Artificial intelligence application and research in accounting, finance, economics, business, and management

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Abstract

Artificial intelligence is a branch of computer science that develop intelligent machines to perform human tasks. Recently, there is growing interest in AI applications in professions that have many processes that can be easily automated. There is widespread optimism that AI systems can lead to new innovations or improve existing processes. This study focuses on some applications of artificial intelligence in the accounting, finance, economics, business, and management profession. The study provides a basic understanding of how AI will be useful in the accounting, finance, economics, business and management professions. The study also offered some insights into the risks posed by the use of artificial intelligence.

Keywords: Artificial intelligence, AI, machine learning, accounting, finance, economics, business, management.

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1. Introduction

This paper presents some applications of artificial intelligence in the accounting, finance, economics, business, and management profession.

The rise of artificial intelligence in business can be traced to the rise of Fintech [1]. Few decades ago, there was a rapid rise in Fintech developments. During this time, innovative technologies were used to deliver financial solutions through software [2]. These technologies were also used to develop software to support accounting professionals and business analysts in their work [3]. But these technologies did not have the capacity to anticipate the needs of users or to suggest innovative solutions by itself to users. In other words, these technologies lacked human-like features. This led to the need to develop advanced technology solutions that will offer basic solutions in business, anticipate user needs and suggest innovative alternatives to users. This led to the development of artificial intelligence technologies that mimic human behaviour and perform human tasks.

Today, artificial intelligence is widely seen as the use of intelligent machines to perform human tasks [4]. Artificial intelligence has grown beyond being a hype. It has become a disruption that cannot be stopped even though AI developments can be slowed down by regulation [5]. Corporations are already adopting AI to improve their processes, and it has the potential to make a significant difference in certain professions, but whether the big difference it makes is a good thing or a bad thing is a question of 'ethics'. Some professions that AI will affect are the accounting, finance, economics, business, and management professions because these professions have numerous processes that can be easily automated, and they also have processes that require data which AI can collect and process efficiently. This has led to widespread interest in AI applications in the accounting, finance, economics, business, and management professions. Therefore, there is a need to understand how AI may affect these professions.

The study explains how AI might be useful in the accounting, finance, economics, business and management professions, and the risks of AI. The study does not examine in detail the harm that AI pose to these professions. It only focuses on the potential applications of AI in these professions. By focusing solely on the application of artificial intelligence in the accounting, finance, economics, business and management profession, this article hopes to provide another viewpoint on how to think about the role of AI in these professions. The

discussion in the articles contributes to the existing AI literature that examine the impact of technology in corporations and in society [6,7,8,9,10].

The remaining section of this article is structured in the following way. Section 2 discusses some applications of AI in the accounting profession. Section 3 discusses some applications of AI in the finance profession. Section 4 discusses some application of AI in the economics profession. Section 5 discusses some application of AI in the business and management profession. Section 6 highlight some risks associated with AI. The conclusion of the study in presented in section 7.

2. Literature review

The existing literature has offered arguments for and against AI in the accounting, finance, economics, business, and management disciplines. For instance, [11] conducted a review of studies that analyse the impact of AI on accounting and found that majority of the studies predict a positive impact of AI systems in the accounting process. [12] suggest that AI might be more helpful in internal control functions as it can assist managers in generating decision-useful accounting information. This will help to reduce internal control weakness and improve audit quality. [13] took a more pessimistic stance towards AI and argued that while AI may improve efficiency and reduce risk, AI is a double-edge sword because it can make accounting professionals to lose their jobs if accounting professionals do not upgrade their computer skills to meet the needs of the industry. [14] contradict the argument of [13], by arguing that AI will not lead to loss of massive jobs; rather, it will create new jobs for accountants because AI systems cannot make decisions by themselves. This means that accountants will be needed to make decisions using the outputs produced by AI systems. [15] examined the potential effect of artificial intelligence on new-generation accounting professionals using qualitative document analysis and found that new generation accountants raised concerns that they think AI systems will replace their jobs. The authors then suggest that accountants must learn to adapt with AI systems for them to remain relevant. In response to this concern, [16] suggest that higher institutions should prepare the future accountant for the realities of the AI world by teaching them computerized accounting and how to interpret the output produced by accounting software. [17] also emphasised the need to prepare accounting educators, standard

setters, regulators, and students for the challenges of the AI world so that accounting jobs can be preserved.

In the AI-finance literature, [18] examined the effect of AI on digital finance and found that AI can enable people to participate in the financial system. [19] undertook a literature review to determine the applications of AI in banks. They found that AI is helpful in reducing losses that arise from bank lending. It also increases the speed of payment processing, it enables seamless compliance in regulatory reporting, and it improves banks' service to their customers. [20] present an overview of artificial intelligence in finance and found that the finance industry is relying on AI-based computational methods to develop complex models that generate new information. They further argue that AI is also helping to transform trading and investment decisions. [21] showed that AI has a major application in financial technology (Fintech) and that AI-led Fintech is leading to more personalised products, services, and applications. [22] showed that artificial intelligence in finance is encouraging fruitful mergers and acquisitions among financial institutions and financial technology providers, and it has also led to increased volatility, uncertainty and complexity in the investment and wealth management field of finance. They identified other risks of AI in finance which are the bias in AI data and the poor choice of AI algorithm. [23] also argue that AI in the financial sector is leading to the development of complicated and complex financial products and systems that have both benefits and unknown risks. [10] show that artificial intelligence can support financial inclusion efforts by improving efficiency and the risk management function of financial services providers, providing smart financial products and services to banked adults, simplifying the account opening process for unbanked adults and creating credit scores for unbanked adults using alternative information.

In the economics profession, [24] argued that AI can affect economic growth. They argued that when AI is introduced into the production of goods and services, it would automate production and stabilise per capita GDP growth. They further argued that AI can increase growth depending on how AI is introduced into the production process. They further point out that AI can limit population growth and lead to exponential growth in GDP per capita. [25] argued that AI in economics leads to the creation of a new type of economic agent, and it will lead to micro-division of labour and greater triangular agency relationship. It can lead to market dominance and push labour out of the labour market. [26] argued that AI can increase efficiency, but its disruptive effect on the economy and society are enormous as it can lead to the emergence of super firms that create undesirable monopoly or oligopoly, it will widen the gap between

developed and developing countries, and it will lead to the demand for workers with AI-relevant skills while rendering traditional labour redundant. [27] argued that AI in economics may be challenged by intellectual property policy, labour and antitrust policies which will seek to mitigate the negative consequences of AI on unemployment, inequality, and competition. [28] argue that artificial intelligence (AI) will affect the economy through increase in AI-related activity which will increase productivity growth but will also lead to massive job losses in the labour market and a widening of income inequality as people with AI relevant skills will be paid more than people doing menial jobs. [29] state that AI can lead to positive effects in the economy if workers are full insured against the adverse effects of AI innovation and if there is a mechanism for income redistribution, but this type of economy does not exist because people will not be insured against the adverse effect of AI innovation. [30] showed that AI systems can assist central bank economists in detecting financial stability risks, automating central banking operations and in searching for granular micro economic/non-economic data that can support central banks in making policy decisions.

In the business and management field, [31] showed that AI can solve some problems in business management. They show that AI can be used to detect abnormal patterns, or to forecast future events or to automate a process in business. [32] suggest that AI is relevant in business management because it offers benefits such as increasing efficiency and productivity, improving accuracy, and enhancing customer experience. The author also identified some challenges of AI in business management which include data quality, lack of AI skills and expertise, ethics and bias, and interoperability issues with existing systems. [33] argued that AI is mostly used in business to analyze data, gain insights, and make informed decisions, and it is very relevant in predictive analytics. It can help companies to unravel hidden patterns and trends which would enable businesses to make accurate forecasts. [34] examined the implications of artificial intelligence (AI) and found that AI increases innovation and entrepreneurial activities which has a positive impact on businesses and society. [35] suggest that AI will have two effects in business management. It may either lead to business automation which means that machines will take over human tasks, or it can lead to augmentation which means that humans will collaborate with machines to perform tasks, and the choice of the two depends on organisational choice and the business need at a particular point in time.

3. Artificial intelligence applications in accounting

Accountants or accounting professionals often follow long-established methodologies and professional standards to analyse information and prepare reports. Artificial intelligence tools for accounting have emerged and are embedded in accounting software and internal control systems. AI-based software and systems are able to accurately automate accounting, tax, and audit tasks, and provide result to accounting professionals who will use their professional judgment to review the produced information. AI will bring a major disruption to the accounting profession by automating most accounting processes. As a result, it is anticipated that AI could lead to 94% job losses in the accounting profession in the next 20 years according to a report published in The Economist[1]. Despite this, AI offers many benefits to the accounting profession such as saving time, improving accuracy, faster analysis, continuous accounting, and active insights. Example of AI products or services that can aid the accounting profession are Vic.ai, Indy, Docyt, Booke AI, Truewind, Gridlex Sky, ZENI.AI, Blue Dot, Bill & Divvy and Sage Intacct. Let's now turn to some of the possible applications of AI in accounting.

- **Complete automation** – AI-based systems can be used to automate bookkeeping, tax, and audit tasks and provide result to accountants so that they can use their professional judgment to review and use the produced information.

- **Clearing invoice payment** – AI algorithm can be trained to analyse invoice payment data, clear out invoices and generate new invoice payments. AI can also be used to quickly match multiple payments and invoices using some pre-set criteria.

- **Efficient auditing** – AI can help companies to comply with the company's accounting policies and regulatory policies. AI can also be used to detect and flag inaccurate data entries for review or approval by a human accountant. It can also eliminate the long hours that would be used to manually identify inaccurate entries.

- **Artificial fiduciaries** – AI systems can be developed to become better fiduciaries than human accounting professionals because AI systems can be trained to make sound decisions and to become artificial fiduciaries that are less prone to errors and undue influences.

[1] https://www.economist.com/briefing/2014/01/18/the-onrushing-wave

- **Financial reporting** – AI systems can be used to produce quality financial reports, store financial reports, compare the financial reports of many companies in a given period, and compare the financial reports of a company over time, and with no human error.

- **Client communication** – Accountants can use AI chatbots to handle routine client inquiries and provide support to suppliers and customers, to free up accounting staff so that they can focus on more important accounting tasks.

- **Sales or revenue forecasting** – Accountants can use AI systems to analyse trends in past and present sales or revenue data in order to make accurate predictions about future sales or revenue. This will help accountants and companies in planning and budgeting.

- **Fraud detection and protection** – Accountants can use AI algorithms to analyse financial data and detect abnormalities that could point to fraudulent activity.

- **Effective data analysis** – AI can help accountants to analyse historical data quickly and identify patterns that aid present and future decision-making.

- **Intelligent financial analysis** – AI algorithms can analyse large financial data, identify patterns, trends, and anomalies, and provide valuable insights. AI algorithms can also assist in cash flow forecasting, profitability analysis and trend identification to reduce cost, maximize profitability and identify areas for improvement in the company.

- **AI-assisted research** – Accountants can use AI systems to assist in conducting research related to changes in accounting standards, taxation, and regulation each year. AI can also assist accountants in conducting research on the emerging financial and macroeconomic factors that could affect revenue.

- **Automating supplier acquisition and procurement processes** – Accountants can use AI systems to evaluate existing supplier data to determine if specific suppliers should be retained and whether more suppliers need to be reached and with minimal human intervention. AI systems can also be used to eliminate the onerous paperwork involved

in purchasing and procurement processes. This will ensure a more seamless procurement process.

4. Artificial intelligence applications in finance

Artificial intelligence in finance means using computers and machines to perform finance functions and to manage money more effectively. AI is commonly applied in financial services to increase efficiency, accuracy, speed, optimize processes, automate processes and to serve customers better. This is often achieved by embedding AI algorithm or AI systems into the core and non-core systems used by financial institutions to assist finance professionals and managers in making important business decisions and in meeting the needs of their clients. Presently, there are many AI systems for lending (e.g., Enova, Ocrolus, DataRobot, Scienaptic AI, Zest AI, underwrite.ai and Socure), financial risk management (e.g., Workiva, Kensho Technologies, Derivative Path, Simudyne, Symphony AyasdiAI and Range), trading (e.g., Tegus, Canoe, Entera, AlphaSense, Kavout Corporation and Alpaca), banking (e.g., Kasisto, Abe.ai and Trim) and for fraud detection (e.g., Vectra AI, Jumio and F5). AI also has wide applications in different areas of finance, as shown below.

- **Personal Finance** – AI systems can be designed to offer personalize insights and suggest advice to customers on how to manage their personal finance. For example, if a customer wants to make a small payment using a digital app, the AI system embedded in the digital app can advise the customer to make the payment using cash, instead of digital payment, if the transaction amount is too small. It can also offer personalized insights such as where to invest in, how much savings to keep in one's account based on average monthly or annual income, etc.

- **Fraud detection and compliance** – AI algorithm can be used to detect fraud and to conduct anti-money laundering (AML) monitoring. For example, AI algorithms can be designed to detect abnormal flow of funds or to detect financial transactions whose purpose are outside the approved purpose, thereby preventing money-laundering. AI systems can also be used to detect uncommon or suspicious financial activity and block such activity until the activity log is reviewed by an ALM staff.

- **Risk management** – AI algorithms can be used to analyse data for the purpose of detecting unacceptable risks. Such algorithms can detect and flag-off abnormal patterns in data that could signal risks that are beyond the risk tolerance level of the company. Risk managers can use this insight or information to reduce risk-taking.

- **Consumer banking** – The customer service department of financial institutions can use AI chatbot or AI robot advisor to assist customers with day-to-day financial, banking, and other enquiries. Financial institutions can also use AI to streamline long processes.

- **Investment** – Investment analysts and investment bankers can use AI to analyse available investment information of companies and identify companies that need to raise equity or debt. AI can also be used to identify companies that are possible candidates for a merger or acquisition. The insight gain from such AI systems can assist investors in knowing which companies to invest in.

- **Financial statement analysis** – AI analytics can be used to quickly analyse the financial statement of companies to determine the level of a company's cash flow, profitability, and efficiency.

- **Trading and sentiment analysis** – AI can be used to develop algorithm that tells a trader when to buy, hold or sell financial assets like stocks, bonds, and cryptocurrencies. AI can also be designed to generate signals through sentiment analysis by analysing people's online comments and feelings about specific financial assets, and using that information to determine whether to sell, buy or hold the assets that are being talked about on the internet.

- **Fintech and Digital lending** – Fintech companies can use AI models to generate unique credit scores and forecast the creditworthiness of online borrowers based on the generated credit scores.

- **Asset management** – AI algorithms can be used to analyse investment data and the insight generated from it can be used to manage assets remotely. This will enable the rise of passive fund managers and the decline of active fund managers.

- **Hedge fund** – AI tools can be used to usher in the era of quantitative investing rather than the usual traditional fundamentals-driven long or short strategies. Hedge fund managers can use sophisticated AI tools to analyse large amounts of data to generate short-term winner-takes-all strategies to beat the market within a short time.

- **Financial forecasting** – AI can be used in conducting high-powered predictive analysis of financial variables. AI algorithm can also be used to predict financial changes in local, regional, and global markets. Companies can use such insights to make better decisions within the company based on the insights generated from AI forecasting, and to reduce the company's exposure to certain markets.

- **Preserving financial stability** – Financial institutions regularly submit regulatory compliance returns to the regulatory authorities. The authorities can use AI analytics to scrutinize the data in the regulatory returns to detect early any sharp drop in bank deposits, a sudden and significant decrease in banking sector liquidity, and excessive debt in the financial system. This insight will enable the authorities to take quick action to prevent a bank run or a liquidity crisis in the financial system as well as to prevent a financial crisis.

- **Pensions** – AI can be used to engage and communicate more actively with pensioners using various channels such as chatbots, robot advisors and voice assistants. AI can also help pension funds to automate pension data collection, reporting, compliance, and auditing processes in order to reduce cost, human errors and the risk of fraud.

- **Insurance** – AI can assist insurance companies in analysing risk, detecting fraud, and reducing human error in the insurance application process. It can enable the automation of claims payout request and assist in insurance underwriting and risk monitoring.

5. Artificial intelligence applications in economics

The major application of AI in the economics discipline is to analyze micro and macro-economic data and use the insights gained to make meaningful economic decisions. Depending

on the field of economics, AI tools can be used to make forecasts and price and output optimization decisions. AI tools will be more useful in specific economics disciplines and less useful in other disciplines. Below are some applications of AI in the economics discipline.

- **AI can enable price discovery in markets** – AI can make it easy to discover the actual price or average price of goods and services in markets where sellers sell at different prices and in markets where there are many transactions in a particular good or service. AI systems can also be used to determine the exact time of sudden changes in the price of goods and services. Policymakers can use such insights to intervene in markets.

- **AI in behavioural economics** – Behavioural economists can use AI tools to analyse large amounts of data obtained from individuals and markets to understand how individuals and markets make decisions. AI can also assist behavioural economists in conducting sentiment analysis to understand the sentiment or feelings of individuals and investors about products, market, industry, or the economy.

- **AI in labour economics** – Labour economists and policymakers can use AI tools to collect data from employers' recruitment platforms and from job search websites and agencies. The collected data can be analyzed using AI analytics to determine whether there is a tight labour supply market, and to make early interventions to improve labour supply before official labour statistics are published. Recruiters can also use AI-based systems to reduce the lengthy process involved in recruiting. This will save time, reduce the cost of recruiting, and motivate employers to recruit more employees, thereby reducing unemployment to some extent.

- **AI in monetary economics** – Monetary economists in the central bank and can use AI analytics to forecast the appropriate level of money supply that is needed to support economic growth. Central bank economists can also use AI data analytics to determine the sectors in the economy where there is too much money supply. Central banks can also use AI analytics to tackle inflation. They can use AI tools to collect data from online consumer market forums to identify the goods and services which consumers feel are unjustly inflated. This insight can assist central banks in understanding the drivers of inflation in consumer markets. It can also assist central banks in knowing the appropriate monetary policy tools to deploy to tackle inflation.

- **AI in development economics** – AI can assist development economists in combating poverty by analyzing demographic data and identifying the people that need more resource for healthcare, welfare, and education to eradicate poverty. AI data analytics can also be used to assist development economists in identifying the most vulnerable people in the population who need prolonged welfare intervention to enable them to live a good life.

- **AI in financial economics** – Financial economists and investor analysts can use AI analytics to make better decisions when trading in financial assets such as bonds and stocks. AI systems can quickly analyze historical and present stock or bond prices and make predictions about the future direction of stock and bond prices.

- **AI in economic research** – AI can be used to collect and analyze real world data to understand economic behaviour particularly the pricing, consumption and savings behaviour of households and firms.

6. Artificial intelligence applications in business and management

AI is rapidly changing the way work in done in the business and management profession. Companies are deploying AI to automate jobs that can be easily automated to save time, save cost and to achieve better financial and non-financial performance. Automating many business management processes will allow managers to focus on the things that matter and the things that add value to their organizations. The downside is that AI may lead to loss of jobs particularly for employees who perform routine administrative tasks which can be easily automated. Employees that are affected will need to develop adaptation mechanisms and adapt to AI needs in the workplace. The affected employees may be moved to job roles that AI cannot automate within a company. Below are some AI applications in the business and management profession.

- **AI will automate business administration and control functions** – AI will automate many administrative functions that take most of the time of managers. Many of these functions are 'repeat tasks' that need to be automated using AI tools so that these tasks

can continue even when an employee is sick or when an employee is on annual leave or vacation.

- **AI will change employee's role in the company** – The automation of routine easy-to-do tasks will lead companies to focus on hiring employees whose role is to develop and gain insights from AI-automated functions and make informed judgements that lead to better decision making. The role of managers will be focused on interpreting the information obtained from organisational AI systems based on their experience and their knowledge of organisational culture, policies, and strategy.

- **AI will improve customer service processes** – Business managers can use AI to deliver a positive experience for customers by using AI robotics to multi-task and to anticipate customer needs, proffer solutions and present the solutions in a way that give customers more choice while meeting their needs. This way, AI will be able to displace a human customer service representative who cannot multi-task and can only work from 9am to 5pm daily.

- **AI will improve employee appraisal** – Managers in charge of a team of employees can use AI robotics to test and assess employees' knowledge of the tasks assigned to them. AI robotics can also be used to evaluate the performance of employees in the past year by requiring employees to provide an oral presentation to the AI robot who will use natural language processing to evaluate the employee's presentation and match it against some predetermined criteria. The AI robot will use this information to appraise employees and suggest areas where each employee needs more training, better coaching, or positive feedback.

- **AI can be used to monitor competitors' activities** – Business managers can use AI tools to gain insight into what competitors are doing in the industry. Business managers can use AI tools to search the internet to obtain new information about competitors' activities such as new products, new services or a new technology that has been recently deployed by competitors. The insight gained from such information can help managers to make rapid changes either by doing what the competitor has done, or by doing something much better. This will help managers to remain competitive in the industry and ensure that managers are not behind the competition in the industry.

- **AI can facilitate competitive advantage** – Business managers can use AI tools to develop a formidable competitive advantage over their competitors. Companies can use AI to develop new product and service offers that meet a new demand in the market. This will give the company a formidable advantage in the industry and set the company apart from its competitors.

7. Risks of AI

While the previous sections have shown that AI has important applications in accounting, finance, economics, business, and management, it must be acknowledged that AI also presents many risks. We know that AI will be used to access lots of data, and as a result, data privacy risk will emerge [36,30]. Also, the data used to train the AI system may have human bias [37]. There is also the risk or problem of accountability in terms of who takes responsibility if AI-based insights lead companies to make bad decisions that result in huge losses or loss of reputation [38]. In such cases, a computer model should not be blamed, rather, a person should receive the blame. Therefore, there is a need to develop a system for accountability whenever AI systems are being deployed to aid decision making. There is also the problem of lack of transparency on how AI models reach the conclusions they generate [39]. Many times, the assumptions embedded into the AI systems are unknown, and when they are known, they may not be understood. Another area of concern is that, as the demand for AI expertise in accounting, finance, economics, and management grows, there may be a shortage of skilled professionals who can develop, implement, and manage AI solutions in these fields [40]. Furthermore, it may be costly for companies to train and upskill their employees to meet the demands of an AI-driven company. Finally, there is the risk that AI systems can be weaponized and corrupted to make it engage in unethical practices such as the AI system refusing to forget or delete sensitive confidential information, or the AI system hacking into computers to access people's private information [41]. These risks suggest that the future of AI will depend on AI ethics and governance. There is a need to regulate or govern AI developments and applications because allowing people and corporations to use AI to perform every business function and to access and analyze all types of data may not be good for society due to the sensitive nature of corporate and personal data.

8. Conclusion

This article discussed some AI applications in the accounting, finance, economics, business, and management profession. The study offered some insights into AI applications in these professions, and it showed that artificial intelligence's most important benefits for customers, business managers, corporate executives, accountants, economists, and policymakers is that it saves time, increases accuracy and speed and it optimises processes. There is high optimism that artificial intelligence will have a positive and impactful application in the accounting, finance, economics, business, and management profession in the next decades. As artificial intelligence applications continue to grow and evolve in these professions, early adopters of artificial intelligence will learn by trial-and-error experimentation while late adopters will adopt artificial intelligence systems that have been well-tested and are less prone to errors. As artificial intelligence applications are emerging in the financial and economic system, economists, accountants, finance, business and management professionals should adapt to remain relevant. Organisations should also adapt by investing heavily in data and technology and determine the human-facing functions and services that will be replaced by AI and determine the human-facing functions and services that will not replace by AI due to lack of repetitive processes and abundant data in such functions or services. Finally, the recent COVID-19 pandemic has led many companies to upscale the use of AI-based digital systems. These AI systems can open the door to more innovations and new operating models and will change the way products and services are offered. However, the decision of companies to adopt AI will be greatly influenced by top-management buy-in, user acceptance and changing regulatory frameworks.

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