Impact of Artificial Intelligence on Financial Markets: Possibilities & Challenges

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Abstract: Man-made intelligence is the course of human insight executed by machines. Artificial intelligence advances the maintainable and robust utilization of assets. Information-driven organizations can upgrade choices and empower more exact expectations (Anastasi et al., 2021). In particular, a further developed computerized change procedure creates information from enormous datasets. In this way, executing artificial intelligence cycles will further develop bank representatives' efficiency. This paper includes monetary and non-monetary data to acquire a dependable image of organizations' presentations, and the yearly report is one of the principal hotspots for the dynamic course of financial backers in the monetary market. Hence, this exploration depends on the examination of 130 yearly reports for each of the 15 Jordanian-recorded banks from the timeframe of 2014-2022. Results suggested that AI has revolutionized algorithmic trading in financial markets. Algorithmic trading is the practice of using automated, computer-based systems to execute high-frequency and complex trading strategies. AI-driven trading algorithms can analyze massive volumes of historical and real-time data, identify patterns, and make split-second trading decisions. Results also suggest a clear upward trend in the increase in AI opportunities over the years, with values generally increasing from left to right. In 2014, the rise in AI opportunities was relatively low, at around 5.4. From 2015 to 2017, there was a steady increase in AI opportunities, with a more noticeable upward trend in 2017. The growth continued to accelerate from 2018 to 2022, with the most significant increase observed in 2022.

Keywords: Artificial Intelligence; Financial Market; possibilities; Challenges; Financial Business.

1. Introduction

Throughout the past many years, investigating artificial reasoning has included advancing clever machines that can operate undertakings requiring human knowledge [1]. Simulated intelligence utilizes PC frameworks and calculations to learn, reason, and settle on choices in light of information inputs.

Artificial intelligence advancements emulate human mental capacities and can dissect information, mechanize undertakings, and aid different areas [2]. Computer-based intelligence alludes to the logical field and innovation that includes the advancement of insightful machines fit for emulating human behavior and knowledge. The huge headways and practical utilizations of artificial intelligence began to pick up speed in the 21st century with the appearance of all the more remarkable processing frameworks and the accessibility of such information [3]. The particular execution of artificial intelligence will differ in light of the business, objectives, and accessible assets. For instance, to saddle the capability of artificial intelligence and gain the upper hand in their separate ventures, organizations have created in-house computer-based intelligence capacities, cooperated with fake intelligence arrangement suppliers, or used cloud-based artificial intelligence stages. The financial area is encountering further developed productivity, exactness, and customized client encounters because of simulated intelligence execution [4]. Bogus intelligence offers various opportunities for banks to build activities further and drive advancement: information examination, versatile learning stages, customized advertising, robotizing monotonous errands, chatbots, empowering normal language handling and voice acknowledgment, and executing risk-based prescient upkeep and misrepresentation location, among others [5].

Artificial intelligence is the course of human insight executed by machines. Artificial intelligence advances the maintainable and robust utilization of assets. Information-driven organizations can upgrade choices and empower more exact expectations [6]. In particular, a further developed computerized change procedure creates information from existing enormous datasets [7]. In this way, the execution of artificial intelligence cycles will further develop bank representatives' efficiency [8]. Past examinations demonstrate that banks have previously perceived cost decrease and income age through upgrading the nature of the cycle of the task, for instance, as far as loaning, security administrations, consistency enhancements, misrepresentation recognition, and new sorts of administrations [9]. Also, these redid arrangements and administrations furnish clients with customized venture methodologies, abundance-the-board strategies, and robo-consultants [10]. Presently, artificial intelligence assumes an essential part in independent dynamic cycles, screens resources and cycles continuously, and empowers esteem creation, and the advantages will increment proceeding. In the quickly developing scene of the financial area, the mix of computer-based intelligence holds vast potential for upgrading dynamic cycles and working on monetary execution [11]. While artificial intelligence can work on monetary announcing, it can likewise prompt inclinations, absence of straightforwardness, information protection concerns, and consistency challenges. Associations might confront work removal, preparation holes, high execution costs, interoperability challenges, and moral worries [11-12]. To alleviate these adverse consequences, associations ought to focus on mindful artificial intelligence rehearsals, put resources into information quality and administration, and address likely predispositions in simulated intelligence models. Remaining informed about guidelines and moral contemplations is additionally critical [13].

There are different inspirations for leading this review, including tending to partners' interests in regard to the responsibility and straightforwardness of computer-based intelligence frameworks. Straightforward revelation can draw in financial backers who esteem mechanically educated direction and possibly impact an organization's valuation and investor structure [14-15]. Besides drawing in financial backers, straightforward simulated intelligence revelation can line up with advancing administrative structures. As administrative bodies examine the moral and mindful mix of computer-based intelligence, organizations that reveal their bogus intelligence practices can show adherence to these rules, adding to consistency and a solid corporate standing [16-17]. These discoveries propose that computer-based intelligence applications are suitable for the financial area and advantageous for the two investors and

partners, as well as concerning expanded proficiency in the monetary area, which prompts economic advantages [18]. Nonetheless, measuring the connection between the utilization of simulated intelligence and bank execution is justified to investigate the degree to which artificial intelligence influences organizations, buyers, and the entire economy.

In spite of the open doors and advantages of the use of simulated intelligence, artificial intelligence revelation is as yet willful. The choice of whether to unveil, how much, and the kind of data is primarily passed on to the watchfulness of organizations. Until this point in time, there is no regularly acknowledged practice for the degree of simulated intelligence divulgence. Artificial intelligence applications are generally new [19]. There are no known committed worldwide detailing principles settled upon around here. The current artificial intelligence divulgence rehearses don't satisfactorily catch the one-of-a-kind effects of artificial intelligence. The absence of a shared vision and revealing principles for simulated intelligence prompts different divulgence works relying upon organizations' discernments [20]. The ascent of Man-made reasoning (bogus intelligence) significantly affects other businesses, and the monetary market is no particular case. Computer-based intelligence innovations, for example, AI and normal language handling, have changed the manner in which economic organizations work, changing dynamic cycles, risk-the-board procedures, client communications, and speculation [21]. This article investigates the groundbreaking effect of artificial intelligence on the monetary market, featuring its advantages, difficulties, and likely future ramifications.

1.1 Opportunities

1.1.1 Upgraded Information Examination and Experiences

Artificial intelligence calculations can handle tremendous measures of information with surprising velocity and exactness. This empowers monetary foundations to examine market patterns, designs, and authentic information all the more, prompting more educated direction [22]. Simulated intelligence-controlled examination instruments can distinguish complex connections, anticipate market developments, and create essential experiences, engaging dealers, portfolio chiefs, and hazard experts to pursue information-driven choices with higher accuracy [23].

1.1.2 Computerization and Effectiveness:

Artificial intelligence-fueled robotization smoothes out and streamlines various monetary cycles, helping functional productivity [24]. Undertakings like information passage, compromise, misrepresentation identification, and consistency checking can be computerized, diminishing human mistakes, further developing adaptability, and saving time. This mechanization permits monetary foundations to zero in on higher-esteem exercises, like system advancement, development, and client assistance, prompting upgraded, generally speaking, execution [25].

1.1.3 Algorithmic Exchanging and Quantitative Examination

Artificial intelligence has catalyzed the development of algorithmic exchange, where modern calculations execute exchanges in view of predefined measures. These calculations can handle massive measures of constant market information and respond to changes in milliseconds, empowering foundations to exploit market unique open doors and execute exchanges with diminished idleness [26-27]. Also, artificial intelligence calculations help in the quantitative examination, helping financial backers think up and streamline speculation procedures in view of verifiable information, market opinion, and different pointers [28].

1.1.4 Risk The Executives and Misrepresentation Location

Artificial intelligence has fundamentally further developed the risk the board rehearses in the monetary market [29]. AI calculations can examine and distinguish examples of expected risk, empowering foundations actually to recognize and relieve gambles more. Extortion identification frameworks controlled by computer-based intelligence calculations can break down vast volumes of exchanges and identify dubious exercises progressively, limiting monetary misfortunes and improving safety efforts [30].

1.1.5 Customized Client Experience

Computer-based intelligence-driven advancements improve the client experience in the monetary market. Remote helpers and chatbots outfitted with standard language-handling capacities can give customized suggestions, answer client questions, and help with fundamental exchanges [31]. Artificial intelligence calculations can examine client information, including inclinations, conduct, and verifiable exchanges, to offer custom-made monetary items and administrations, further developing consumer loyalty and faithfulness [32].

1.1.6 Challenges

While the effect of computer-based intelligence on the monetary market is groundbreaking, it likewise presents difficulties [33]. Issues like information protection, algorithmic predispositions, administrative consistency, and network safety should be addressed to guarantee moral and mindful artificial intelligence reception. Besides, the potential interruption brought about by simulated intelligence and mechanization might require the retraining and reskilling of the labor force [34].

2. Related Work

Man-made Intelligence Suggestions in the Financial Business The most recent tech advancements that have altered computerized business are simulated intelligence, AI, colossal information examination, distributed computing, and virtual entertainment [35]. These advancements are utilized in the everyday existence of present-day culture. Innovation changes physical, substantial things, adds to activity improvement, and advances skill and capacity for future business arrangements [36]. Simulated intelligence's capacities work on its applications. First and foremost, bogus intelligence can estimate what is happening through the handling of sound, text, and computational semantics in the general climate.

Furthermore, simulated intelligence depends on language and importance through regular language handling (NLP) and helps people conform to machines through related computer-based intelligence calculations [37]. At extended last, computer-based intelligence programming frameworks can act alone without human commitment [38]. Additionally, unlike customary machines, artificial intelligence might improve itself all the time because of its self ability to learn in light of past activity encounters.

The new advanced arrangements are continuously changing the serious procedures utilized in business and adding new ways to deal with esteem creation [39]. There is expanding attainability of the use of chatbots by the financial industry. For instance, a chatbot uses regular language innovation to tackle the client's concerns [40]. The utilization of chatbots in the monetary area has changed critical thinking and replying to shoppers' questions. Chatbots fathom composed and spoken text and can answer ambiguous inquiries and talk with different entries or online information stores [41]. Chatbot advancements handle enormous quantities of calls from clients and upgrade clients' fulfillment and trust in financial administrations and their apparent value [42-43]. Additionally, chatbots handle a more significant number of records than human counselors at lower functional expenses and boost benefits [44]. Besides, the all-day, everyday accessibility of online evaluation chatbots has made tasks more adaptable, prompting a lessening in the utilization of actual bank offices [45].

For the most part, banks use programming like UiPath, Computerization Anyplace, Blue Crystal, end-client gadgets, robots, programming, and artificial consciousness specialists to help the course of dreary financial activities [46]. The presentation of artificial intelligence improves and works on the course of decision-making while at the same time proceeding to submit to guidelines. Simulated intelligence can diminish the number of bogus agreements, enhance the expectation of functional assets [47], and achieve compliance with administrative necessities [48-50]. Various current computer-based intelligence strategies have been used by banks to lessen deceitful cycles, for example, information mining, fluffy rationale, AI, grouping arrangement, and hereditary programming [51]. Banks have further developed their interaction speed, precision, and productivity using independent information from the executives [52].

A prescient examination can stop extortion occurrences before they occur through a few innovations, for example, a Secure Attachment Layer (SSL) for online exchanges, encryption information capacity, staggered approval, gadget fingerprinting, malware location, token passwords, marking exchanges, and endpoint insurance [53]. Banks have used profound learning and fake brain networks in customized retail banking to evaluate their exhibition in direct showcasing and figure out which clients are probably going to acknowledge advertising recommendations. Computer-based intelligence upgrades the speed of the cycle, diminishes cost-related issues, lessens functional dangers, and further develops know-your-client processes using chatbots and robot counsel administrations [54].

3. Materials and Methods

In view of a substance examination of 115 yearly reports for 15 Jordanian-recorded banks from the period 2014 to 2021, the outcomes show an expansion in artificial intelligence-related watchwords revelation in the annual reports of Jordanian-recorded banks from 2014 to 2021. The outcomes additionally demonstrate that computer-based intelligence-related watchword exposure affects banks' monetary exhibition. Computer-based intelligence-related term revelation decidedly affects bookkeeping execution in terms of ROA and ROE. It adversely affects the bank's complete costs, which upholds the prevailing perspective that artificial intelligence further develops income, lessens cost, and is predictable with past writing discoveries. This study adds to the developing assortment of fake intelligence writing.

To begin with, it decides the spread of computer-based intelligence-related term exposure in Jordanian banks by shaping an underlying computer-based intelligence-related term revelation file. Second, it gives bits of knowledge into the connection between computer-based intelligence exposure and monetary execution. The discoveries of this study add to policymakers', worldwide specialists, and administrative associations' endeavors to address simulated intelligence revelation issues and feature the requirement for divulgence direction necessities. Besides, the review gives a commitment to banking area professionals who are changing their tasks involving computer-based intelligence systems and supports the requirement for additional artificial intelligence revelation and informed dynamics in a way that lines up with the targets of monetary establishments.

3.1 Research Design

3.1.1 AI Disclosure

Following the motivation behind this review, the Researcher utilized the substance investigation strategy for estimating levels of computer-based intelligence revelation and producing a starter rundown of computer-based intelligence watchwords. Past investigations have applied comparable cycles [55]. Specifically, the choice of artificial intelligence revelation-related things is done in three phases. Right off the bat, Researchers make a computer-based intelligence revelation record through a far-reaching survey of computer-based intelligence parts that have been, for the most part, referenced in the money area by

related proficient associations like the FSB [56]. For instance, the computer-based intelligence File Report 2019 features the terms most frequently referenced in the money area, including "Artificial intelligence," "Enormous Information," "Cloud," and "AI" [57], in view of the recently related writing that uses different self-built divulgence intermediaries' actions. With regards to artificial intelligence [58], applied content investigation to the yearly reports of Malaysian freely recorded organizations, looking for the words "Man-made brainpower," "AI," and "Large Information." [59] led a substance examination and characterized the computer-based intelligence applications in USA banks; "Mechanical Cycle Mechanization," "virtual specialists," "normal language text getting it," "AI," and "PC vision" are referenced as often as possible. [60] directed content examination of European recorded organizations, and they recognized search watchwords things including "computerized reasoning," "AI," "automat," and "calculation" [61].

3.1.2 Sample and Data

Monetary examiners utilize both economic and non-monetary data to acquire a dependable image of organizations' presentations, and the yearly report is one of the principal hotspots for the dynamic course of financial backers in the monetary market [62]. Hence, this exploration depends on the examination of 130 yearly reports for each of the 15 Jordanian-recorded banks from the period 2014-2022. The majority of the annual reports are accessible as a PDF rendition for all Jordanian banks on their sites. The significant words are looked at being those recently referenced in the setting examination. The newly made watchword dataset, in view of the yearly reports, gives bits of knowledge into the improvement of artificial intelligence reference.

4. Results and Discussion

Table 1. Artificial intelligence disclosure is year-wise.

Year	AI frequency	Percentage
2014	71	2%
2015	74	2%
2016	120	3%
2017	221	4%
2018	265	12%
2019	294	13%
2020	498	14%
2021	551	24%
2022	750	26%
Total	2844	100%

Table 1 suggests that In 2014 and 2015, AI disclosures were relatively low, with 2% of the total each year. In 2016, there was a noticeable increase in disclosures, accounting for 3% of the total. The year 2017 saw further growth, with AI disclosures representing 4% of the total. The most significant increase occurred between 2017 and 2018, when the number of AI disclosures more than doubled, jumping from 221 to 265,

and the percentage increased to 12%. This trend continued in 2019 and 2020, with 13% and 14% of the total disclosures, respectively. In 2021 and 2022, there was a substantial surge in AI disclosures, with 24% and 26% of the total, respectively. The total number of AI disclosures over the entire period is 2,844, with each year contributing to this total in varying proportions. Overall, the table illustrates a clear upward trend in AI disclosures, indicating an increasing interest and investment in artificial intelligence projects over the years, with a significant acceleration in recent years (2021 and 2022).

Table 2. Descriptive statistics

Variable	Obs No.	M	Med	SD	Min	Max
AI	125	21.67	13	19.61	2.00	120.00
Opportunities	127	6.79	6.81	4.21	1.76	118.00
Challenges	126	6.54	6.71	4.19	1.57	115.81

Table 2 shows the descriptive analysis for the "AI" variable. The data has a relatively high mean (21.67) and standard deviation (19.61), suggesting a wide range of values with some potentially high outliers. The median (13) is lower than the mean, indicating that the data may be right-skewed. The "Opportunities" variable has a mean (6.79) and median (6.81) that are pretty close, showing a relatively symmetric distribution. The standard deviation (4.21) suggests moderate variability in the data. The "Challenges" variable also exhibits a mean (6.54) and median (6.71) that are relatively close. The standard deviation (4.19) is similar to that of the "Opportunities" variable, indicating moderate variability.

Table 3. Correlations of variables

	1	2	3
AI	0.21***	0.00**	0.01**
Opportunities	-	-	0.03**
Challenges			-

Table 3 suggested a positive correlation of 0.21 (***), with a high level of statistical significance, between "AI" and "Opportunities," indicating that as the variable "AI" increases, the variable "Opportunities" tends to increase as well. In other words, there is a strong, positive relationship between AI initiatives and the opportunities they present. The correlation between "AI" and "Challenges" is very weak (0.00 **) but still statistically significant. This suggests that there is little to no linear relationship between AI initiatives and challenges. While statistically significant, the correlation is not practically significant. The correlation of 0.03 (**) between "Opportunities" and "Challenges" is statistically significant but remains relatively weak. It indicates that there is a slightly positive relationship between the variables "Opportunities" and "Challenges," suggesting that when opportunities increase, challenges also tend to grow, but the relationship is not very strong. In summary, this table provides insights into the relationships between the variables "AI," "Opportunities," and "Challenges," along with information about the strength and statistical significance of these correlations.
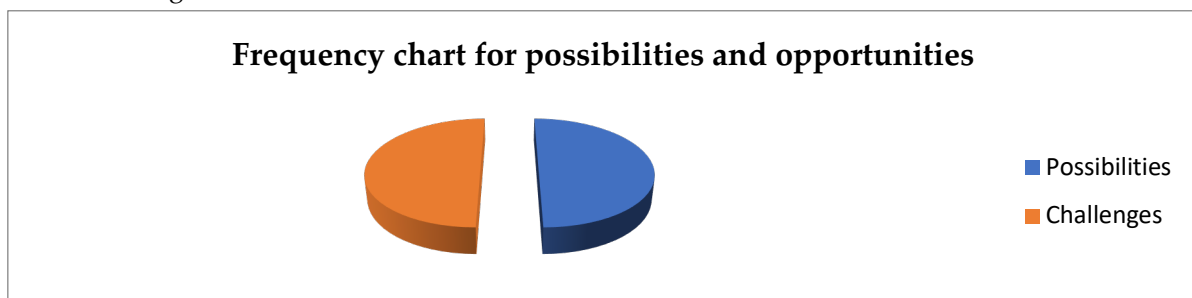

Figure 1. Frequency Graph for Possibilities and Challenges
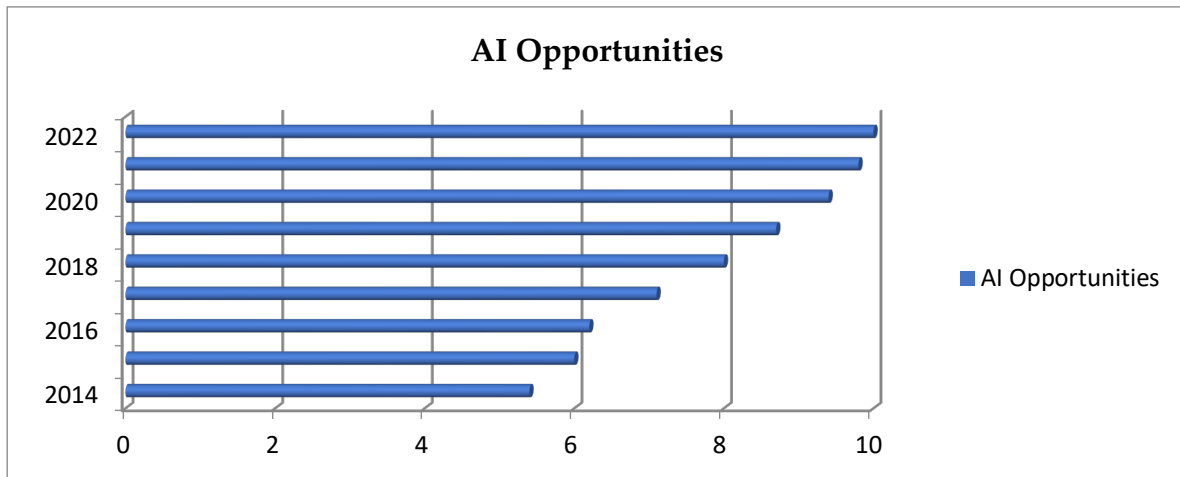
Figure 2. Increase in AI opportunities Year-wise

Figure 1 shows an equal frequency of artificial intelligence opportunities and challenges as well. Figure 2 shows a clear upward trend in the increase in AI opportunities over the years, with values generally increasing from left to right. In 2014, the rise in AI opportunities was relatively low, at around 5.4. From 2015 to 2017, there was a steady increase in AI opportunities, with a more noticeable upward trend in 2017. The increase continued to accelerate from 2018 to 2022, with the most significant increase observed in 2022, reaching approximately 10. This suggests a substantial expansion in AI opportunities in the most recent year. The graph provides a visual representation of the growth and development of AI opportunities, indicating that there has been a consistent and substantial increase in opportunities over the years, with the most significant surge occurring in the latest year, 2022. This information can be valuable for understanding the evolving landscape of AI opportunities.
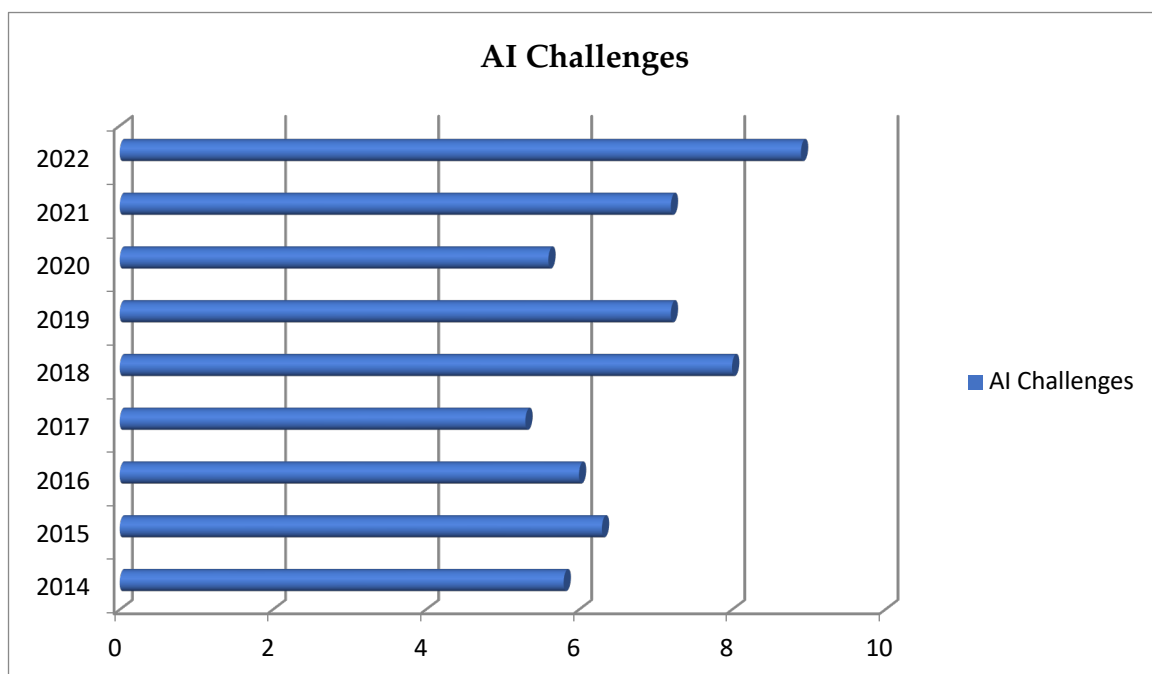

Figure 3. Increase in AI challenges Year wise

The figure illustrates the variations in the increase in AI challenges over the years. In 2014, the rise in AI challenges was relatively low, at around 5.8. There was a slight increase in challenges from 2015 to 2016, followed by a dip in 2017. This suggests that the difficulties fluctuated during this period. In 2018, there

was a significant increase in challenges, reaching 8, indicating a substantial rise in AI challenges. The following years (2019 to 2021) saw fluctuations in AI challenges, with some years having values around 7.2. In 2022, the graph shows a significant increase in AI challenges, reaching 8.9, which is the highest value in the dataset. This suggests a notable increase in challenges in the most recent year. The graph provides a visual representation of the changing landscape of AI challenges over the years, with fluctuations in some years and more substantial increases in others. The peak in 2022 indicates that AI challenges have become more pronounced in that year, which could be of interest to those monitoring or addressing AI-related challenges. The integration of Artificial Intelligence (AI) into various industries has left no stone unturned, and the financial markets are no exception.

The power of AI technologies, including machine learning, deep learning, and natural language processing, has ushered in a significant transformation in the world of finance [50]. This essay delves into the possibilities and challenges presented by AI in the financial markets, focusing on its implications for trading, risk management, and regulation. AI has revolutionized algorithmic trading in financial markets [42]. Algorithmic trading is the practice of using automated, computer-based systems to execute high-frequency and complex trading strategies. AI-driven trading algorithms can analyze massive volumes of historical and real-time data, identify patterns, and make split-second trading decisions. This not only enhances the efficiency of trading but also minimizes human errors. Traders can capitalize on arbitrage opportunities and execute trades with remarkable precision [53]. Predictive analytics, underpinned by AI, empowers financial institutions to predict market trends and make well-informed investment decisions [35]. Machine learning models can scrutinize historical price data, news sentiment, economic indicators, and other pertinent information to forecast the future direction of various assets [60]. Investors can harness these predictions to optimize their portfolios, manage risks effectively, and augment their returns [39]. AI plays a pivotal role in risk management within financial markets. Rigorous risk assessment and mitigation are fundamental to successful investment and trading.

AI models can scrutinize a multitude of risk factors and market conditions to evaluate portfolio risk [45]. They can also issue early warnings regarding potential market downturns, enabling investors to adjust their strategies and mitigate potential losses. AI's contributions extend to fraud detection and cybersecurity, bolstering the integrity of financial markets [51]. Comprehending market sentiment is pivotal for making informed trading decisions. AI, mainly through natural language processing, can analyze news articles, social media posts, and other textual data to gauge market sentiment [62]. Traders and investors can use this information to gain insights into public perception and assess its potential impacts on asset prices. AI-driven chatbots and virtual assistants have transformed the way financial institutions interact with their customers. These tools offer personalized financial advice, portfolio management, and round-the-clock customer support. This personalization of financial services enhances customer engagement and satisfaction [62]. AI's profound influence in financial markets also brings forth the challenge of data privacy and security. Financial institutions deal with vast volumes of sensitive data, and AI systems necessitate access to this data for effective operation. Ensuring the safeguarding of this data against cyber threats and unauthorized access is of utmost importance.

The risk of data breaches, insider threats, and malicious attacks poses a significant challenge. AI models are only as good as the data they are trained on, leading to concerns regarding bias and fairness. If training data exhibits bias, AI systems may inadvertently make biased decisions, leading to unfair treatment in financial markets. For example, AI algorithms used in lending or credit scoring may inadvertently discriminate against certain groups of people. Regulators and financial institutions must address this challenge to ensure fair and equitable market practices [62]. The adoption of AI in financial

markets has given rise to several regulatory and ethical concerns. Regulators need to establish appropriate frameworks to oversee AI-based trading and ensure market stability. Additionally, questions about accountability and transparency in AI decision-making processes need to be addressed. Ethical dilemmas also surface, such as when AI algorithms prioritize profits over ethical considerations [15]

While AI can help manage risks, it can also introduce new risks into financial markets. The interconnectedness of AI systems can lead to systemic risk, where a single failure or error can cascade throughout the financial system [28]. It is crucial to establish robust risk management protocols to address this challenge and prevent potential market crashes [24]. The integration of AI in financial markets necessitates a skilled workforce that can develop, maintain, and improve AI systems. However, there is a significant talent gap in the field of AI, particularly in finance. Recruiting and retaining qualified professionals to work on AI projects is a challenge for many financial institutions [57]. Overreliance on AI systems can also be a challenge. Traders and investors may become too dependent on AI for decision-making, potentially neglecting the importance of human judgment and intuition. Striking a balance between AI-driven decision support and human expertise is essential [59].

5. Conclusions

In conclusion, the integration of Artificial Intelligence into financial markets is a double-edged sword, offering exciting possibilities while presenting complex challenges. The potential for AI to revolutionize algorithmic trading, predictive analytics, risk management, sentiment analysis, and personalized financial services is immense. However, these possibilities are accompanied by issues of data privacy and security, bias and fairness, regulatory and ethical concerns, systemic risk, a talent gap, and the risk of overreliance on AI. To unlock the full potential of AI while addressing these challenges, a collaborative and multifaceted approach is imperative. Financial institutions, regulators, and AI practitioners must work together to strike the right balance. Robust cybersecurity measures, transparency, and accountability in AI systems are essential to safeguard data privacy and security. Mitigating bias and ensuring fairness requires data auditing, transparency, and model interpretability. Regulatory frameworks need to be established to oversee AI-based trading and address ethical concerns. Managing systemic risk demands early warning systems, stress testing, and contingency plans. Bridging the talent gap necessitates investment in education and collaboration with external experts. Lastly, promoting human-AI collaboration is crucial to prevent overreliance on AI. In this evolving landscape, collaboration is the key to realizing the benefits of AI while mitigating its risks. The financial industry must adapt to this new era of technology, ensuring that AI serves as a valuable tool rather than an unpredictable force. By navigating these challenges together, financial markets can harness the full potential of AI, ushering in a new era of efficiency, innovation, and responsible financial practices. The journey to achieve this balance will be a collective effort, but the rewards are well worth the endeavor.

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