National College of Ireland

Project Submission Sheet

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Dissertation

‘What has been AI’s impact on the financial services and how can it be successfully managed’

Jermaine Arkins Esim – x20515106

BAHBMDWP4

Lecturer – Robert McDonald

Module – Capstone Project

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AI's Impact on trading: Navigating the future of finance

Introduction

What is AI? According to John McCarthy it is "It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable." (IBM)

This study will look at how AI what type of affect AI has had in the financial services over the last few years as well as looking forward to see what can be done to ensure it does not displace people by being futureproofed whilst still remaining effective and efficient to the organisations who utilise it.

Significance of the study

Finding the significance of AI's impact on finance is important for a variety of reasons. It allows for us to see what advances have been made in an everchanging landscape. It also allows for us to have the discussion and get perspectives on how we can ensue job displacement will be managed efficiently.

Scope of the study

This study will be focusing on the impact that AI has had on the financial market, it will do in-depth research on different sectors within the industry to see the impact AI has caused. The sectors highlighted are algorithmic trading, HFT and risk management. The aim is to assess the positive and negative impacts that have been found since the implementation and advancements of AI.

Research objectives

- To gather an understanding of how AI has already been introduced into finance and its impact so far.
- To assess how it has had an impact on specific sectors such as;
    - Algorithmic trading
    - High-frequency trading (HFT)
    - Risk management

- To see how we can implement AI successfully into the Irish market to increase efficiency but not displace workers.

Research Questions & Subsections

- The Aim of this report is to answer the question "*What has been AI's impact on the financial services and how can it be successfully managed*"
    - What is AI?
    - What has been its effect on the efficiency overall?
    - Has it had a positive or negative impact on the future of the industry?
    - What can be done to ensure jobs are preserved?
- The Subsections that it will be split across are the sectors that we will be looking at in the financial market.
    - Subsection 1: Will be, 'An understanding of AI'
        - What is Artificial Intelligence?
    - Subsection 2: Will be 'what outcomes has algorithmic trading had on the market'.
        - Has it had an increase on returns?
        - Has it required upskilling in this sector?
    - Subsection 3: Will be 'what effect has AI had on high-frequency trading'.
        - How has it been able to account for external factors?
        - Who can use it, big firms or retail investors?
    - Subsection 4: Will be 'What has the result been of Ai's implementation into risk advisory divisions'.
        - Has it been more efficient than humans have been?

The structure of the Dissertation

The dissertation will be divided into 6 sections:

1. The introduction: Will establish why the study is being conducted and what the study is looking to find out
2. Literature Review: This section will look in detail at what has been the reported impact of AI in the financial market, it will take a look at the impact of AI in algorithmic trading, HFT and risk management.

3. Methodology: The methodology will discuss how the data was collected and analysed, will mention the different collection methods that were used for different sources.
4. Findings: This section will look at the data that has been collected in the methodology and analyse it in comparison to the stance we had come up with in the literature review.
5. Discussion: In this section we will look at the findings from the analysis and compare them to our literature review to see if the stance made was correct.
6. Conclusion: This will be a final overview of the whole dissertation, it will bring all elements together and give the final opinion on the topic of AI's impact in finance.

Abstract

The main objective of the study was to uncover what changes have occurred in the financial industry as a result of the advancements of AI and what can organisations do to manage it efficiently in the future. The method to get to our conclusion will be by conducting interviews.

Literature review

In today's world, there is heavy reliance on technology for almost everything and this is no different in the world of finance, specifically the financial markets. The market has grown steadily year over year for the last 50 years. Per year since 1950, the S&P 500 which is a collection of the top 500 publicly traded companies in the US has grown 11.28% (S&P 500 Data). The constant growth in the market has created a push for the market to evolve to enable more and more trades every single day and because of this and with the efficiency of modern-day technology, we have been able to use algorithms to self-sufficiently run trades for us and manage our systems security for us, which leads us to our research question for this report, "*What has been AI's impact on the financial services and how can it be successfully managed?".*

<u>Subsection 1: An Understanding of AI</u>

Artificial Intelligence, also known as AI has been around for many years, but in recent years it has come to the front of people's attention with new models such as

‘ChatGPT’, which was created by Open AI, one of the many aims for AI is that it is able to be a fully automated system that requires little to no human involvement once it is up and running. Open AI’s mission and aims are to “ensure that artificial general intelligence benefits all of humanity” (OpenAI, 2024). When looking at these goals in depth we look at the two different type of AI models that are being used at present, known as General and Narrow AI.

Narrow AI is a singular focused type of system that was put in place to help with certain specific tasks, it can do these tasks sometimes better than a human can perform but it lacks the ability to innovate and absorb new data, the sole purpose that it was designed for is the only thing that it can do it is not able to learn a new skill on its own or to adapt to find a more efficient way of doing the task it was made for, “narrow AI systems can only do what they are designed to do and can only make decisions based on their training data” (Mark Labbe,2024).

General AI has a key feature designed into it that allow it to able to adapt to situations as if it had cognitive ability, this allows it to react to certain situations almost as if it was a human being “general AI can manage to perform a broad range of tasks by using humanlike cognitive capabilities” (Mubarak Musthafa, 2024). The power in such an ability is it enables the machines to learn and evolve, unlike the narrow AI it has the ability to learn from its past interactions and it will make adaptations that enable the system to move forward with better results as it can stack this learning to continue to evolve in a similar way to how a human would adapt, but AI is able to do it much more efficiently than a human could as its processing power is much more efficient than that of what human beings can process.

In today’s world both types of AI are used within the finance industry, but the system this report looks at is primarily focused on general AI, due to its design to be focused solely on a single outcome it allows institutions to gather different types of general AI to create systems that intertwin to enable for more effective results, this is not just applied to the investing or risk management side of the firms but has been used to make the organisations more efficient overall in many different ways, one example of how general AI has been introduced like this is the ‘Optical character recognition’ (OCR) it is used to analyse physical data and then transforms it into digital data, this saves employees time instead of having to search through documents by hand they can do it on monitors, “HCL’s Exacto tool recognizes and processes handwritten text that is unstructured. Digitizing paper records greatly benefits F&A processes. With

invoices coming in various formats, OCR technology helps process unstructured data and extract information far more quickly than a human could do manually" (ISG, 2023).

Subsection 2: AI in trading

Introduction

In this section we will be looking at how AI has played its part in trading within the financial market and how it has changed the way trading is done, Algorithmic trading is a new development in the trading process and is defined by Markus Gsell as "One of the most recent developments is Algorithmic Trading, which primarily focuses on the minimization of implicit transaction costs in order execution" (Markus Gsell, 2008). Before the introduction of AI, trades were done by hand (humans) in order for these trades to be done they had to completed through a series of detail orientated steps which would take substantially longer than what AI takes to do them now, "Traditionally, traders would spend hours manually analysing charts, financial reports, and market trends" (Hiren Sanghvi, 2023), this process was a tedious and time consuming task that would result in each trade to take hours to be completed as traders would have to compare each stock with one another to ensure the best value for money in every scenario. The introduction of AI into the stock market has changed how traders have to work and analyse the information given to them, the first instance of algorithms in the market was introduce into the 1970's. The first algorithms were simple and were not used to analyse data like the systems we have today but instead the first piece of AI used in the stock market was a system known as "Program trading" and the purpose of the system was to place trades on the behalf of stock brokers at the best price point or when certain market conditions had been met, Algo mojo described the early trades made by AI as "systems which allowed traders to enter a list of orders that would be executed only if certain market conditions were met" (algomojo, 2024).

Trading now

Traditional stock brokers trade drastically different from that of their counterparts in the past, these days stock brokers do not have to go through pages of information about each stock individually they are interested in, now instead they can now use AI to collect the data from the reports published by these organisations and break it down into more concise information so traders can compare different organisation against

one another to make the most informed decision possible, “AI trading involves the use of algorithms and machine learning techniques to analyse vast amounts of data and identify patterns and trends in the market. This technology enables traders to make informed decisions based on market data, reducing the risk of human error and increasing the accuracy of trades” (PTA, Nasdaq, 2024). Thanks to machine learning traders are able to use AI to their advantage and work with it to decrease the amount of mistakes they may make which in turn increases their output.

Machine learning

Machine learning is defined by IBM as “a set of rules or processes that are used by an AI system to conduct tasks, they are used discover patterns and data insights, or in some cases to predict output value” (IBM, 2024). Machine learning would fall under the Narrow AI description as its role is to detect specific values or patterns and will not search for information it is not designed for. The usefulness of this is it enables traders to priorities other responsibilities while the system looks for patterns in the background, once a pattern has been spotted it will present itself to the trader who is then able to look at the information provided, see what kind of output is being predicated based on the information gathered and proceed with the stock purchase if it is worth the investment. AI has more features than just collecting data, it can be used to develop strategies to help traders make more informed decisions. Such investment strategies like HFT fully rely on AI so they have no need for human involvement once they are up and running, whereas different strategies such as quantitative strategies, are strategies which can utilise machine learning and they rely on the AI to suggest trends to the trader who can then “use these models to develop trading strategies that take advantage of market inefficiencies and other opportunities.” (PTA, Nasdaq, 2024).

Types of traders

These days the role of a trader has changed from someone who is exclusively a white collar citizen who works for a large financial institution to anybody. Now there are not only stock brokers who look to take advantage of the market to create wealth but there are also people known as ‘retail investors’. A retail investor is defined as a “nonprofessional investors who use their own money to buy and sell securities” (Krishan Arora, Forbes). These investors don’t use traditional methods such as AI to help them inform themselves on trades but instead they use a number of social sites such as Reddit and Quora to exchange information which is known as digital

information sharing. Although these traders are unable to use the same level of AI that big institutional investor are able to use they have been able to utilise smaller programmes such as market calls where they can make purchases at certain market conditions, just like the first stock brokers could in the 70's.

Algorithmic trading

Over the years Algorithmic trading has transformed and increased its complexity throughout time, 'in the beginning algorithms were used on a basic function to buy or sell their options with very simple instructions, as time progressed the innovation improved and the second generation algorithms were able to deploy strategies that enabled them to break up orders that were too large to be made in one go, this feature allowed firms to reduce the potential of a major market impact which in turn increased the opportunity for better prices to be obtained by the firms. Today the algorithms use deep Neural networks that are in place to obtain the best prices and execution skills to reduce the impact they have on the overall market, these neural networks are algorithms based off of human decisions that have been made in the past and they are used to mitigate the requirement of human intervention as their function is to behave like a human' (OECD, 2024).

In today's new age of high-frequency trading which will be covered later, the most premium algorithms are used less for making faster trades on the market but have now been optimized to provide instant news to firms to help with information, "Rather than help with speed of execution, AI is actually used to extract signal from noise in data and converts this information into decision about trades" (OECD, 2024). The less advanced systems are still used by firms but in a slightly different approach, they are used to transfer financial information in a more efficient manor than scoping though the information by hand "Less advanced algorithms are mostly used for 'high informational events', which consist of news of financial events that are more obvious for all participants to pick up and where execution speed is of the essence" (OECD, 2024).

Although the larger firms are able to use the their size to enable them to enlist the best AI systems, the smaller firms are still getting value for money with the digital information they are able to extract from these systems, Algorithmic trading isn't available for all companies as the systems are too high tech but institutes that use AI to collect data give themselves a competitive advantage when compared to their

competition as they improve their efficiency by reducing errors and improving production. “Digital transformation can significantly improve a business’s efficiency by automating manual processes, reducing errors and improving productivity (Igors Astapciks, 2023). Even though the smaller organisations are benefiting from the addition of AI, they still face a disadvantage when compared to larger organisations as they are slower to receive the information about the potential trades.

Subsection 3: High-Frequency Trading

What is HFT

High-frequency trading also known as HFT, its defined by Brogaard as “HFT is a type of investment strategy whereby stocks are rapidly bought and sold by a computer algorithm and held for a very short period, usually seconds or milliseconds” (Brogaard, 2010). HFT’s are a subset of algorithmic trading, the days of traders having to conduct business on a stock exchange floor in person are over, most firms in today's world utilise algorithms to initiate trades for them at a much more efficient speed then once achievable, with the ability to make trades away from the stock floor it also enables financial institutions to make trades in different continents instantly as well.

How HFT works

There are different types of HFT, the main programme that it is known for is for making investments at rapid speeds to beat out competitors, the programme and definition mentioned above, but there are different strategies that can be used. There are methods used by traders to break up the costs of large trades, Bruno Biais describes it as “the splitting of large orders over time and across different trading platforms to achieve small execution costs” (Bruno Biais, 2014). The way HFT trades work are not all the same either, as some trades like mentioned aren’t designed to be the fastest around but their focus is to save as much money on purchasing of the trade. With HFT’s requiring so much data to be processed in real time they also require a robust data management system in order for them to process all the information without crashing and actually be able to make the trades at the correct moment with no delays to their system.

Positive of HFT

A major benefit for firms using these HFT systems is that it allows for them to use the information that is collected by the algorithms to make trades faster than the human trader would be able to. As a result of this high frequency information the systems can

then make small but fast and effective trades on the information it is collecting and by doing this allows them to create profit for themselves, this is supported by a study by Bruno Bias who states that “This supports the view that fast access to market data provides HFTs with an informational advantage. As a result, HFTs obtain small, but positive, profits per trade when using market orders” (Bruno Bias, 2014).

Downside of HFT

There are negatives for such powerful powers at play as well, as only institutions of certain stature are able to utilise the benefits that the algorithms provide. The high cost of implementing such systems into an organisation is a problem for smaller organisations as it creates a barrier to entry for small players to get involved or to generate returns as high as those attained by the larger financial institutes, “Yet, the possibility of trading on advance information on market data can generate negative externalities, e.g., induce less market participation by slow traders, overinvestment in trading technologies, and an increase in systemic risk” (Bruno Bias, 2014).

Market Volatility

Market Volatility is described by Forbes as “the frequency and magnitude of price movements, up or down. The bigger and more frequent the price swings, the more volatile the market is said to be” (Forbes). The price of a single stock can be effected by an influx of trades at a certain time whether that be by one entity or thousands of retail investors, an example of that would be “GameStop” when the reddit investors pushed its price up when 1000’s of shares were bought in a short span of time, “thousands of other retail investors put their money behind the company and bought the shares that hedge funds were betting against” (Cooper Hood, 2023).

Knowing that market volatility is caused by trades being placed in rapid succession on single stocks, it can be believed that the rate at which HFT’s are being used more and more by larger organisations that they can lead to an increase in market volatility over the years, “HFTs’ involvement in the fraction of shares traded is 71.6%, and they demand liquidity in 38.4% of all shares traded and supply it in 47.3%. In each panel and category HFTs’ fraction of activity increases with stock size” (Brogaard, 2010).

This proves that HFT has had an impact on the market volatility over the years and that the quick trades that are consistently occurring are beginning to equate for a lot of the markets actions. An outcome of this is that with such speed of trades there is always a possibility that market liquidity hit’s unstable levels “the speed and the

information-processing technologies which is naturally inherent to HFTs, can make market liquidity less stable over time" (Dion Bongaerts, 2015, PG.29). The downside of this, is that it can then lead to market failure in the wider market for a period, "HFTs can trigger periods of market failure that could not take place when market participants were only fast or possessed only superior information processing technology"((Dion Bongaerts, 2015, PG.29).

Subsection 4: Risk Advisory Divisions

What is risk

Risk management is not exclusively related to the financial industry, it is used in a variety of sector across the globe to protect each company and industry from failure. It is known defined as " the process of identifying, assessing and controlling financial, legal, strategic and security risks to an organization's capital and earnings"(IBM, 2024).

There are many reasons for organisations using risk management, but one of the biggest advantages of the system is to minimise losses amongst your organisation, when organisations are able to identify and asses risks it enables the organisation to take a proactive measure to minimize potential losses. In this section we will take a look at how AI has had an effect on risk management, we will look at whether it has made it more efficient overall or not. Finally we will look at how it has had an effect on risk management division exclusively in the financial market.

AI's involvement

Before the integration of AI, there were similar issues like the trades that are mentioned prior, the data that had to be analysed would have had to be manually and independently looked through for patterns or signs of a problem. When organisations are looking for fraud or trying to detect irregularities within the business the risk department would have to manually find these irregularities and report them which could result in missed cases due to human error or simply not enough resources or man power to find all risks, "traditional methods of analysis have become increasingly incapable of handling this data volume" (Deloitte, 2024). The inefficiency of the old method meant that when AI was introduced its ability in finding irregularities made risk management a much more efficient process now with the integration of machine learning "ML solutions are therefore able to generate large amounts of timely, accurate data, allowing financial institutions to build competence around customer intelligence,

enabling the successful implementation of strategies and lowering potential losses”(KPMG, 2024). With the knowledge that was gained from machine learning it enables these firms to be more proactive in their hunt for safety and security.

Fraud

In cases of organisations trying to identify fraud before the implementation of AI they had to ensure there was a set structure so that certain activities would trigger a warning and then a human would have to manually decide whether the suspected incident was indeed fraud or just a regular transaction which could occur over and over again. Now that AI has been developed with machine learning if they suspect something is fraud the programme will alert a human operative with notifications and send them the report, if it turns out to be a misidentification the human can programme the irregularity to not be alerted anymore and the AI will bypass similar instances, “if a cognitive system kicks out something that it determines as potential fraud and a human determines it’s not fraud because of X, Y, and Z, the computer learns from those human insights, and next time it won’t send a similar detection your way” (Deloitte, 2024). The benefit of such system is that it eliminates the need for the human to process through all the data and instead enables them to focus on more serious matters and once a correction is made in the system the AI can operate at a more efficient rate, which in return provides better quality reports for the human to navigate through.

Future proofing

There has been a concern that with the increased efficiency of AI that jobs will be displaced as AI learns how to develop cognitive abilities so it can carry out the job on its own in the future, but the goal behind AI’s inclusion in risk management is not to displace jobs but instead it is being futureproofed to allow augmentation and not replace people, the aim is to allow the AI to replace the routine time consuming tasks so that the humans are able to focus on more complex decision making strategies, and whilst the routine tasks are no longer consuming human time they are able to upskill to coexist with future developments that may lie ahead, “Regardless, appropriate training strategies are necessary to help workers develop technical, human, and conceptual skills; shift job roles; become flexible and coexist with AI systems in a technologically changing workforce” (Araz Zirar, 2023, Chp.7).

In the realm of the financial services the integration of AI extends beyond just risk management or trading, AI has allowed for a paradigm shift. The older more traditional methods were too labour intense and time consuming, as well as more inclined to error thanks to AI the data is analysed infinitely quicker and allows for more proactive approaches by strategy teams. Overall the inclusion of AI into the financial market has been a success to date and with the right training and planning it may allow for even more growth in the future as we have seen the market already reach new all-time highs, the future could look even brighter.

Methodology

Introduction

In this study the method that was decided on to be used to collect the findings was a qualitative research approach, instead of using a quantitative reporting style. When looking at what type of data needed to be collected during the study in comparison to how similar studies have collected their research, it was decided that the qualitative method was the method that was being used more frequently and will return better more decisive results to the research that this study is undertaking. The alternative option was to use a quantitative method such as sending out surveys, but when looking at the amount of data that needed to be collected as well as the specific type of detail needed in the answers it was decided that this approach was not suitable for this type of research. Throughout this study there is some pieces of literature that quote from studies revolved around this area who decided to use the quantitative approach, but as these were number based approaches that were put in place to see how the algorithms behaved instead of focusing on their results in the market they were able to follow a different approach. The report used literature such as “Assessing the impact of algorithmic trading on markets: A simulation approach” to collect information on AI’s behaviour, and with the information gained from these studies the report could then compare what has been reported and what has been said by participants and analyse the difference in the market in comparison to the perception of what has changed.

Research

When it was time to start collecting the data that would be required for the study, a comprehensive in-depth approach was used. When collecting the data it was ensured that I would incorporate both types of sources into the research. The first type of sources that were used were the primary sources, these are first hand sources such as interviews that helped shape the direction of the study and enabled the report to have a strong argument in the analysis below. A method to collect these sources was to conduct in-depth interviews with a broad and diverse range of individuals who have experience in the financial service industry. Another method was to conduct interviews which were a little less in-depth with participants who had experience in closely related fields such as risk departments, the basis for these interviews were to analyse the change AI has had in the financial sector but also to analyse the change AI has had

to industries that have a direct link to the financial market. The interviews were crucial in helping the study gain an insight into how the industry was behaving with AI, with the help of the participants the study was able to discuss how AI has changed the roles and responsibilities of individuals within the financial market and how they have had to come to adapt to the changes that AI has set in place to date, not just in their roles but they have had to deal with the shift that AI has in the entire industry. Also, these conversations were used to gain an insight into how individuals see AI impacting the future of their jobs we discussed if they believed their job was future proof and if they believe that the training they received or will receive will be enough to ensure they can upskill successfully, they also provided insight into the future of the entire industry from their perspective. Primary sources were key to the analysis, but the addition of many secondary sources helped played a pivotal role in shaping the literature review. This was due to the sheer excess of information available from academic articles to journals. These were used in helping build the argument put forward in the literature review, these sources served as a foundation and supporting act in the position that was taken up in the literature review, which was that AI has indeed had an impact in the financial market from its early introduction to the self-sufficient system it is today. By using both primary and secondary sources in this study, its aim is to provide a well informed and well-structured examination of the impact that AI has had in trading and finance, the two-prong approach helps to support the analysis with findings that have been put forward by other studies in the past as well as a new perspective from individuals witnessing a change in the industry first hand.

Participants

When selecting individuals to be interviewed one of the most important aspect was that they had relevance experience in the financial markets, whether it be current or past experience was not relevant, the most important part was that they had played a role within the industry. When looking for potential participants to interview with the study focused primarily on candidates who worked in Ireland, the focus was to look for participants who were working in the financial services in Ireland so they could provide what changes they have witnessed here but the study would also look at people abroad to gain insight into changes within the wider market. This study looked for participants who had more experience as they would be more inclined to have

witnessed the changes AI has made in recent years, although new individuals to the industry were also interviewed so we could analyse the difference between their vision into what they see the industry looking like with the advancement of AI in the future in comparison to that of their seniors who have seen changes happen already along the way. The study has a broad background it has conducted interviews with long term employees of major financial institutes such as PWC as well as interviewing newer junior analysts, the study didn't preference any one field but looked at sectors that could potentially link directly to the report such as trading divisions or risk departments, the aim is to find people who can give feedback that is directly linked to the literature review. In total the aim was to interview between 6 – 10 individuals with most coming directly from the finance industry as well as some coming from the IT side to give a better insight into the behaviours of AI and its algorithms. The belief is that if there are changes that were happening behind the scenes that the financial industry participants were not aware of then the IT specialist would be able to provide insight into these topics. After deciding what individuals should be interviewed for the study it was then time to get into contact with the participants, the method for getting in touch with people was to if possible directly send them an email and if it was not possible for this then a connection on LinkedIn would be sent and a message would be sent over after connecting. The approach for using LinkedIn allowed us to check participants relevant experience and then connect with them if they had met the criteria. When participants agreed to be involved in the study they would be sent a consent form and it would be signed from all parties involved and dated to the day of agreement, then we would agree on a location and date for the interview. This was the approach that was used during the project as it felt like a fair way to collaborate with participants as they had busy schedules so the interviews could be decided on a time that suited them, as well as ensuring that all candidates were to understand everything that would be needed from them in advance of the interview so they would be able to prep themselves effectively. During the process of getting all the participants to sign their consent form, I would explain to them everything that it address so all the ethical concerns that any participant may have about being a part of the study were addressed in advance. The form also noted that if at any time if required, a participant can request that their interview not be used in the study and that their name be refrained from being mentioned in the report, in the aspect of safety and privacy for all participants their names are extracted and instead nicknames or initial are used to identify each

participant. In terms of the storage of the audio recordings all audio was protected in a locked file upon completion and attached with a consent form the particular participant. For personal privacy reasons along with the nickname the participants employer is withheld from the study unless it was deemed necessary to ensure no breaches of privacy are being committed by the study or the said participant. Lastly, the college has an ethics form that must be completed in order for the study to take place any breach of that can lead to the termination of this study, the ethic form was to be followed and was followed to an exact by all members of this report.

Data analysis

After the interviews were completed they then had to be transferred from audio to physical data so they were transcribed. The in person and online interviews were both audio recorded on mobile devices so they had to be transcribed so the data could be analysed during the analysis and discussion section of the report. The audio was played back and analysed numerous times to ensure details were correct and to protect the integrity of the report. The online interviews were recorded by teams as well as an extra level of protection in case the audio file did not save, but once they were transcribed they were deleted for protection as it was not possible to secure the teams videos in a locked file. The findings in both types of interviews allowed for a discussion down below in which the study argues the points made throughout the literature review and discusses what perspective people have for job security in the future.

Limitations

In terms of limitations there were quite a few, the first limitation that was experienced during the study was ensuring that the sample size for the interviews were sufficient, the fear was that the study would not be able to reach the sample size that was envisioned for the report and ultimately that became a problem during the report. Throughout the project 4 interviews were secured from financial professionals and one was conducted from a member of the risk department of a financial institute but they worked in the AI sector of the risk department, the insight was deemed significant so was used throughout the discussion. Another limitation is that it was increasingly difficult to interview members outside of the financial market as they did not want to speak on topics they were not entirely sure of so it limited our diversification. Another limitation that was faced was due to there being no budget in this report there was no

incentive for participants to participate in the interviews outside their goodwill and once they would participate the process of manually transcribing all of the data and ensuring it is saved in secure files created for more labour required than initially thought as well as putting a constraint on time as it required significant attention to detail to ensure it was done properly. The final limitation encountered was that of personal bias throughout the reporting. The argument that Ai is going to replace jobs have been pushed by the media, especially in recent years and it has gotten to the point it is something to be taken as fact, so when approaching this study there had to be a self-evaluation in order to ensure that there was no bias when creating the questions and asking them during the interview, it was to be ensured that there was no way the questions could lead a participant down a path to answer how we wanted but it was to be fair and open as well as ensuring the data was analysed with no bias.

Future research

Looking forward AI still has plenty of development to undertake in the future, so far it is developing at a tremendous pace and will only develop more as time advances, due to this the need for future studies is crucial to maintaining an understanding of how AI has changed over time and how its future changes are changing industries and the regulations that protect these industries. This study may be used as a benchmark in future reports to compare and contrast the change it has undergone from the present to the future. Future studies may approach the reporting style differently and may use alternative strategies such as using surveys, by using other methods they may be able to uncover different results to this and find other notable differences. In future studies they may be able to analyse different sectors of the market, this report looked primarily at the stock market but future reports can take a deeper dive into how AI has changed the corporate banking world or the retail banking sector. They may analyse the more efficient processes that have been introduced with the Implementation of AI and how it has enabled retails to focus on less time consuming tasks.

Conclusion

In conclusion, when looking at how the study was analysed and how information was collected, the most descriptive and informative information that was collected was that of the interviews. The primary sources were pivotal in helping to support the argument built in the literature review and were used in the discussion for support. The insight gained allowed for the study to compare and contrast the information that we had

reviewed earlier in the literature review and allowed for the discussion and analysis to address the question we had of what has been changed by AI in the financial markets.

Findings

Introduction

In this section we will look at what data we have found from conducting the research for the study, the question set out was “what has been AI’s effect on financial markets and how can it be managed”. The view has been that AI has made major advancements to the way we use the financial market over the years, “In recent years, AI has started to revolutionize the financial industry in ways we could only have dreamed of in the past. AI-driven tools have streamlined operations, improved customer service and enhanced investment decision-making” (world economic forum, 2024). This section will take a look at what participants have had to say about each topic covered and where they see AI leading into the future.

Participants

There is a variety amongst the candidates that participated with two working in internationally recognised and esteemed finance organisations and the another candidate working in a major financial institute but as part of the technology risk department. In total there had been 3 interviews conducted during the dissertation with other candidates offering to answer any questions via email or messages, the candidates that didn’t conduct interviews were used in a supporting role to show correlation amongst the themes produced in the interviews.

Themes

During the interview stage and the back and forth emails with participants was when there was a theme discovered from the answers across the board with the data. The major theme that was uncovered was, at present the idea that AI has changed the way we work is not the case, participant 1 stated

“in my line of work I have not come across many noticeable changes from AI, I am aware it is being introduced but at present it seems to be very minimal in my department”. (Participant 1,2024)

Participant 1 does auditing for a large institute and stated there isn’t much of a difference now to when they began in their role even with the advancements made with AI in the last few years. Participant 2 states that

“AI has started to come into play in my department more and more but it hasn’t yet made a drastic change to how I need to prepare myself on a daily basis, although I can see that changing” (Participant 2, 2024)

even though there has been an introduction of AI similar to participant 1 the changes have been minimal to date but in the future they believe there may be more advanced changes coming. At present though the consensuses amongst employees in the financial sector is the change of AI has not been drastic enough for them to notice or for their work to have been affected in any meaningful way yet.

Key points

During the findings the research conjured up some key words and phrases that were regularly pointed out, all participants mentioned they are not fearful of AI, they mentioned that with the right training they will be able to grow alongside it. The key phrase that was mentioned by the participants was upskilling, showcasing it is clearly on the mind of employee's to ensure they do not get replaced.

Job displacement

Another theme that was covered was the impact that AI would have on employment levels and how employees skills would need to be improved to co-exist with the introduction of AI. Participant 1 stated that they don't see AI replacing people,

"it will more be a case of employers requiring people to learn new ways to work so that they can use the AI programmes being brought in" (Participant 1, 2024).

The belief amongst some participants is that if they ensure that they upskill they will not have to be replaced but instead can do the job they are asked to do with the assistance from AI. Participant 2 said that

"in our company over the last year or so we have been required to take classes to learn how to use AI effectively, management wanted to provide online resources so employees could manage the new systems that were to be introduced" (Participant 2, 2024).

The outlook from this is that if organisations provide the ability for employees to upskill and develop their skills it can enable them to utilise AI efficiently while benefiting the origination as they will not lose staff while improving the quality of their work force. Participant 2 mentioned that if employees utilise the training provide it can enable them to grow within their roles, the benefit this can create is that they can use AI to replace the mundane routine tasks and be more efficient with their time in turn bringing more value to the organisation. Overall the fear of job displacement has been something highlighted constantly with the advancements of AI but after conducting the research

it is clear that the employees are not too worried as long as they are provided with the ability to adapt to the new systems.

Risk management

As risk is a sector that is very broad and can be categorised differently, it was not a shock to find different departments have found variety levels of AI involvement in their day to day operations. According to participant 3

“AI has been implemented into our day to day to help identify fraud, it goes through a series of data and will flag cases which will be alerted to us” (Participant 3, 2024).

This is one of the implications of AI being integrated into the financial services but in the fraud department of risk, as mentioned risk is extremely broad and although there has advancements of AI in the fraud department the pace at which the involvement is not always the same. In the tech side of risk the involvement has been higher as it is trying to use AI to battle against the risks that other AI systems and growing technology can produce, according to Participant 2

“we have our own AI technology being developed, in our organisation we don’t use ChatGPT but instead have an internal AI system that uses the information from our database” (Participant 2, 2024).

One of the purposes of this is to combat the risk of using external AI services which could potentially pose a threat to the data the organisation manage, using an internal AI system allows for them to store all confidential information without running the risk of it being leaked or stolen from outside factors.

Ethical concerns

During the interviews there was the question asked of if employees had any ethical concerns about AI, the general theme was that most employees believed that AI was being introduced in a positive and ethical manor. The basis behind this question was to see if participants felt that there was a risk with AI being introduced to soon and not properly being regulated. Participant 2 was asked if they felt that it was too soon to introduce AI into the organisation the response was clear

“AI has been tried and tested in our company, like anything new there is going to be risks but we have ensured that the programme we use is secure and trustworthy” (Participant 2, 2024).

From this it is clear to see that the understanding at present from our data is that people are secure and confident in their organisations usage of AI, the feeling is that

they believe that if the organisations allow for transparency and confidentiality over quick time results then there should be no worries to move forward with AI in the company.

Summary of findings

In summary, after these interviews were conducted it was time to come up with a conclusion and from analysing the data it was clear to see there were some prominent themes throughout the data collection period. The most note-able observation was that the perspective on AI is not as negative at what we see in main-stream media, if basing all of your opinions from news outlets it is easy to fall into the perception that AI is taking peoples jobs and people are afraid of it, in contrary from conducting these interviews we were able to see that the overall perception from the participants is that addition of AI is welcomed.

From the interviews conducted, it is believed that the implication of AI will in turn be a good thing, the addition of AI will enable employee's to prioritise the more demanding functions of their jobs while AI can monitor and manage the repetitive tasks that used to take up so much time. From what was collected it seems employees are happy to use AI as long as it is implemented correctly and there is set offerings for employees to learn how to use the new systems to the best of their ability.

The assumption that AI will take away jobs from people has so far been discredited, it is believed that with proper implementation it will allow new roles to be made and as long as employees and organisations work in unison to provide efficient upskilling then the fear of being replaced can be forgotten and instead employees can look at developing their skills to further suit their new roles.

Finally, when looking back at the question of 'what has been AI's effect on the financial market' there has been dramatic change over the years but not in all sectors, the observations concluded have shown that in some areas such as risk management there has been implementation, but it has not had the same transformation in comparison to sectors like HFT which have been revolutionised.

Discussion

Introduction

Beginning this study the objective was to find what type of impact AI has made in the financial markets and do professionals see it remaining a positive. Throughout the report the aim was to gain insight from professionals and see if they had encountered

any changes as a result of AI. The questions asked were focused primary on what have they had to do to adapt to the changes if they have encountered any and do they believe their job is safe in the future or do they believe AI will replace them. I believe these questions allowed for the correct insight into the professionals mind, they allowed for the report to see if there were worries about being replaced and the answers we concluded shows how the fears of job displacement can be managed.

Summary of Key findings

As mentioned above, the most important piece of information that was uncovered during the duration of the study was the perception of job displacement is different from working professionals and the information available in the media. The participants have the stance that if they are trained properly and provided the correct support from their employers they will be able to upskill and maintain their jobs, whilst the media pushes the agenda that AI will replace jobs and leave people without work. Overall it is believed that when AI is introduced into the financial services it will be in a positive manor, with the correct steps ensured when integrating AI into an organisation they can elevate any worries staff may have about being displaced as they can learn ways to use the new systems to help fast track their jobs and make their work more efficient.

Interpretation of findings

In terms of what it means for the research questions, the results show that AI has already changed the way we the financial industry operates, AI has created new markets such as HFT and has transformed the old ways of trading into the new faster and more lucrative systems such as algorithmic trading, these are the changes which we have found through the literature review, the differences we can see upon the market now in contrast to before are massive. Risk management has completely changed, auditing has been streamlined with codes that can go through large quantity of data much faster than the accountant in charge of the code could. These changes signify the difference AI has had on the financial markets to date, but the question was also asked of how we can manage it correctly moving into the future. As we have become aware the perception of AI was that it was beginning to advance rapidly, and with that came a fear of job displacement and data leaks, but after the research had been conducted we were able to argue the point that AI will not replace employees but instead it will be brought in to alleviate the pressure of routine tasks. The study

shows that organisations can retain staff and reduce turnover if they provide adequate training, the benefit of this will reduce the cost of staff turnover and improve the organisations culture and moral.

Comparison with previous reports

When comparing this report to previous literature on the topic of how AI has made an impact in the financial services we are able to see some differences as well as some similarities. One of the difference that was uncovered is how much narrow AI is used over General AI, in the beginning the assumption was that most of the advancements of AI had come down to general AI and it's learning abilities but in reality the most effective advancements of AI have come as a result of machine learning as IBM stated "a set of rules or processes that are used by an AI system to conduct tasks, they are used discover patterns and data insights, or in some cases to predict output value" (IBM, 2024). This narrow AI code is used actively in the financial world to process data and manage the repetitive tasks, for example tasks that accountants have to do, a report from Forbes stated that "Accounting professionals use AI with data tools to analyze vast amounts of data with precision and speed, a task that once consumed significant human resources and time (Neil Sahota, 2024). These AI systems have made the most difference in the financial services to date and it is a stark contrast to the belief that general AI has been the main pusher in shifting how the financial industry operates.

Practical implications

Looking forward there may be some practical implications available for the world to use as a result from some of the information in the report. The outlook was that job displacement is meant to be a concern but this report argues that employees do not fear job displacement as much as to be believed. The application that can be provided as a result of this report is for organisations to provide structured training in the understanding of AI and allow employees to learn it at their own pace. If employees, especially long term employees are afraid of being replaced, organisations can allow them to upskill with courses on understanding AI which will allow them to feel more relaxed about their job security. Like participant 1 had said

"it will more be a case of employers requiring people to learn new ways to work so that they can use the AI programmes being brought in" (Participant 1, 2024).

As long as employers provide the right training methods the employees will learn and then be able to use these new AI systems required.

Limitations of the report

There were quite a few limitations faced throughout the duration of the report, one of the largest limitations faced was mentioned in the methodology, which was the difficulty in finding participants who were willing to volunteer to be a part of the study. Once the participants agreed the difficulties continued when conducting interviews and asking questions it was crucial to not ask anything biased or to lead participants to an answer I wanted. The limitations of this study did not stick solely to the interviews though, another problem faced was that this was a free study, there was no budget so therefore resources were not at the level of which they could be had the research been conducted by an organisation with the means to provide funding. Due to this and the fact it was a singular person reporting there was topics that were not covered which could provide valuable insight.

Future Research recommendations

As mentioned above there were some areas that were not yet covered which could lead to uncovering more insight into how far AI has changed the industry and how it may affect it. Overall more research is needed to see how organisations can balance their AI goals and keeping the employee satisfaction at a sufficient level. For specifics though I believe that there should be further studies done on other departments in the financial services. This report scratched the surface but I believe that further studies on aspects of how the coding is written and what it searches for should be looked at, when looking at HFT's and algorithmic trading an in-depth study could discover how organisations are planning to use AI to change the market again, soon we could go from paper trades to computer to fully automated AI stock markets.

Reflection

One of the challenge that was encountered during this report was the inexperience, this was the first time a report like this had ever been done and learning the methods to interview people and going about it in an appropriate and ethical manor were new situations. Luckily though moving forward this report can be a framework for me and allow me to create stronger reports which can further understand AI's impact on the financial industry.

Conclusion

In conclusion, I believe the argument can be made that AI has changed the financial industry to date extremely but overall the future is brighter than it is negative. The assumption that all employees will be replaced by the machine has been disproven and can be avoided if organisations ensure their staff are well trained on the matter of AI. I believe that the research has helped provide a basis for understanding the employees view on AI and that organisations should not fear integrating it once done effectively.

Conclusion

Firstly when looking at what type of role AI has played in the financial industry, I came to the conclusion that it has had a much larger positive impact than negative impact. Although it does have the ability to erase jobs, it comes with the ability to create many more as well as improve the standard of work in roles that already exist. It allows for organisations to erase the mundane repetitive parts of roles and instead allow employees to be more productive which in turn allows for more output. The adaptation of AI into the financial services has already had many key benefits and its advancements will only lead to more positives for the industry, the fears have so far been managed and if organisations ensure safety over profits then the implementation of AI moving forward in the industry could have extremely beneficial repercussions. In conclusion the report showcased that the initial thought that AI was a job replacing system that had fewer long term pro’s then con’s was deemed incorrect, after researching the conclusion was made that AI is more beneficial and if managed correctly the employees can work alongside it.

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