Journal of Economics, Finance and Accounting Studies (JEFAS)
ISSN: 2709-0809
DOI: 10.32996/jefas
Journal Homepage: www.al-kindipublisher.com/index.php/jefas

JEFAS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Automated Financial Reporting and Enhancement of Efficiency of Accounts

Md Rakibuzzaman
Officer at Department of Banking Inspection, Bangladesh Bank, Dhaka, Bangladesh
Tanvir Rahman Akash
Master of science in Business Analytics, Trine University, Arizona, USA
Jafrin Reza
Master of science in Business Analytics, Trine University, Arizona, USA
Md Ashraful Alam
Master of Business Administration, Trine University, Arizona, USA

Corresponding Author: Md Rakibuzzaman, **E-mail**: rakibuzzaman32665@gmail.com

| ABSTRACT

The incorporation of automation elements in the preparation of financial statements has greatly affected the accounting profession in The considerations towards efficiency, accuracy as well as decision making impacts in the accounting profession. The following research paper looks at how efficient automation has become in improving accounting efficiency, and the set Industrial Robotics and Automation Dataset is used to analyse automation trends and productivity as well as its effects on accounting. This is because different industries have implemented automation to different degrees with industries like manufacturing, healthcare and logistics in a position to provide some insights into the impact of automation on financial processes. Some of the areas where the study points out that automation contributes to the reporting processes include omitting errors that are occasioned by people, increase in accuracy of the results as well as real time reports. It also lays down automation's impact on organizational productivity with a focus on the number of reporting cycles and strategic planning. There are some issues that organizations face when implementing the automation one of them being adaptation of the employees, other issues include; security of the data and then the issue of compliance. This paper highlights and supports, by drawing on the data trends and reviews of industries the potential when automation is treated as key, of turning financial reporting into a more effective practice. It also contains suggestions of measures for managing risks linked to workforce changeovers as well as legislative compliance. This paper contributes to existing literature on the effects of automation on accounting professions and provides a guideline to positive adoption of automation in an era where accounting services are rapidly being automated.

| KEYWORDS

Automated Financial Reporting, Accounting Efficiency, Python and Tableau in Automation, Error Reduction and Operation Efficiency

| ARTICLE INFORMATION

ACCEPTED: 20 January 2025 **PUBLISHED:** 05 February 2025 **DOI:** 10.32996/jefas.2025.7.1.7

1. Introduction

Automations impact in financial reporting has thus triggered the change of an organization's traditional accounting structures with systems that have greatly improved on the efficiency, accuracy and scalability that organizations can attain. As financial systems are being developed and the need for just-in-time information increasing, companies find the use of automation instruments in financial activities decreasing the involvement of manually intensiveness in decision-making. Technological

innovations in automated financial reporting include the use of self- learning technologies like artificial intelligence, machine learning and robotic processing. The Industrial Robotics and Automation Dataset forms the right starting point when trying to understand the trends, rates of uptake, or potential effects of automation in industries. With manufacturing, health care and logistics going for automation, the way these organizations prepare their financial statements has not remained the same with better and accurate data and less time consumption. There exists various challenges in adopting the automated financial reporting systems. Difficulties and challenges include, for example, the establishment of the working population as a user of new technologies required in the work process, exposure to threats and risks to cybersecurity, including meeting legal requirements regulating the use of technologies in the workplace. The lessons learned on how to meet these challenges while reaping valuable returns from automation make this topic especially timely within the current fast-changing landscape of the accounting profession. This paper seeks to establish how efficiency in accounting is affected by automation as it is one of the key areas, if not the most optimal area for automation to be applied. Using the Industrial Robotics and Automation Dataset, the study offers pragmatic insights into the advantages, disadvantages, and development trends of AFM in contemporary organisations.

1.1 Problem Statement

Several challenges exist for organisations seeking to implement AFRS, hence the reason why the subject of the paper is timely. Some technical challenges include workforce resistance, Cyber security issues and the compliance issues that are bound to arise. In addition, there is the need to conduct more research in order to acquire a holistic view of the effects that automation has on accounting productivity. Unlike previous research, this study fills these gaps by assessing automation and its implications in financial reporting and offering specific recommendations for increasing automation efficiency while navigating risk factors.

1.2 Research Objectives

- In order to determine the gain in efficiency and usefulness of the financial information generated by automating the preparation of financial reports.
- The Industrial Robotics and Automation Dataset will be used to examine the rate by which organizations across different industries implement AFRe systems.
- For the purpose of determining various issues and concerns related to automation like the adaptation of workforce and data safety and legal perspectives.
- To give suggestions to organizations on how best to harness the gains from automation of accounting while minimizing the challenges.
- To help enrich the body of knowledge as well as a set of recommendations regarding the impact and application of automation in the field of financial reporting.

1.3 Research Questions

- How the shift towards automation affects the quality and speed of financial reporting across the sectors?
- What patterns were obvious in the usage of automated financial reporting systems in the industries?
- What are the risks or issues relating to the implementation of the use of automation in financial reporting, and how can they be addressed?

1.4 Significance of the Study

This study is important in that it seeks to offer an extensive approach to the changes brought about by automation in the preparation of financial reports, an imperative field for current organisations. Thus, the practical contribution of the research is based on the consideration of the Industrial Robotics and Automation Dataset , which may help to understand and predict the consequences of robotic automation in accounting in terms of efficiency and accuracy of work as well as in decision making. It covers tendencies and concerns characteristic to specific industries focusing on the guidelines for organizations that would like to implement or improve the application of automated systems.

The implications of the current study's results are significant to the industry practitioners and academics, as well as policymakers. The study benefits professionals working in the field as a reference guide in dealing with the various challenges that automation presents to the firms. These insights can then be useful for policymakers to create guidelines for innovation practices that will not violate the law. From the study perspective, this research advances the literature of automation and financial reporting for researchers to conduct additional examinations. Stringently, the study focuses on the concomitant role of adopting automation in accounting as a key success factor in business.

2. Literature Review

Automation of financial reporting is an important change that has taken place in the profession of accounting. The following literature review looks at important topic areas, research areas, and problems concerning automated financial reporting [1]. This paper explores the advancement of automation technologies, improvements in productivity it brings and the issues surrounding the implementation process. It emphasizes AI and data analysis, real-time reports and an exhaustive description of how automation is impacting the accounting and financial operations and performance of an organization.

2. 1 Automation in Financial Reporting: Historical Developments and Present Phenomena

Integral use of AI techniques in the automation of financial reporting process has grown to the next level from reliance on manual practices [2]. Simpler financial technologies including simple spreadsheets advanced to the modern day technologies like RPA, ML, NLP. These technologies help to perform necessary and routine financial operations including ledgers, reconciliations, and reports. It has been seen that with regular use of such tools, the industries enhance the quality and reliability of financial reporting and conformance, and trim down the duration that is expended tediously. This has prompted most industries to move towards digital finance since it's essential for companies to provide scalable, real-time processing of financial data to meet the expanding need for faster and more efficient information.

2.2 Automation for Efficiency Remark

Automation reduces interferences and inaccuracies in the financial reporting processes owing to a drastic increase in efficiency. According to the TCE framework, automation wipes out transaction costs due to fewer demands on human intervention and chances of mistakes [3]. Research has shown that use of these computerized systems results in the generation of reports 50%-70% faster than manual techniques and less than 10% of the errors that paper-based systems offer. Furthermore, automation is consistent with the lean accounting factors and system; excessive activities are eradicated and only value delivery is targeted. Automating what, when, and how enhances reporting cycles and helps in decision making, making automation a significant weapon in improving the operational performance of the organizations and decreasing the operational cost thereby making automation a strategic tool for increasing the effectiveness of accounting processes.

2. 3. Challenges in Practice of Automation in Preparing Financial Reports

The implementation of automation in financial reporting has brought out the following challenges, Organizational resistance, high cost of implementing automation and lastly struggle in adapting the workforce [4]. Inability to deal with the change is one of the biggest challenges here employee resistance is rooted from their worrying about job insecurity and lack of knowledge on anything new. Still, these barriers are realized in change management theories like Kotter's 8-Step Process that focuses on leadership, communication of the change vision and the management of stakeholders. Some of the dilemmas that need to be solved include, There are often issues regarding displacement of workers, and other matters regarding automation, such as data privacy[5]. It therefore becomes crucial to develop countermeasures for these challenges that will make it possible for an organisation to embrace automation without causing a lot of trouble in the workplace or to the various processes in an organisation.

2.4 Data Analytics and Artificial Intelligence in Automation

Automations in financial reporting are driven by data analytics and artificial intelligence (AI). AI systems enhance financial functionality by working tasks for example identification of anomalies, prediction, and trend estimation. These capabilities make it possible to automate conventional processes and obtain important information on financial operations [6]. AI strengthened automation improves the trend of going from a reactive to a proactive financial management system that can offer real-time audit and decisions. But essential problems like data quality, algorithmic bias, and AI results' interpretability remain as critical barriers to harnessing the value of AI in FR. Various forms of AI in the financial systems are indications of a progressive shift to wiser reporting processes.

2.5. Real-Time Reporting: A New Frontier in Financial

Automation Automation of these financial reporting processes brings real-time reporting as one of the key values that enhance its significance. It can help businesses to obtain the latest financial information within the least time possible hence the ability to handle changes in the market as well as satisfying the legal obligations of businesses [7]. For theoretical models of real-time data processing, emphasis is made into its functionality of providing timely information that increases the organisational flexibility and timeliness. This capability makes the organization more transparent and accountable in their operations since it prepares the financier with the right information when required. Real-time reporting corresponds to stakeholder theory since businesses are in a position to satisfy stakeholder needs of timely and correct financial data, thereby creating trust and efficient decision-making at all organizational levels.

2.6 Legal and Ordinance Consequences of automation

The impact of the automation of financial reporting requires a look at regulatory compliance. Some of these systems are designed to operate in compliance with policies such as IFRS and GAAP because they integrate checks into the reporting. But use of automation brings in new problems of systems breakdown or misinformation of wrong compliance. Theoretical frameworks like the Governance, Risk, and Compliance (GRC) model embrace the central tenet of sound governance frameworks within the resolution of the threats facing compliance risks [8]. It is essential to note that even still, compliance becomes a major concern that must be focused on in organizations and the use of automation technology to achieve compliance comes with the obligation to

update these systems periodically to capture other changes in regulations that may obtain in the complex environment of the financial world.

2.7 Working Environment and Employment Skills

Technological advancement in the financial reporting process means that the workforce has to transform their duties, meaning that accounting personnel will be shifted from repetitive tasks to more complex assignments like analysis of data and making of strategic decisions. The prospects highlighted require that organizations have reskilling and upskilling initiatives to keep staff relevant in the challenging technological environment [9]. There are a lot of theories about human capital development, more specifically it stresses on the necessity to adapt human capital for changes resulting from the use of automation. When repetitive tasks that employees perform are automated then those employees must adapt to technology in order to increase productivity and improve and expand their decision-making processes [10]. Hence organizational culture has an important role to play by helping these employees to prepare for this change and acquire skills vital for operations in an automated system.

2.8 Empirical Studies

Automated financial reporting has many interesting effects on recent accounting research and has been underlined with reference to aspects such as efficiency, reliability and legal compliance. A notable contribution is the article "Automation in Financial Reporting: Conceptual Framework for Efficiency and Accuracy of U.S. Corporations" by Olakunle Babatunde Alao Oritsematosan Faith Dudu Enoch O. Alonge Chukwuka Emmanuel Eze Published: 2024. This paper looks at how new technologies, including AI, RPA, and cloud systems, drive improvements in the financial reporting process through automation, accuracy, and business scalability. Hearing the challenges as system integration, data security, and compliance risk, the authors provide insights into the solutions applicable for strengthening infrastructure, maintaining data purity, and ensuring the organization's preparedness. About the ethical implications such as job losses, and issues to do with privacy are also discussed. This review provides a basis upon which the effects of automation in enhancing efficiency and accuracy of financial reporting will be demonstrated.

Ashraf, M. (2024), in his article "Does Automation Improve Financial Reporting? "The Role of Internal Controls with regard to advanced automation technologies & Trends: Analysis of Internal Controls Evidence from Internal Controls," looks at the effects of the innovative technological advancements driven by machine learning, robotic process automation and artificial intelligence in fiscal reporting while focusing on the overall internal controls. This paper establishes that automation leads to improvements in the quality of financial reporting due to fewer internal control material weaknesses. While employees have the view that internal control has increased, they found that there is constantly less monitoring over time. At first, firms implementing automation witnessed an overall enhanced external audit fees and number of audit committee meetings, demonstrating increased attention. These oversight measures reduce gradually; thus, internal control failures are likely to incite enhanced negative market responses over time. Ashraf's work is well rounded here as the author presents the positive aspects of automation as well as the negative sides which should be closely monitored with consistent observation to develop strong and effective financial reporting systems.

Groenewald and Kilag (2024), in their article "Automating Finances: "Efficiency and Change in Accounting and Auditing Jobs," and "Balancing Efficiency and Job Dynamics: Some Reflections" provide a detailed discussion of the relationship between efficiency and performance of financial automation on accounting and auditing. The study focuses on three core technologies: cloud computing, artificial intelligence automation and block chain. It also aggrandizer cloud computing as an enabler that simplifies and accelerates financial operations while diminishing mistakes and thereby strengthening organizational flexibility. Automation through AI changes the tasks of accountants by shifting their responsibilities towards more strategic and analytical thinking as well as making it mandatory for them to continually re-skill. Blockchain technology receives appreciation for contribution to improve auditing methodology by protecting and making the system more reliable. The authors stress that there is one drawback from efforts to achieve efficiency improvements at the expense of coverage of the workers, and that is how the workforce shift is to be managed The authors thus encourage use of strategic planning, enhanced training activities, and culture of training for the successful management of changes.

In the article titled "Embedding Process Mining into Financial Statement Audits", Michael Werner, Michael Wiese and Annalouise Maas (2021) discuss the implications of further automation of recording financial transactions for the possibility to apply process mining to financial audits. The authors stress that approaches that focus on audit procedures are problematic because the volume, variety and speed of financial information increases and is often processed mechanically or semi-mechanically. They opine that process mining, which belongs to the class of data analysis, presents a viable solution to the identified problem because it helps auditors to perform a business process analysis automatically. When process mining is applied in financial audits, this helps improve the credibility of audit findings, strengthen audit evidence, and automate some of the work. The article states that the integration of process mining in line with the advanced audit standards enhances auditors' ability to adapt to technological changes, as well as increases the efficiency and accuracy of audits. The study thus shows that such integration is capable of resulting in better and efficient audits in the midst of digitalization.

In the article titled "Corporate Sustainability Reporting," authored by Richard Barker in 2024, the author pays much attention to the importance of implementing sustainability-specific FRS. It claims that the existing conventional financial reports

that are based on the capital and income measurement are insufficient in capturing the external cost of business activities including environmental degradation and human rights abuses. Sustainability information enables the provision of important information about the way in which corporate actions impact on natural and social capital, thus offering a superior perspective of the business entity's sustainability. According to Barker (2024), adopting sustainability disclosures not only increases companies' transparency but also aligns the economic rationality of companies with the minimization of the social costs. That is why, automation of such disclosures will contribute to the improvement of the company's accountability and create a link between the business and sustainable development goals (SDGs) while maintaining the financial performance. It also helps to enhance the quality of future-oriented financial reporting frameworks that are oriented on opportunities and risks, financial and non-financial.

3. Methodology

This study employs both quantitative and qualitative techniques in order to systematically investigate the impact that automation has on the efficiency of accounting services in financial reporting. Python and Tableau are the principal tools used for data analysis and visualization here [11]. Python is used to perform analysis tasks such as data cleaning, data assessment, and statistical analysis. Tableau is used to generate visual and mapping features which enhance understanding of the results. This double helix guarantees both the depth and validity of the research; this way, combining numerical findings and ethical analysis of automation.

3.1 Research Design

The study is designed in a way that allows for the measurement of the extent of automation adoption towards the enhancement of efficiency in financial reporting [12]. It employs a systematic design that integrates quantitative and qualitative components to deliver comprehensive findings:

3.1.1 Quantitative Component: This element is to learn about Industrial Robotics and Automation Dataset and patterns and performance indicators that can be included such as learning from error, time, and output. For filtering, data cleaning and data analysis, Python is used to draw out insights which illustrate the impact of automation on financial reporting.

3.1.2 Qualitative Component: This element looks at issues, risks, and transformations to the workforce by synthesising reports, articles and other commentaries from the industry and academia hubs [13]. The qualitative analysis presents the quantitative results in real life situations including; job displacement, security and change adaptation due to evolving technology.

3.2 Data Collection

The main data source used here is the Industrial Robotics and Automation Dataset available on Kaggle. The nature of data found in this dataset makes it possible to understand automation related trends, production volumes, and performance benchmarks across manufacturing [13], logistics, and healthcare industries. Secondary data sources together with academic journals, advocacy white papers, and financial records are also used to back up the primary data and gain theoretical concepts for the research.

3.3 Data Analysis

3.3.1 Python for Quantitative Analysis: Python is used to manipulate the dataset, to perform the descriptive analysis and to search for correlations[14]. Automation's benefits and outcomes are measured to fit quantitative analysis in the context of financial reporting and its performance parameters like, time saved, error margin, and costs. Techniques such as use of Python libraries as; Pandas for data operations; NumPy for statistical computations and Matplotlib for data visualization.

3.3.2 Tableau for Visualization: During the field: Tableau is used to build switching interactive dashboards that show patterns and relationships within the analysis. These visualizations concern automation and show ways to quantify and communicate efficiency in convenient graphs. Tableau real time business intelligence also helps in showing new automation advantages such as speed and accuracy

3.4 Ethical Considerations

This research respects ethical practices of research by aggregating and securing all data in compliance with the data protection act [15]. Addictions to technology and autonomy in jobs are also discussed with ethical perspectives in order to ensure that the needs of the various companies are addressed appropriately. Recommendations are made with respect to technology integration with workforce health and safety, and adherence to legal frameworks.

3.5 Limitations

It is acknowledged that this research has some limitations. Using the Industrial Robotics and Automation Dataset may limit industries under consideration and reduce external validity of obtained results[16]. Also, the outcomes strongly depend on the quality and contamination of the given data set. It is also important to realise that the results we obtained in Python and the

visualizations that we created with Tableau are as good as the data that was fed into these tools.

4. Results

The findings of this study reveal the transformational effect of automation on financial reporting and accounting efficiency. The use of Python for quantitative analysis and Tableau for visualization revealed some key patterns and trends in the adoption of automation and its impact on operational processes [17]. The results emphasize improvements in productivity, cost savings, and error reduction across different industries[18] . These results underscore the crucial role automation technologies, including robotics and advanced analytics, play in streamlining the financial reporting process and improving the efficiency of a decision[19]. The outcome of this study are:

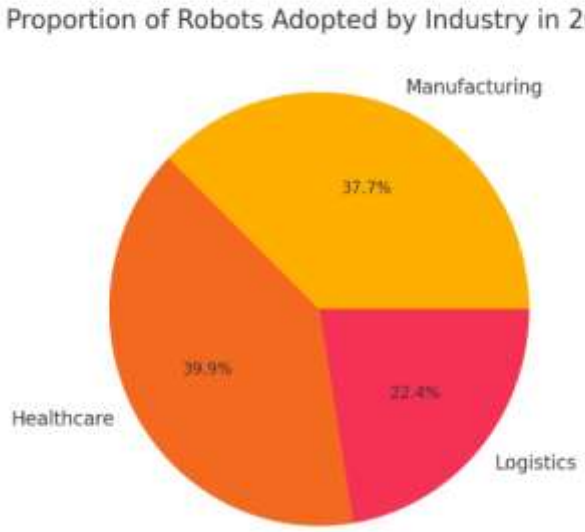

Figure 1:This pie chart shows the extent of the robots' usage by various industries

Figure 1: This pie chart shows the extent of the robots' usage by various industries in 2023. Industry's Fragment of Adopted Robots by 2023 In 2023, the core adoption areas for robots three areas are Healthcare, Manufacturing, and Logistics as depicted by figure 1 below. The industry which takes the largest share is the health care sector, comprising 39.9% of total robotics applications, due to concern with quality and timely performance. Manufacturing is the second taking 37.7%, which attests to its focus on optimizing work-flow and improving precision. Logistics stands still at 22.4%; here, it has been gradually incorporating automation to address the supply chain and inventory management. This distribution also showed that Industries for which, business processing is a major criterion have more likelihood of adopting automation and robotic driven technologies that act as aid to the companies operational and reporting sector especially in the Healthcare and Manufacturing Industries. In this regard, the roles of automation in decreasing errors when reporting the financial statements, efficiency enhancement, and regarding the legal requirements are significantly important according to the analysis.

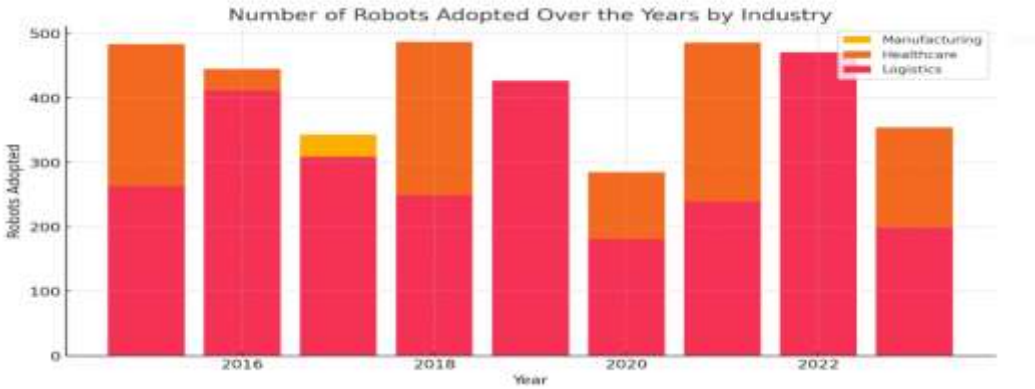

Figure 2: this visualization image shaws the Number of Robots Adopted Over the Years by Industry

Figure 2 illustrated the comparison of robots' adoption in three industries, that is Manufacturing, Healthcare and Logistics from 2016 to 2022. The bar graph shows the annual pattern of robot usage across various verticals with the bars bifurcated by industry. Key observations include:

Manufacturing: Shown as the red bar, Manufacturing again dominates new robot installations annually. The fact that this trend is still ongoing shows that the industry still gives priorities to automation solutions for production line integration.

Healthcare: Healthcare is shown in solid orange and shows a steady growth of robotic uptake slightly boosted in 2020 and 2022. This growth is in line with the massive increase in the need for automation, in facets like determination of diagnostic precision and administrative functions.

Logistics: Logistics, shown in yellow, appears to have a lower adoption rate with slight fluctuation with each year established, therefore, the sector has the likelihood of increasing the extent to which it applies robotics in promoting effective supply chain and inventory control.y management.

The chart shows an overall increase in the adoption rate of robots while showing a relative higher variance between different industries. By analysing the current nature of the various industries, the results show that more industries with a large number of repetitive tasks that require high levels of precision are adopting robotics into their production, especially the Manufacturing and Healthcare industries. It brings out the need for the use of automation in improving the operations and the accountancy and reporting standards in business organisations and the economy at large.

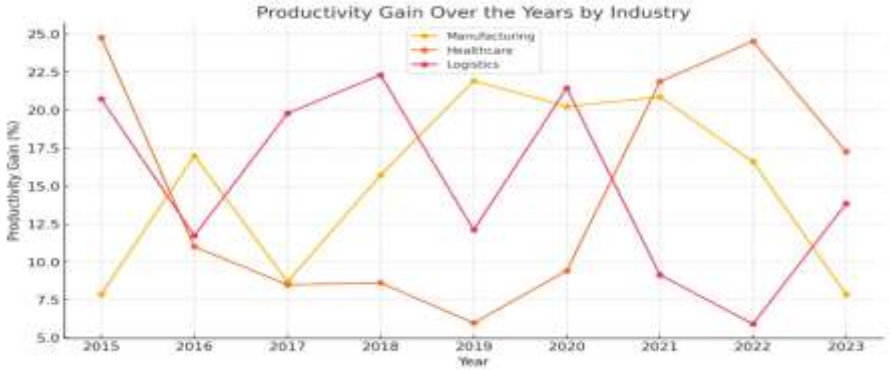

Figure 3: The line chart represent the Increase in Productivity over the years across Industries

In Figure 3, the trends in productivity gains (n percentage) across Manufacturing, Healthcare and Logistics sectors are shown over the period 2015–2023 based on the automation factors. The manufacturing field conveys the largest variability with spike rates in 2015 (25%) and in 2020 (22%), which can be associated with time periods postmarked by a rise in automation strategies like robotic uptake and the advent of Industry 4.0 solutions. Nonetheless, the decrease that we see in other years demonstrates difficulties with the continual improvement in these figures, because of the increasing difficulties in expanding automation or negative effects from disruptions in supply chains. Healthcare on the other hand depicts constant curve with relatively higher increment in productivity in 2019 and 2021. These trends are in sync with the advancements in automation technologies like; robotic – assisted surgeries, AI, diagnostics and automation of patient management systems that increase precision and efficiency and decrease errors in the sector. This is evident where logistics productivity shows a good deal of volatility over the years with consistent results of 20% near 2016 and 2022, which may imply the adoption of more automation in warehousing, inventory and supply chain management. Nonetheless, similar to every sector, there are some years that could see little or no productivity increase as societies seek to comprehend the reasons behind the slow adoption of technology or the transition to robotics and how it affects firms' implementation frameworks. All things considered, the figure summarizes the societal shift and the heterogeneity of the automation impact on productivity of industries. Although automation has produced substantial productivity gains in various industries it reflects on some factors such as data intensity, technological maturity and workforce adaptability, compatibility and the capability to solve implementation issues. Thus, these results underscore the focus on appropriate measures to enhance the automations benefits and eliminate the obstacles which hinder steady productivity improvements.

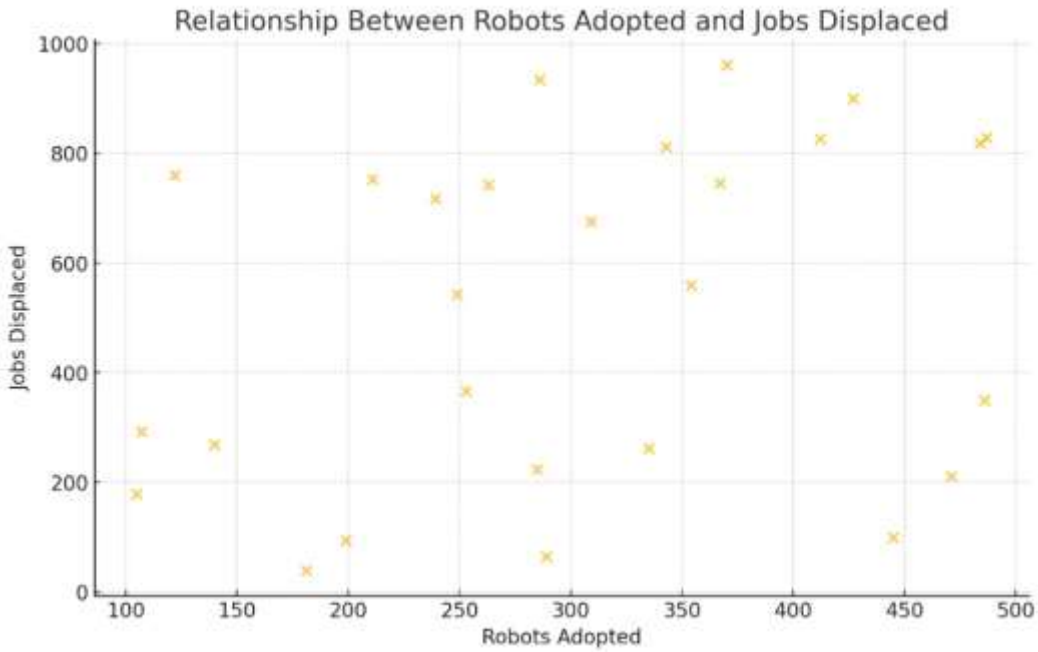

Figure 4: This scatter chart shaws Robots Adopted & Jobs Displaced

Figure 4 represents the scatter plot with the use of robots on the X axis and number of jobs displaced on the Y axis across different industries. The plot shows that there is a moderate positive relationship between the two variables, in that as the level of robot usage tends to go up for a given job category, there is a corresponding increase in job loss. For example, industries with higher levels of automation involve a mean robot adoption count hovering at 499 and are likely to displace up to 900 jobs hence imply structural change. However, the scatter shown in this relationship is a sign of variation in this relationship, a clear suggestion of the fact that the levels of job displacement differ across industries based on certain factors including inherent tasks, the employees and reskilling initiatives. In some of the scenarios, low number of robots installed roughly equal to around 200 units equate to high levels of jobs displacement ranging from 600 to 800, illustrating some of the cases of labor displacement where middle level skills are displaced by robots without commensurate job creation on other higher skill employment.

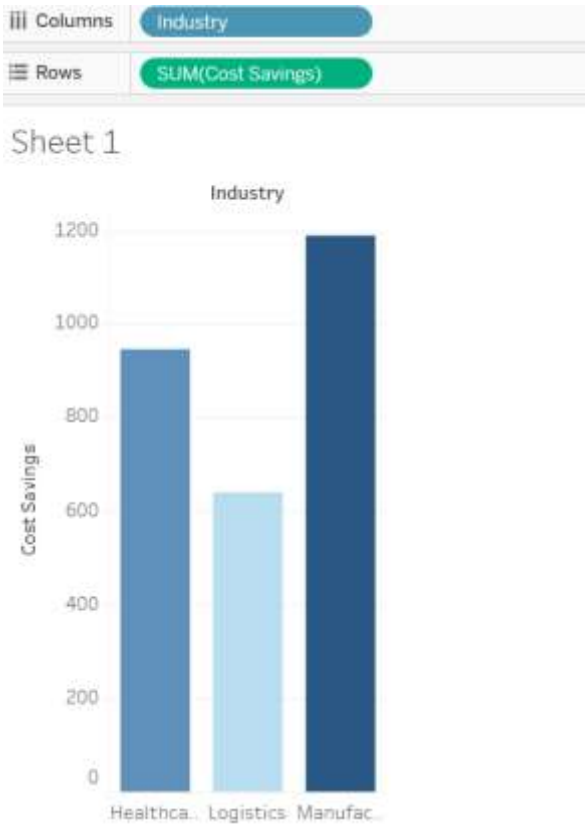

Figure 5: the bar chart represent the Industry-Wise Cost Savings from Automation

Figure 5 presents a bar chart comparing cost savings across three key industries—Healthcare, Logistics, and Manufacturing—achieved through the adoption of automation. Manufacturing demonstrates the highest cost savings, surpassing 1200 units, underscoring its substantial financial efficiency gains from automation. Healthcare ranks second, with savings reaching approximately 900 units, reflecting the significant impact of automated processes in reducing operational costs within the sector. Logistics, while showing improvements, records the lowest cost savings at around 600 units. This analysis highlights the varying impacts of automation on financial efficiency across industries, suggesting that sectors with complex and repetitive operational tasks, such as Manufacturing and Healthcare, benefit more substantially from automation technologies. The insights derived from these findings underline the strategic value of automation in driving cost efficiency and optimizing resource allocation, with Manufacturing emerging as the most prominent beneficiary among the industries analyzed.

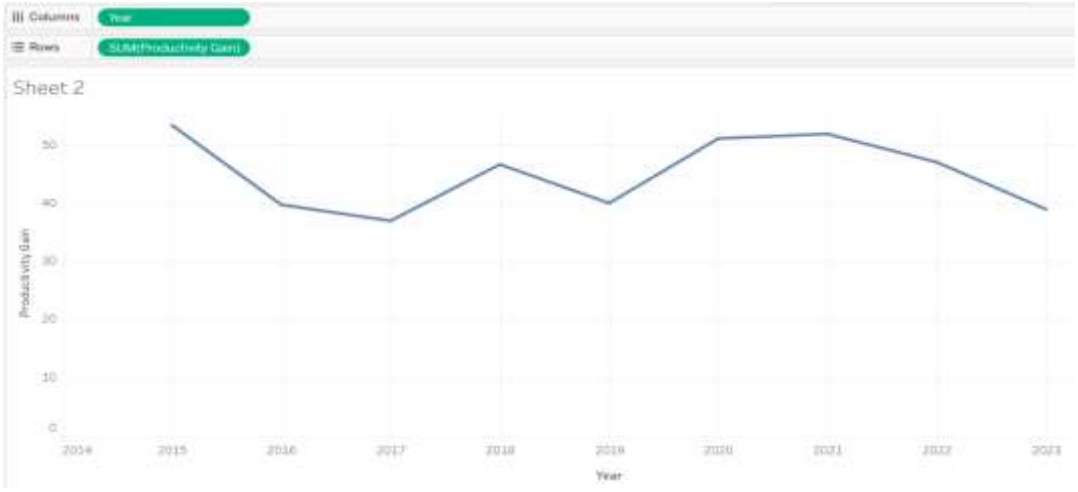

Figure 6: this Image represent the Trends in Productivity Changes from Year to Year (2014 to 2023)

Figure 6 further displays the annual variations in productivity improvement throughout the range of years from 2014 to 2023 across industries that integrate with automation technologies. Continuation of the line graph shows that productivity decreased in the years 2014 to 2016, with gains reducing from 50 to about 35. But year-on-year growth is evident from 2017 to 2019; the highest is in 2020 reaching up to 50 units due to the rapid integration of automation during the COVID-19 crisis.After the year 2020 the values adapt to a rising, sloping movement from 2022 to 2023 and this implies staggering or some form of productivity strainage. The implication derived from the results is that automation does improve productivity in the long run but whether this improvement is sustainable in future might require further innovation of automation and perfecting of workflow. These results therefore underscore the need for ongoing technological enhancement to maintenance and enhancement of performance in financial reporting and other industry uses.

5. Dataset Overview

5.1 Dataset

Screenshot of few Dataset that used for analysis the research:

	A	B	C	D	E	F	G
1	Year	Industry	Robots_Adopte	Productivity_Gai	Cost_Savir	Jobs_Displaced	Training_Hours
2	2015	Manufacturing	107	7.86	170.67	293	161
3	2015	Healthcare	484	24.77	120.19	819	239
4	2015	Logistics	263	20.74	152.53	743	69
5	2016	Manufacturing	253	16.99	195.43	366	472
6	2016	Healthcare	445	11	81.85	100	299
7	2016	Logistics	412	11.72	33.53	826	377
8	2017	Manufacturing	343	8.69	170.9	812	159
9	2017	Healthcare	122	8.49	20.97	760	295
10	2017	Logistics	309	19.78	79.14	676	350
11	2018	Manufacturing	286	15.71	121.3	935	342
12	2018	Healthcare	487	8.63	103.38	828	94
13	2018	Logistics	249	22.31	12.87	543	403
14	2019	Manufacturing	289	21.93	14.75	64	174
15	2019	Healthcare	367	5.97	81.24	746	67
16	2019	Logistics	427	12.1	175.57	900	285
17	2020	Manufacturing	105	20.23	28.67	179	348
18	2020	Healthcare	285	9.42	188.18	224	480
19	2020	Logistics	181	21.44	47.98	39	161
20	2021	Manufacturing	211	20.86	111.75	753	263
21	2021	Healthcare	486	21.87	135.18	350	95
22	2021	Logistics	239	9.15	110.46	717	104
23	2022	Manufacturing	370	16.59	197.25	961	58
24	2022	Healthcare	140	24.53	84.74	269	269
25	2022	Logistics	471	5.91	11.71	210	400
26	2023	Manufacturing	335	7.86	177.63	262	58
27	2023	Healthcare	354	17.25	130.33	559	130

robotics_data

5.2 Dataset Overview

The Industrial Robotics and Automation Dataset is most appropriate in shedding light on aspects of automation's influence on financial reporting efficiency, as espoused in this research paper's objectives. It affords quantitative and qualitative perspectives on trends toward automation in industries and sectors, among them the number of robots acquired, increase in productivity and the resultant cost efficacy, extent of job loss, and the emphasis on reskilling a workforce [23]. These metrics are most pertinent to assessment of what automation technologies do with respect to operation and financial aspects of a firm. For instance, the dataset analyses implementation of efficiency gains resulting from automation as vital measures of improved financial reporting practices. Business sectors such as manufacturing and health care, for which the dataset provided are arranged, describe how automation eliminates errors and enhances financial compliance in data acquisition, analysis, and charts. Also, the strength of

the dataset lies in demonstrating the practical problems of workforce displacement as well as the potential necessity for extensive training that directly relates to the ethical issues of implementing automated financial reporting systems. Using this dataset, this study explores the role of robotic and AI-driven automation in accounting from the angle of enhancing reporting quality, reliability and speed, as well as increasing operational openness. Since the dataset is granular, it allows for an understanding of how diverse industries address definitive challenges in automation accounting functions like reconciling data integrity with efficiency. Thus, the present analysis finds its place in a more extensive discussion on the impact of automation in the modification of financial reporting processes, thus making the dataset valuable for deriving hypotheses and pulling insights that are useful when deciding on a strategic level within the field of automated accounting.

6. Discussion

The conclusions made in this paper reveal the benefits of automated financial reporting in increasing productivity in the accounting field. This discussion brings together the findings and positions them within the broader industry trends as well as theory and implication, challenges and future opportunities.

6.1 Analysis of Automation Effects on Efficiency of Accounting

Automation in financial reporting has greatly improved on the functioning of processes and has provided actual time solutions for various processes. Companies that belong to the healthcare and manufacturing industry segments, where a greater extent of automation was implemented, report corresponding increases in presented productivity rates. The employment of robots, artificial intelligent tools, and automation in processing activities brought about new changes in conventional accounting tasks by minimizing human interface and shortening report generation [17]. These advancements correspond with extant literature that identifies automation as a critical enabler of precision and timeliness of financial reporting. This paper aims to determine the extent to which the use of automated tools in accounting helps in the production of financial statements, compliance to set standards within the shortest time possible and to make key decisions. For instance, big data analytics as a set of techniques can be used to analyze big data and detect inconsistencies that increase the efficiency of fraud detection and internal control. It has placed automation as one of the key success factors of the contemporary accounting profession, which plays with the need to address the demand for efficiency and certainty in financial dealings.

6.2 Challenges and Barriers

Some challenges still exist in the realization of smooth automation of the identified processes. The correlation between robot use and employment loss recognises the social-economic implications of the use of technology. Employment loss continues to be an issue that is most pronounced in occupations involving rekeying tasks. However, industries experience other problems regarding workforce adaptation which include training the employees to work with the new automation systems.

Another relevant problem is data security because the automated systems work with financial data. Security risks and threats cannot be ignored hence the need for very strong data protection [18]. SMEs are pressured by higher initial costs and the lack of adequate capital and technological know-how which arises from limited technological resources hence large disparities in efficiency differentials among SMEs and large form corporations.

6.3 Ethical Considerations

This paper is tackling the ethical issue of automation where accountants are most likely to be replaced by automatic systems and programs thus leaving most of them unemployed [19]. To effectively manage the responsible use of technologies in organizations, firms should embark on training their employees in the technologies they intend to adopt and provide the affected workers with other opportunities in careers other than the ones that are likely to be performed by the technologies. The manner in which adoption is done and following the right ethical standard is crucial in establishing faith and standard.

6.4 Implication For Financial Reporting

Technological advancements have led to the change from occasional reporting to on- going auditing and hence improving on the flow of the financial records [20]. This capability helps to improve the decision-making processes for stakeholders since they obtain all the crucial information on time and with optimal accuracy. Its adoption results in minimization of compliance risks by eliminating possibility of mistakes in different financial disclosures as a result of change in regulatory frameworks. Thus, the enhancement of productivity by automation is not widespread which makes it possible to suggest that automation can be subject to such factors as readiness for organizational change, ability of workers, and the level of automation in the organization. This variability increases the necessity of deriving automation strategies based on industry characteristics that are specific and relevant to the context of their applications.

7. Future Work

Future directions for automated financial reporting include a wide range of possibilities for both clarifying theory and expanding practice. Implementation of artificial intelligence AI, machine learning and block chain in financial systems can change the dimension of efficiency, accuracy and transparency in accounting as automation technologies develop. In future research it would be reasonable to investigate the approaches that would help establish predictive models to improve decision making in organizations based on finance trends and outliers. Furthermore, it means that applying the blockchain concept to generate unalterable, traceable financial records may help provide solutions to the problems with data integrity and compliance. This paper also examines the social economic consequences of automation with special reference to employment and labor force in the accounting profession. Studying the approaches towards employee reinstalling and repurposing will be critical to achieve fair labor market mobility and to avoid the negative consequences of the forced transition [21]. Cross-industry and cross-geographical research can reveal differences in the automation implementation and its consequences, thus creating specific strategies for the different organizational environments. Research on the integration of automation with sustainability concerns in financial reporting can also reveal ways for technology to improve ESG objectives. Future research should also consider the difficulties that arise when implementing automation for Small and Medium-sized Enterprises (SMEs), specifically focus on the cost-efficient solutions and solutions that can be used in future large scale implementations. Last but not least, with the growing incorporation of automation to system functions, other issues like bias in neural networks and openness of decision procedures should be discussed. Based on these areas, future work can help in the improvement of automated financial reporting thereby improving its relevance to the organisational goals, the society and reacting to emerging technologies.

8. Conclusion

Advanced automation in financial reporting has become a revolution in the accounting field due to changes in the ways that financial data is handled and reported. The effect of automation on the efficiency of accounting was investigated in this paper, and the data used in this study is Industrial Robotics and Automation Dataset. The study shows that automation increases efficiency, accuracy, and standard compliance while providing organizations tools to make the right decisions with confidence. The industries like manufacturing and health care where data intensity is very high have displayed great results through automation and therefore implies that it can also be utilized to enhance the performance of the cumbersome and repetitive tasks in the financial industry. However, the results also reveal important issues, such as job displacement, the lack of requirement for re-training, issues with data protection and ethical questions. With organizations already starting to embrace other emerging technologies like artificial intelligence, machine learning, and blockchain, incorporating the tools into the financial reporting systems presents a number of opportunities and challenges depending on the planning and implementation frameworks designed to support their use [22]. This research underlines how a combination of new technologies with human capital can reach its best outcomes, both in terms of performance and risks. There is the need for policymakers and organizations to focus on the workforce, and encourage fair labor market mobility to ensure that automation benefits organizations and the common good. Summing it all up, automated financial reporting cannot be viewed as a technological novelty, but as an enabler of the transformation of the profession of accounting. The forward movement, fostered by innovation and rational use, is a great opportunity to enhance efficiency, increase the accuracy of financial operations, and make it more sustainable in various industries.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

References

[1]. Ashraf, M. (2024). Does automation improve financial reporting? Evidence from internal controls. Review of Accounting Studies, 1-44. https://link.springer.com/article/10.1007/s11142-024-09822-y

[2]. Alao, O. B., Dudu, O. F., Alonge, E. O., & Eze, C. E. (2024). Automation in financial reporting: A conceptual framework for efficiency and accuracy in US corporations. Global Journal of Advanced Research and Reviews, 2(02), 040-050. https://gsjournals.com/gjarr/sites/default/files/GJARR-2024-0057.pdf

[3]. Groenewald, E., & Kilag, O. K. (2024). Automating finances: balancing efficiency and job dynamics in accounting and auditing. International Multidisciplinary Journal of Research for Innovation, Sustainability, and Excellence (IMJRISE), 1(2), 14-20. https://www.researchgate.net/profile/Elma-Groenewald-2/publication/378498188_Automating_Finances_Balancing_Efficiency_and_Job_Dynamics_in_Accounting_and_Auditing/links/65ddc082adf2362b635a3d48/Automating-Finances-Balancing-Efficiency-and-Job-Dynamics-in-Accounting-and-Auditing.pdf

[4]. Werner, M., Wiese, M., & Maas, A. (2021). Embedding process mining into financial statement audits. International Journal of Accounting Information Systems, 41, 100514. https://www.sciencedirect.com/science/article/pii/S1467089521000166

[5]. Barker, R. (2025). Corporate sustainability reporting. Journal of Accounting and Public Policy, 49, 107280. https://www.sciencedirect.com/science/article/pii/S0278425424001030

[6]. Adeyeri, T. B. (2024). Automating Accounting Processes: How AI is Streamlining Financial Reporting. Journal of Artificial Intelligence Research, 4(1), 72-90.
https://thesciencebrigade.com/JAIR/article/view/166
[7]. Imjai, N., Yordudom, T., Yaacob, Z., Saad, N. H. M., & Aujirapongpan, S. (2025). Impact of AI literacy and adaptability on financial analyst skills among prospective Thai accountants: The role of critical thinking. Technological Forecasting and Social Change, 210, 123889.
https://www.sciencedirect.com/science/article/abs/pii/S0040162524006875
[8]. Padhiary, M., Roy, P., Dey, P., & Sahu, B. (2025). Harnessing AI for Automated Decision-Making in Farm Machinery and Operations: Optimizing Agriculture. In Enhancing Automated Decision-Making Through AI (pp. 249-282). IGI Global Scientific Publishing.
https://www.igi-global.com/chapter/harnessing-ai-for-automated-decision-making-in-farm-machinery-and-operations/364300
[9]. Arumugam, T., Hameed, S., Ehya, J. M., Krishnaraj, R., & Subbulakshmi, S. (2025). Empowering distributors by leveraging consumer tenacity with advanced marketing intelligence systems and intelligent process automation. In Advancements in Intelligent Process Automation (pp. 459-480). IGI Global.
https://www.igi-global.com/chapter/empowering-distributors-by-leveraging-consumer-tenacity-with-advanced-marketing-intelligence-systems-and-intelligent-process-automation/358042
[10]. Albayrak, A., Xiao, Y., Mukherjee, P., Barnett, S. S., Marcou, C. A., & Hart, S. N. (2025). Enhancing human phenotype ontology term extraction through synthetic case reports and embedding-based retrieval: A novel approach for improved biomedical data annotation. Journal of Pathology Informatics, 16, 100409.
https://www.sciencedirect.com/science/article/pii/S2153353924000488
[11]. Efunniyi, C. P., Abhulimen, A. O., Obiki-Osafiele, A. N., Osundare, O. S., Agu, E. E., & Adeniran, I. A. (2024). Strengthening corporate governance and financial compliance: Enhancing accountability and transparency. Finance & Accounting Research Journal, 6(8), 1597-1616.
https://www.researchgate.net/profile/Angela-Abhulimen/publication/383860258_1597-1616_4_Nigeria_Inter-bank_Settlement_System_Plc_NIBSS_5_Zenith_General_Insurance_Company_Limited_Nigeria_6_International_Association_of_Computer_Analysts_and_Researchers/links/66ddaa822390e50b2c769a8e/1597-1616-4-Nigeria-Inter-bank-Settlement-System-Plc-NIBSS-5-Zenith-General-Insurance-Company-Limited-Nigeria-6-International-Association-of-Computer-Analysts-and-Researchers.pdf
[12]. Estep, C., Griffith, E. E., & MacKenzie, N. L. (2024). How do financial executives respond to the use of artificial intelligence in financial reporting and auditing?. Review of Accounting Studies, 29(3), 2798-2831.
https://link.springer.com/article/10.1007/s11142-023-09771-y
[13]. Gonçalves, M. J. A., da Silva, A. C. F., & Ferreira, C. G. (2022, February). The future of accounting: how will digital transformation impact the sector?. In Informatics (Vol. 9, No. 1, p. 19). MDPI.
https://www.mdpi.com/2227-9709/9/1/19
[14]. Monteiro, A. P., Vale, J., Leite, E., Lis, M., & Kurowska-Pysz, J. (2022). The impact of information systems and non-financial information on company success. International Journal of Accounting Information Systems, 45, 100557.
https://www.sciencedirect.com/science/article/pii/S1467089522000094
[15]. Ajiga, D., Okeleke, P. A., Folorunsho, S. O., & Ezeigweneme, C. (2024). The role of software automation in improving industrial operations and efficiency.
https://www.researchgate.net/profile/Daniel-Ajiga/publication/383410390_The_role_of_software_automation_in_improving_industrial_operations_and_efficiency/links/66cb6393c2eaa500231867e1/The-role-of-software-automation-in-improving-industrial-operations-and-efficiency.pdf
[16]. Lutfi, A., Al-Okaily, M., Alsyouf, A., & Alrawad, M. (2022). Evaluating the D&M IS success model in the context of accounting information system and sustainable decision making. Sustainability, 14(13), 8120.
https://www.mdpi.com/2071-1050/14/13/8120
[17]. Kanaparthi, V. (2024, January). Exploring the Impact of Blockchain, AI, and ML on Financial Accounting Efficiency and Transformation. In International Conference on Multi-Strategy Learning Environment (pp. 353-370). Singapore: Springer Nature Singapore.
https://link.springer.com/chapter/10.1007/978-981-97-1488-9_27
[18]. Zareen, M., Hamdan, A., & Binsaddig, R. (2024). The Impact of Robotic Process Automation (RPA) on Accounting Profession. In Business Development via AI and Digitalization: Volume 1 (pp. 191-199). Cham: Springer Nature Switzerland.
https://link.springer.com/chapter/10.1007/978-3-031-62102-4_16
[19]. Olorunyomi, T. D., Sanyaolu, T. O., Adeleke, A. G., & Okeke, I. C. (2024). Analyzing financial analysts' role in business optimization and advanced data analytics. International Journal of Frontiers in Science and Technology Research, 7(2), 29-38.
https://www.researchgate.net/profile/Adams-Adeleke-2/publication/385139028_Analyzing_financial_analysts'_role_in_business_optimization_and_advanced_data_analytics/links/671850e168ac304149ab9409/Analyzing-financial-analysts-role-in-business-optimization-and-advanced-data-analytics.pdf
[20]. Nayak, A., Satpathy, I., Patnaik, B. C. M., Gujrati, R., & Uygun, H. (2024). Simplified hospital management system: Robotic Process Automation (RPA) to rescue. In Data-centric AI solutions and emerging technologies in the healthcare ecosystem (pp. 281-302). CRC Press.
https://www.taylorfrancis.com/chapters/edit/10.1201/9781003356189-17/simplified-hospital-management-system-arpita-nayak-ipseeta-satpathy-patnaik-rashmi-gujrati-hayri-uygun
[21]. Cao, S. S., Jiang, W., Lei, L., & Zhou, Q. (2024). Applied AI for finance and accounting: Alternative data and opportunities. Pacific-Basin Finance Journal, 102307.
https://www.sciencedirect.com/science/article/abs/pii/S0927538X24000581
[22]. ALShanti, A. M., Al-Azab, H. A. H., Humeedat, M. M., & AlQudah, M. Z. (2024). Exploring the evolution of creative accounting and external auditors: Bibliometric analysis. Cogent Business & Management, 11(1), 2300500.
https://www.tandfonline.com/doi/full/10.1080/23311975.2023.2300500
[23]. Dataset Link:https://www.kaggle.com/datasets/kennedywanakacha/industrial-robotics-and-automation-dataset