kind of chatbots which are using the same technology and they are linked with a big data.

Experts around the world have started exploring the use cases for different industries and financial industry has no exception. ChatGPT has applications for stock market data analysis and investment management. It is expected that with the new update in ChatGPT and its integration with databases will scale up the ability of doing accurate analysis of the data and will enhance the computation power of solving complex problems.

The tasks claimed to be performed by ChatGPT such as stock price prediction are not possible without its integration with data, then machine learning and deep learning.

So, we asked our next question: How ChatGPT can do stock price prediction?

ChatGPT can perform stock price prediction using various machine learning techniques such as:

1. Time series analysis: This involves analyzing historical stock price data and identifying patterns that can be used to make predictions about future prices.
2. Natural language processing (NLP): This involves analyzing news articles, social media posts, and other text data to determine market sentiment and identify factors that may impact stock prices.
3. Technical analysis: This involves analyzing stock price and volume data to identify trends and make predictions based on chart patterns and other technical indicators.
4. Deep learning: This involves using artificial neural networks to analyze large amounts of data and make predictions about stock prices.

Keep in mind that stock price prediction is a complex task and no model can accurately predict future prices with complete certainty. ChatGPT's predictions can provide insights and inform investment decisions, but they are not guaranteed to be accurate.

Source: Output from ChatGPT

This output shows that ChatGPT need enormous amount of data and ability of using deep learning and machine learning algorithms and networks to perform the task of stock price prediction and also for providing advices for investments and asset management.

The resemblance of ChatGPT with robo-advisors lead to our next input, because robo-advisors are able to automate investments and ChatGPT is not able to automate this function with the present capability and training. So, we asked:

How ChatGPT is different than financial robo-advisors?

ChatGPT and financial robo-advisors differ in the following ways:

1. Input: ChatGPT is a language model that can answer questions and provide insights based on natural language inputs, while financial robo-advisors typically require structured inputs such as financial information and investment goals.
2. Capabilities: ChatGPT can provide a wide range of information and insights related to finance and investment, while financial robo-advisors are primarily designed to automate the investment management process and provide portfolio recommendations.
3. Human interaction: ChatGPT can provide answers and insights without any human intervention, while financial robo-advisors often have a customer support team for questions and assistance.
4. Regulation: Financial robo-advisors are subject to regulatory oversight and must comply with rules and regulations set by financial authorities, while ChatGPT is not subject to the same regulations.

In summary, ChatGPT is a more general-purpose tool for financial information and analysis, while financial robo-advisors are specifically designed to automate investment management.

Source: output from ChatGPT

This response shows that ChatGPT has limitation as it is unable to automate investment and asset management which is the core function of financial robo-advisors. However, ChatGPT is more convenient for taking information about prices, trends and investment advices than robo-advisors.

To end up our discussion, we asked a final question: What will be the impact of ChatGPT in financial industry?



ChatGPT has the potential to have a significant impact on the financial industry in several ways, including:

1. Improved decision making: ChatGPT can provide financial professionals with real-time information and insights, which can help them make more informed and effective decisions.
2. Increased efficiency: ChatGPT can automate many time-consuming and repetitive tasks, such as data analysis and financial reporting, freeing up financial professionals to focus on more high-value activities.
3. Enhanced customer experience: ChatGPT can be used to provide personalized financial advice and support to individual investors, improving the overall customer experience.
4. New business opportunities: ChatGPT can be used to develop new financial products and services, such as virtual financial advisors and personalized investment portfolios, which can drive innovation and growth in the industry.
5. Increased transparency: ChatGPT can provide real-time and historical data and insights, which can increase transparency and accountability in the financial industry.

Overall, the impact of ChatGPT in the financial industry will likely depend on how widely it is adopted and integrated into existing financial processes and systems.

Source: Output from ChatGPT

This output shows that ChatGPT has various offerings for financial industry including new business opportunities and enhance customer experience. The same kind of benefits are highlighted by the experts in their blogs and articles (Mergers & Inquisitions, 2023; Uddalak, 2023).

4. Conclusion

The new era is coming as one of the experts said “ChatGPT is Uber of this decade”. The study opens the discussion on ChatGPT from a different perspective from previous studies. It can be said that ChatGPT is only a starting point as integration with more databases and computational power

will enhance, it has more applications beyond content creation. There will be more research in the future on ChatGPT and its impact on different industries including banking and finance.

The arrival of the open AI chatbot ChatGPT caused a sensation in the field of Generative Artificial Intelligence (AI). Although scholars have already explored ChatGPT's content production and response capabilities, our research takes a distinctive angle by examining its potential applications in the financial sector. This paper is one of the first attempts to comprehend ChatGPT's contributions to the financial industry and how it distinguishes itself from existing banking and financial chatbots. By concentrating on ChatGPT's financial potential, we aim to encourage conversations about its use in other areas and explore the likelihood of a broader revolution in the future. Our results based each question give valuable clues for the future applications of ChatGPT in the finance industry.

Certainly, ChatGPT is the latest and most powerful open AI chatbot that has been revolutionizing various industries including the financial industry. Indeed, ChatGPT offers a bundle of services to financial institutions such as account management, customer service, investment advice, data analysis, and compliance with financial regulations and laws. It has unique features such as conversational behavior, constant learning, customization, and interoperability. ChatGPT has the ability to perform tasks such as stock price prediction, investment management, and asset management, similar to financial robo-advisors. However, ChatGPT needs a large amount of data, deep learning, and machine learning algorithms and networks to perform these tasks.

The impact of ChatGPT on the financial industry is immense. It helps financial institutions reduce costs, improve efficiency, and enhance the customer experience. It also provides a unique engagement experience for customers and helps in improving the overall financial services sector. The advent of ChatGPT has been a hot topic in various global forums, including the World Economic Forum, which highlights the importance of this technology for the financial industry. However, there are also challenges associated with ChatGPT, such as cybersecurity vulnerabilities, compliance with financial regulations, and data protection. Moreover, the use of ChatGPT in academic writing has also raised concerns about plagiarism detection and exam integrity.

Despite these challenges, ChatGPT has the potential to transform the financial industry by providing advanced services and improving customer satisfaction. With further development and

integration with databases, ChatGPT can become a powerful tool for financial institutions and contribute to the growth of the financial sector.

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