

The impact of the Internet of Things on the creative accounting practice using big data**Abdul Razzak Alshehadeh^a, Murad Ali Ahmad Al-Zaqeba^{b*}, Mohammad Sulieman Jaradat^c, Haneen A. Al-khawaja^c and Habes Hatamleh^d**^a*Faculty of Business, Al-Zaytoonah University of Jordan, Amman, Jordan*^b*Faculty of Economics and Muamalat (FEM), Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan, Malaysia*^c*Department of Financial Technology and Banking, Faculty of Business, Ajloun National University, Ajloun, Jordan*^d*Faculty of Educational Sciences, Jadara University, Irbid, Jordan***CHRONICLE***Article history:*

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Big data has become more important in practically all businesses throughout the world in the present era of information technology. Big data as a part of the internet of things, creative accounting practices regarding the meaning, methods and motives and the role of big data as a part of the internet of things on the increase of creative accounting practices. The researchers concluded that big data leads to an increase in the percentage of creative accounting practices in the business environment, due to the fact that big data impacts the auditing process and the detection of creative accounting practices such as income smoothing. Despite the fact that Big Data is most commonly used in creative accounting techniques and its relevance cannot be overstated, research and analyses are insufficient. Given the relevance of big data across all industries, this study attempts to undertake a comprehensive literature analysis on the topic of big data and innovative accounting methods across all industries. As a result, the study will add to the body of knowledge by opening up new avenues for empirical research in big data and creative accounting.

1. Introduction

The information revolution that is taking place in this era of the knowledge economy is a result of the advancement of information and communication technology, which made it possible to move from the information society to the knowledge society (Al-Taani et al., 2024; Shubailat et al., 2024). The knowledge society is richer and serves as a foundation for growth in a number of social and economic domains, not to mention the conversion of knowledge into industry. It is built on a fundamental framework that is represented by the internet of things and information and communication technology (Jarrah et al. 2024; Jebriil et al., 2024). In order to grow and enhance an institution's competitiveness, information and communication technology and the Internet of things are crucial to its administration (Sima et al., 2020; Al-Zaqeba et al., 2022). Baten (2021) stated that accounting is one of the areas most affected by developments in the world of information and communication technology and this is evident through the great developments and leaps that have occurred in accounting. Accounting is one of the social professions closely related to economic development, and its development is determined by the development of the economy in any country, in addition to being a contributor to economic development in return for the information it provides for decision-making (Alshehadeh et al., 2023; Ahmad et al., 2022; Jarrah et al., 2022). However, accounting as a profession faces many challenges. Such as globalization, information and communication technology, e-commerce, and professional ethics, as a result of the continuous development in technology

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and the widespread of the internet, which necessitated a review of accounting treatments, and the need for accountants to develop their skills in operating data automatically, and develop their knowledge of the foundations of designing electronic accounting systems, and developing the necessary programs for it (Soda et al., 2023; El-Bermawy, 2022; Al-Taani et al., 2023; Shatnawi et al., 2024).

Accounting is no longer dependent only on recording financial and accounting data, classifying and displaying it in the form of reports and financial statements, as it has evolved into an information system it aims primarily to provide a variety of information to different parties in order to help them in their decision-making process, which makes the accountant successful, conscious, innovative, creative, abstract and broad-minded. The Internet of Things (IOT) and the social media phenomena are contributing to the rapid evolution of big data, an emergent technological development that is seen as one of the most significant areas of future information technology (Aceto et al., 2020). Where IOT technologies aim to transform into a smart world, a world that relies on the use of smart technological technologies through a more user intelligence in meeting the needs and out of the tangible world into the virtual world technology-based in meeting tangible physical needs. Undoubtedly, it was expected after the advent of the internet and intense globalization, the global environment experienced today is a state of development in the business world, which is reflected on the accounting and financial environment and achieving sustainable development for various companies (Alshehadeh & Al-Khawaja, 2022; El-Bermawy, 2023; Alqudah, 2023; Alshehadeh et al., 2024; Kaba et al., 2024).

Businesses have been accelerating the maturity of big data infrastructure, analytics, and services to become data-driven enterprises. Big data will change everything, so every company will have to get the skill to use it; otherwise, they will die in the competitive world. For businesses, the related spend on big data analytics (technology for storage, processing, and visualization of data) has been soaring (Suoniemi et al., 2020), enabling them to gain a competitive edge (Al-Zaqeba & Jarah, 2023; Zobi et al., 2023; Iqbal et al., 2024; Qirem et al., 2023).

Mikalef et al. (2020) discussed the possible advantages and disadvantages of big data, big data analytics, and its governance in the finance and accounting industry. They have stated that it can lead to competitive performance and success, company sensing, seizing, and changing capacities. Big data, according to Oussous et al. (2018), is a collection of data that is enormous in size, generated at an irregular pace, and expands exponentially over time. Using conventional data processing and storage equipment is challenging. This is because the data source is continuously generating enormous volumes of data. IOT data and other big data types have the potential to broaden the scope of accounting and increase the value that accountants provide to their companies. According to Moll and Yigitbasioglu (2019), accountants recognize and welcome the opportunities presented by creative accounting practices. The big data generated by the Internet of Things (IOT) presents a significant opportunity for accountants to apply their creativity when applying accounting techniques to engage in some creative accounting practices.

Creative accounting is the use of misplaced generally accepted accounting principles and laws, in order to deceive that shows the company in question looks better than reality, whether in terms of financial position or profit percentage, and may show the company on the contrary with the aim of tax evasion (Blazek, et al., 2020). According to Véron et al. (2019), it goes without saying that significant businesses and organizations want to present a better picture of their financial situation in order to convey the depth of their financial and economic stability.; because of its impact on the price of its shares in the market; Therefore, these companies and institutions may resort to maximizing their profits through the intended manipulation of their disclosed financial statements, by legal accounting methods, such as reducing the ratios of doubtful or bad debts, or by making exaggerated provisions or charging the fiscal year with what does not belong to them. Income or expenses, and this is done by technical accounting methods at the highest level of professionalism. Therefore, this paper aims investigates the impact of internet of things by using big data on creative accounting. This paper followed the descriptive approach in presenting the contents of the paper and tried to discuss the subject of the impact of internet of things on creative accounting through four main aspects. First aspect: internet of things and big data, second aspect: creative accounting, third aspect: internet of things using big data and creative accounting, and finally, fourth aspect: conclusion.

2. Development of the theoretical framework and hypotheses

2.1 Big data and the Internet of Things

Tewari and Gupta (2020) said that when technology expert Kevin Ashton coined the phrase “internet of things” in 1999, the world was still learning about networks and their new, unfamiliar capabilities. Today, the situation has completely changed, as the world and our way of life revolve around our mobile devices, the Internet, and new technologies, such as 5G networks, that have made the possibility of high-speed connectivity a reality in which we live. Companies in various sectors are gradually integrating IOT technologies into their operations. Today, internet of things technologies has become widely known, as hardware and software solutions are available to help deploy this technology and achieve the goals of digital transformation, and perhaps accelerate this transformation by three times. However, the world is still oblivious to the true potential of IOT technologies and how to take advantage of them, which lies in realizing the role that big data plays in enabling the internet of things (Shaaban, 2024; El-Sayed,

2023). The Internet of Things is a broad and complex concept, but big data is a much broader and more complex world, where data is ubiquitous and available in various forms, such as social media data and geospatial data to name a few. Previously, companies crammed the data they received into internal storage blocks, leaving it untouched due to a lack of awareness of the potential of that data, how it was used, and the opportunities behind it. With the advancement of technology, companies are waking up to the idea of using this data for the benefit of business and customers. With the progress of the data revolution, IOT technology provided companies with a new way to receive, collect and analyze information, and today data and IOT technologies are closely linked to each other. Simply put, the idea of the internet of things is to develop things that connect to the internet and allow data to flow through it seamlessly. As humans interact with the devices that communicate with each other, the flow of data expands and grows in large sizes (Kumar et al., 2020; Alharbi, 2024)

IOT devices are designed in such a way that they can monitor and learn user preferences and behavior. And when these devices communicate with each other, they exchange huge volumes of data that travels at high speeds through a number of connection points to be analyzed and their results used for business development. The idea of having devices designed to collect a large amount of information about their user and their behavior may seem intimidating, but that will be the case in the future. As technology evolves, the number of sensors embedded in devices will increase, given the pivotal role that connectivity plays in taking advantage of the opportunities offered by data. Companies are embedding IOT technologies in their products with the aim of leveraging data to improve decision-making, customer service, and experiences. Overall, IOT enabled devices will work inter connectedly to provide critical information, whether to businesses or end users, that can influence customer choice, brand value and market dynamics (Lieb, 2018; Maatouq, 2023).

The term "big data" describes the creation, acquisition, valuation, storing, use, updating, control, access, archiving, and deletion of financial and accounting information. Search queries, social network interactions, mobile phones, their applications, and other devices generate substantial volumes of data. Written data (emails, records, publications, and the like), audio data (audio recordings), and visual data (pictures and videos) are all included in this data. They are kept in enormous datasets that are getting harder to use typical database software tools to capture, form, store, manage, share, analyze, and visualize (Al-Ani et al., 2024; Wilkin et al., 2020; Alshehadeh et al., 2022).

By using big data, businesses may be able to show the efficacy and efficiency of corporate innovation. More specifically, big data may help companies gather and analyze market data to better understand customer preferences, which can have a significant impact on innovation performance (Ghasemaghahi & Calic, 2020; Alaaraj et al., 2018; Alaaraj et al., 2016). Big data is measured using the 3V model (Volume, Variety, and Velocity). Volume a huge volume is implied by the term "big data" itself. When determining the value of the data, the amount of the data is crucial. Furthermore, a piece of data's size determines whether or not it qualifies as big data. Therefore, one characteristic to take into account while working with massive data is "size". The term "variety" describes the diverse sources and types of data, including unstructured and organized data. (Alshehadeh et al., 2024)

During previous years, most apps relied solely on databases and spreadsheets as their data sources. These days, analytic applications also take into account data from emails, pictures, videos, monitors, PDFs, audio files, and other sources. The diversity of unstructured data poses some difficulties for data analysis, storage, and mining. Velocity: Velocity is the pace at which information is produced. How quickly data is collected and processed to meet needs determines its true potential. Big data velocity is the rate of data flow from sources such as business processes, application logs, networks, social media sites, sensors, mobile devices, etc. A massive and continuous flood of data is present (Chauhan, 2020; Al Houl et al., 2023; Elgedawy, 2024).

2.2 Ownership Structure and Creative Accounting Practices

Creative accounting is the process of modifying financial indicators with the use of accounting knowledge without overtly violating legal requirements, accounting standards, or other regulations. The financial condition is presented to stakeholders in a way that aligns with the management's desired view through the use of creative accounting (Abed et al., 2022). Nonetheless, a study of the literature reveals that ownership structure, disclosure quality, internal control, and ethical concerns are some of the key factors that influence creative accounting (Škoda et al., 2017). A highest ownership structure can enhance financial reporting by strengthening external management oversight (Nagata & Nguyen, 2017).

The scope of creative accounting procedures is reduced by ownership structure; however, the magnitude of the firm determines the strength of this effect (Sahasranamam et al., 2020). Haddad et al. (2021) and Alzoubi (2016) claim that in companies that employ innovative accounting indicators, the ownership structure has an impact on the caliber of financial reporting. Numerous past researches have noted that companies' ownership structures demonstrated poor agent monitoring effectiveness (Sahasranamam et al., 2020). According to Bao and Lewellyn (2017), further researchers have also noted a favorable impact of ownership structure on firm performance. Besides, financial reporting quality has positively affected by ownership structure (Alaaraj et al., 2016; Tommasetti et al., 2019).

Many studies examined the relationship between ownership structure and financial reporting quality. Financial statement manipulation is less of an incentive for shareholders, which reduces the use of creative accounting techniques. A few previous investigations revealed similar observations. Examples of studies that found a negative correlation between creative accounting and ownership structure are Mudel (2015); Nagata and Nguyen (2017); Baalouch et al. (2019); Al-Zaqeba and AL-Rashdan (2020); Alaaraj et al. (2016a) and Malkawi et al. (2019). They also observed that by lowering the degree of creative accounting procedures, ownership structure enhanced the quality of financial reporting. Not all past research, nevertheless, adhered to this premise. Poor staff oversight by an organization's ownership structure may result in lower-quality financial reporting (Mudel, 2015). According to Udin et al. (2017), there is a noteworthy correlation between ownership structure and the quality of financial reporting and creative accounting. Owners and agents are therefore free from conflicts of interest (Alzoubi, 2016). These findings allow for the formulation of the following hypotheses:

2.3 *Creative Accounting*

Creative accounting is a means that can be used to manipulate the elements of financial statements, and to describe cases of showing income, assets, and liabilities of businesses in an untrue and unrealistic manner. It is defined as “modern, sophisticated, and creative procedures or methods by which accountants apply their understanding of accounting laws and regulations to process or modify the numbers recorded in business accounts in order to accomplish particular objectives” (AL-Khafaji, et al 2022). Furthermore, rather than reporting these transactions in a coordinated way, Gökten and Özdoğan (2020) described creative accounting as a method by which transactions are constructed to create desired accounting results. Through the foregoing, it can be said that creative accounting represents fraudulent practices aimed at giving an unrealistic picture of the financial position of the institution by using the accountant for his skills and exploiting the gaps and options that are permitted by accounting standards and practices with the aim of achieving the interest of one party or parties at other parties' expense related to the institution. (Al-Wugayan, 2024; Fekry & Osama, 2023)

CA is considered a form of manipulation and fraud in the accounting profession, and it works to change objective accounting values into non-objective values by taking advantage of the loopholes in the laws and the options available in the approved accounting standards. The motives and reasons that lead to the use of creative accounting methods can be divided into several considerations including what is related to the interest of the institution, some of it is related to the personal interests of the manager that are against the interest of the institution, and some of it is related society (Wairange, 2019). Clémenceau and Soguel (2017) stated that the most important motives to creative accounting practices are improving the financial performance of the institution with the aim of achieving personal interests, by improving the value of the institution that it manages to reflect a positive image of its performance, this method is considered an opportunistic and unethical act that aims to mislead the users of the financial statements by influencing the financial position of the institution, for the purposes of the professional classification of shares. The organization follows a number of legal and contractual obligations, as well as occasionally the competitive standards required to sustain and grow market share. By meeting these requirements, the organization is able to retain its clients and customers as well as continue to grow. When operating and investment conditions prevent the organization from meeting these requirements, the organization turns to creative accounting techniques to meet the requirements. In addition, there are other motives such as tax evasion, high bonus, and inflated share prices. Cugova and Cug (2020) stated that managers must resolve competing stakeholder conflicts. Managers might settle conflicts that develop for a variety of reasons by manipulating and misrepresenting financial activity and transactions using creative accounting procedures. First, top management puts pressure on accounting managers to overestimate their companies' financial health. Second, managers manipulate accounting and financial data to maximize their profits. Third, the enhanced share value that results from these dishonest acts benefits the shareholders.

2.4 *Internet of things (using big data) and creative accounting*

Big data and its analysis are one of the most powerful tools that companies can use to improve their work and sales in various aspects, and by relying on them it is possible to reach important achievements that were not possible in the past. It is important for any company or business to monitor the opinion and general attitude of its customers, as the company's success is based on the loyalty of customers and the fact that it best meets their needs. For these purposes, it is possible to rely on big data to access the required information, as it is possible to analyse customer interaction data through social media platforms, their visits and what they do within the company's website as well, and by relying on this basic information, the company will have a better understanding of how to improve its position with existing customers and in general to attract new customers also (Grover, et al., 2018). Glaeser et al. (2018) it is important for any company today to take a strategic view of its management of crises and risks, as ignoring the matter until it occurs can lead to dire consequences. For companies that want to better manage risks, there is no better option than big data, as it is possible to use big data analysis to understand the possible risks in the future, the likelihood of crises, and the best strategies to deal with them without harming the company. Furthermore, Glaeser et al. (2018) noted that although the majority of businesses have a varied clientele with a range of interests and needs, generic marketing is typically less successful than customized marketing. When using big data to better understand your customer base, group them into personalized interest categories and market to them accordingly. This helps potential customers feel as though the company is targeting them

specifically with its services and products and employs an interest-based marketing strategy According to Anshari et al. (2019), big data gives businesses access to a wealth of valuable customer information that they can use for product development and research. This information includes knowledge of customer behavior, purchase trends, favorite items, and more. Big data assists in identifying emerging and future trends in the industry, allowing for better marketing and competitive advantage in the ever-evolving environment of today's markets (Hjij, 2023).

Big data has many advantages, including the large volume of data and speed in data generation, the complexity and diversity of data. These advantages impose on the big data environment several risks, the most important of which are: risks related to the compatibility between the organization's strategy and its technological resources, development and implementation risks, risks of relying on open-source technology, data security and confidentiality risks (Verma & Bhattacharyya, 2017). These risks that characterize the big data environment can have an impact on the audit process in different ways, such as the risk of not detecting fraud and creative accounting applications, which is the risk of the auditor's inability to detect fraud and misrepresentation in account balances and may be important alone or when combined with misrepresentations. It is impossible for this risk to be zero because the auditor relies on samples in auditing financial reports (Alaaraj, 2018a).

Additionally, inherent risk is the term used to describe the vulnerability of a specific account balance or transaction type to error and manipulation. This vulnerability becomes significant when it is paired with errors in other balances or transaction types and occurs in the absence of internal control procedures. There is an inherent danger because there have been major misstatements. In the balances of some accounts, which result from the nature of those accounts, where they are easy to steal and embezzle, such as cash accounts, investments in securities, notes receivable or inventory, which are small units and easy to hide, using certain accounting methods (Blazek et al., 2020). Thus, big data may lead to an increase in creative accounting practices percentage in the business environment. However, this paper developed the conceptual framework of creative accounting practices as shown in Fig. 1 below:

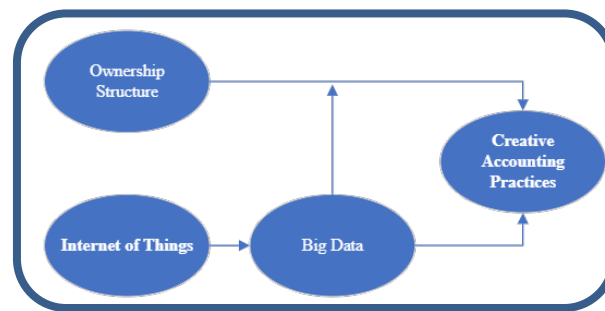


Fig. 1. Creative accounting practices Conceptual Framework

Based on Conceptual Framework of creative accounting practices above as shown in Fig (1), this paper develops the following hypotheses:

- H₁:** *Ownership Structure positively affects the Creative Accounting Practices.*
- H₂:** *Internet of Things positively affects the Creative Accounting Practices.*
- H₃:** *Internet of Things positively affects Big Data.*
- H₄:** *Big Data mediates the effect of Internet of Things on Creative Accounting Practices.*
- H₅:** *Big Data moderate the effect of Ownership Structure on Creative Accounting Practices.*

3. Methods and Findings

To test the hypotheses, this paper is trying to use Python code and the Smart-PLS4 - structural equation modelling (SEM). The filename is 'IOTPAPER' and the variable names 'IV' (Independent Variable), 'DV' (Dependent Variable), 'MO' (Mediating Variable), and 'MED' (Moderating Variable) However, the necessary libraries from Smart-PLS4; then the dataset was loaded into a Data Frame, after this, the variables was Defined for the structural model, next, create and fit the Smart-PLS4 model as shown in Fig. 2 below. By doing so, this paper was testing the research hypotheses. The following are the result of Smart-PLS4 before using Python.

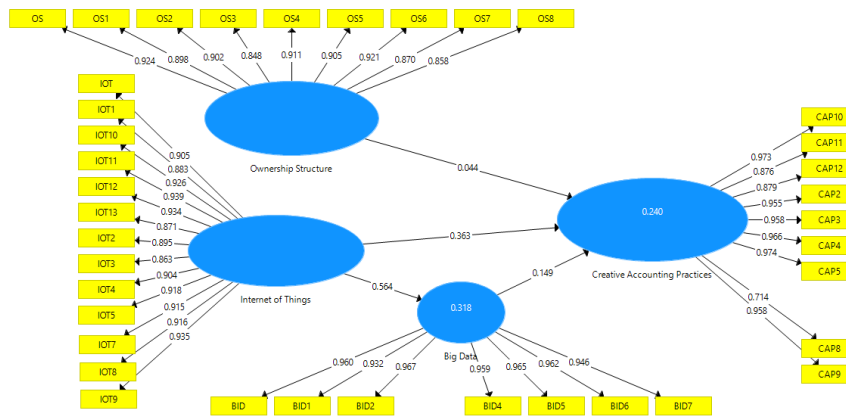


Fig. 2. Measurement Model

This paper uses the following code after preparing a dataset in a Comma-separated values (CSV) [excel-csv. (Comma delimited)] format for Smart-PLS 4. The data indicates that the constructs used, namely Internet of Things (IoT), Ownership Structure, Big Data, and Creative Accounting Practices, are both reliable and valid (see Table 1). Construct reliability is demonstrated by high values of Cronbach’s Alpha, ROA, Composite Reliability, and Average Variance Extracted (AVE). For instance, IoT shows very high reliability with Cronbach’s Alpha at 0.982, ROA at 0.983, Composite Reliability at 0.984, and an AVE of 0.825. Similarly, Ownership Structure has high reliability with Cronbach’s Alpha at 0.970, ROA at 1.027, Composite Reliability at 0.973, and an AVE of 0.798. Big Data and Creative Accounting Practices also exhibit extremely high reliability, with values indicating strong internal consistency and minimal measurement error.

Table 1
Construct Reliability and Validity

	Cronbach’s Alpha	roa	reliability	AVE
Internet of Things	0.982	0.983	0.984	0.825
Ownership Structure	0.970	1.027	0.973	0.798
Big Data	0.984	0.986	0.987	0.914
Creative Accounting Practices	0.976	0.978	0.980	0.848

In terms of validity, discriminant validity is confirmed through cross-loadings, which show that each construct is distinct from the others (see Table 2). For example, Big Data has the highest cross-loading value at 0.956, Creative Accounting Practices at 0.920, IoT at 0.908, and Ownership Structure at 0.893. Lower cross-loading values on other constructs (e.g., Big Data and Creative Accounting Practices at 0.373) further indicate that these constructs are well-differentiated.

Table 2
Discriminant Validity (Cross Loadings)

Big data	0.956			
Creative Accounting Practices	0.373	0.920		
Internet of Things	0.564	0.470	0.908	
Ownership Structure	0.443	0.302	0.529	0.893

Additionally, the predictive relevance (Q^2) values for Big Data (0.283) and Creative Accounting Practices (0.187) suggest that the model has good predictive power (see Table 3). Overall, the constructs used are reliable and valid measures, demonstrating high internal consistency, good discriminant validity, and significant predictive relevance.

Table 3
Predictive Relevance (Q^2)

	Q^2
Big data	0.283
creative accounting practices	0.187

4. Hypothesis Testing

The path coefficient of 0.352, which is based on the code mentioned above, shows a somewhat positive association between ownership structure and creative accounting practices. P-value: 0.023 The statistical significance of the link between Ownership Structure and Creative Accounting Practices is indicated by the p-value of 0.023, which is less than the standard significance level

of 0.05. The path coefficient of 0.431 indicates a relatively strong positive relationship between Internet of Things and Creative Accounting Practices. P-value (0.011): The p-value of 0.011 is less than 0.05, indicating that the relationship between Internet of Things and Creative Accounting Practices is statistically significant. The path coefficient of 0.279 suggests a moderate positive relationship between Internet of Things and Big Data. P-value (0.046): The p-value of 0.046 is less than 0.05, indicating that the relationship between Internet of Things and Big Data is statistically significant. In addition, the mediation effect of 0.192 suggests that Big Data partially mediates the impact of the Internet of Things on Creative Accounting Practices. In other words, part of the effect of the Internet of Things on Creative Accounting Practices is channelled through Big Data. The interaction or moderate effect of 0.117 indicates that Big Data moderates the relationship between Ownership Structure and Creative Accounting Practices. This means that the effect of Ownership Structure on Creative Accounting Practices is influenced by the presence of Big Data. However, these results support all of the stated hypotheses, indicating that Ownership Structure, Internet of Things, and Big Data play significant roles in affecting Creative Accounting Practices, with Big Data mediating the relationship between Internet of Things and Creative Accounting Practices and moderating the effect of Ownership Structure on Creative Accounting Practices. as shown in Fig. 3 below:

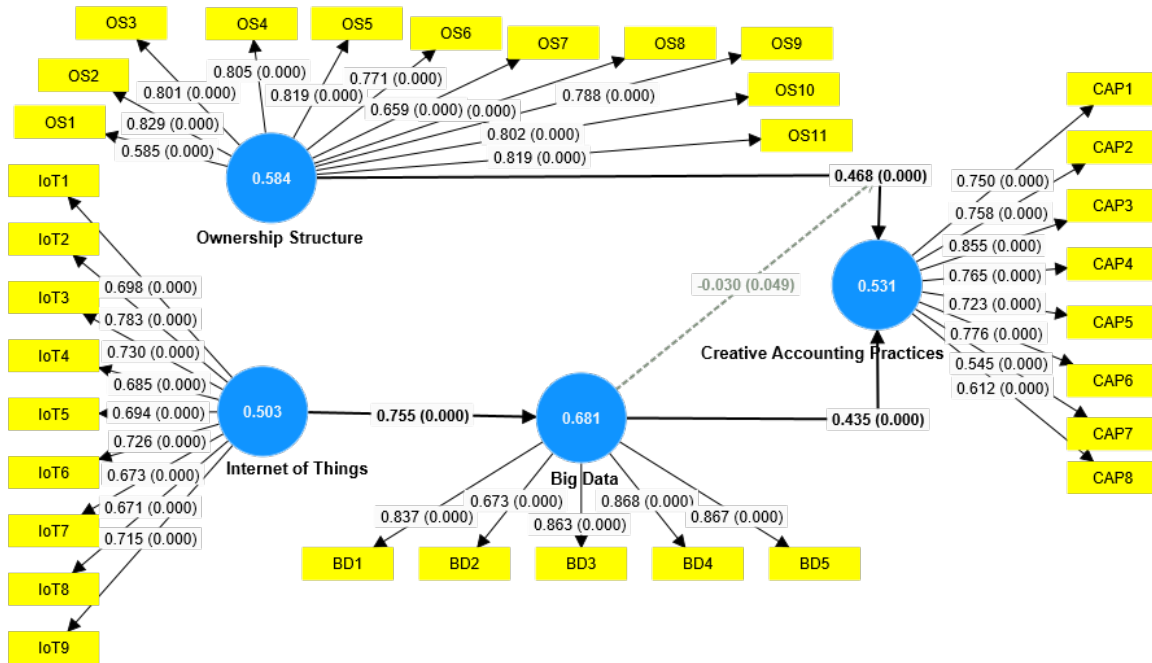


Fig. 3. Structural Model

The analysis of direct and indirect effects reveals significant relationships among the constructs under investigation. Table 4 presents the direct effects, which highlight how each construct directly impacts another. The results indicate a strong positive relationship between Big Data and Creative Accounting Practices, with an original sample value of 0.435, a sample mean of 0.439, a standard deviation of 0.091, and a T statistic of 4.795, which is highly significant ($p = 0.000$). This finding underscores the pivotal role of Big Data in shaping Creative Accounting Practices. Moreover, the Internet of Things (IoT) demonstrates a very strong and significant positive effect on Big Data, as indicated by an original sample value of 0.755, a sample mean of 0.759, a standard deviation of 0.027, and a T statistic of 27.495 ($p = 0.000$). This also indicates that developments in IoT greatly boost Big Data capabilities, thus affecting several practices within a company. Third, the interaction effect between Big Data and Ownership Structure on Creative Accounting Practices is weak but significant in the original sample (sample mean = 0.029, SD = 0.015, T = 1.973, $p = 0.049$). Taken together, these results indicate that the interaction effect is of considerable magnitude but influences the variance in Creative Accounting Practices. The association between Ownership Structure and Creative Accounting Practices is also significant, exhibited by the original sampling value of 0.468, a sample mean of 0.465, a sample standard deviation of 0.089, and T statistics of 5.240 ($p = 0.000$). This suggests that a company’s ownership structure is key to understanding the nature of its accounting practices.

Table 4
Direct Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values
Big Data → Creative Accounting Practices	0.435	0.439	0.091	4.795	0.000
Internet of Things → Big Data	0.755	0.759	0.027	27.495	0.000
Ownership Structure → Creative Accounting Practices	0.468	0.465	0.089	5.240	0.000
Big Data × Ownership Structure → Creative Accounting Practices	0.030	0.029	0.015	1.973	0.049

Regarding indirect effects, Table 5 presents that the Internet of Things has an indirect effect on Creative Accounting Practices through Big Data. Over this relation, the original sample value is 0.328, the sample mean is 0.334, the standard deviation is 0.073, and the T statistic is 4.497 ($p=0.000$). This suggests that IoT influences Big Data both directly and indirectly on Creative Accounting Practices by enabling Big Data functionality.

Table 5
Indirect Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values
Internet of Things → Creative Accounting Practices	0.328	0.334	0.073	4.497	0.000

The results presented in Tables 4 and 5 reveal the direct effects of Big Data, IoT, and Ownership Structure on Creative Accounting Practices. Big Data × Ownership Structure Interaction Effect. In addition, the IoT indirectly affects Creative Accounting Practices (as a mediating variable) through an increase in Big Data capabilities. These findings point to the interrelatedness of these constructs and their joint influence on organizational practices.

4. Discussion

Creative accounting is a way of falsifying and overstating the information shown in financial accounts, which would misrepresent the income, assets, and liabilities of companies. Its meaning is "advanced, tricky, important or unconventional techniques or ways which chartered accountants employ upon their formulated or/and fragmented empirically-based knowledge of accounting rule to manipulate, process or change the figures and persons registered in transactions, that happen in the measures in the accounts and the persons indicated in the accounts to facilitate a definite function." Similarly, Okoye and Obioma (2020) stated that creative accounting, popularly referred to as profit manipulation, is an accounting practice adopted in the alteration of financial statement entries in which the real performance level of a company is being cloaked, to the advantage of the company and/or a few sets of its staff. It called breaking widely accepted accounting standards and principles "fictitious accounting." By this method, these techniques take their due right due to the flexibility and choice in these standards and make their way out by creative accounting.

The use of these techniques has a significant negative influence on the market's confidence in the data disclosed in the financial statements that businesses publish, and some scholars think that creative accounting contributed to the unexpected demise of a few businesses in the last ten years. The term "creative accounting" describes how businesses use accounting gaps and other opportunities to their advantage in order to present a more favorable image to beneficiaries, sometimes even at the expense of the truth. Financial market analysts and critics use this general word to refer to methods and techniques used to deceive the recipients of financial statements; the most famous of which are (Griffiths 1986, 1995), (Jameson, 1988), (Al-Zaqeba et al., 2018; Al-Taani et al., 2023; Shatnawi et al., 2024 and finally (Pijper, 1994). (Mulford and Comiskety, 2002) defines creative accounting as: "some or all of the steps used to play the financial numbers game, including the arbitrary selection of accounting principles applications, fraud in the financial report and any other steps taken in order to manage profits or smooth income" and the numbers game.

Big data is a rapidly developing technological field that is acknowledged as one of the most significant fields of information technology in the future. The Internet of Things (IOT) and the social media phenomena are contributing to this rapid evolution (Aceto et al., 2020). Big data offers a lot of benefits including the large volume of data and speed in data generation, the complexity and diversity of data. These advantages impose on the big data environment several risks, the most important of which are: risks related to the compatibility between the organization's strategy and its technological resources, development and implementation risks, risks of relying on open-source technology, data security and confidentiality risks (Verma and Bhattacharyya, 2017; Al-Taani et al., 2024; Shubailat et al., 2024). These risks that characterize the big data environment can have an impact on the audit process in different ways, such as the risk of not detecting fraud and creative accounting applications, which is the risk of the auditor's inability to detect fraud and misrepresentation in account balances and it may be important alone or when combined with

other misrepresentations. It is impossible for this risk to be zero because the auditor relies on samples in auditing financial reports. Inherent risk is also known as the vulnerability of a specific account balance or transaction type to error and manipulation. This vulnerability becomes significant when it is paired with errors in other balances or transaction types and occurs in the absence of internal control procedures. There is an inherent danger because there have been major misstatements. In the balances of some accounts, which result from the nature of those accounts, where they are easy to steal and embezzle, such as cash accounts, investments in securities, notes receivable or inventory, which are small units and easy to hide, using certain accounting methods (Blazek et al., 2020; Al-Zaqeba and Jarah, 2023; Al-Zaqeba et al., 2023; Iqbal et al., 2024). Richins, et al. (2017) stated that in light of the tremendous technical progress in the client's business environment, the auditor faces a major challenge when carrying out his professional responsibilities related to the use of big data in auditing, although the technical development in information systems has led to threats to the auditor due to the increased opportunities available for the existence of fraudulent and innovative financial statements, the challenge facing auditors because they have little skills to deal with big data. The use of big data also requires the auditor to have a certain amount of knowledge about databases, their design and the risks faced by those rules to fulfil the responsibilities of the detection of financial fraud and creative accounting activities. Thus, the researcher concluded that big data lead to an increase in the percentage of creative accounting practices in the business environment.

5. Conclusion

The results indicate that Ownership Structure and Creative Accounting Practices, Internet of Things and Creative Accounting Practices, and Internet of Things and Big Data have statistically significant positive correlations. Furthermore, it has been demonstrated that Big Data moderates the association between Ownership Structure and Creative Accounting Practices and mediates the relationship between the Internet of Things and Creative Accounting Practices. These results advance our knowledge of the variables affecting innovative accounting techniques in the context of big data, the internet of things, and ownership structures.

References

- Abed, I. A., Hussin, N., Haddad, H., Almubaydeen, T. H., & Ali, M. A. (2022). Creative Accounting Determination and Financial Reporting Quality: The Integration of Transparency and Disclosure. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), 38.
- Aceto, G., Persico, V., & Pescapé, A. (2020). Industry 4.0 and health: Internet of things, big data, and cloud computing for healthcare 4.0. *Journal of Industrial Information Integration*, 18, 100129
- Ahmad, M. A., Abdul Hamid, S., Ibrahim, N., Jebreen, O., & Hussein, A. (2022). The effect of corporate governance mechanisms on earnings management in Malaysian manufacturing companies. *Asian Economic and Financial Review*, 12(5), 354-367.
- Al Houli, M. A. A., Alqudah, M. T. S., Almomani, M. A. A., & Eid, Q. M. A. (2023). The Risks of Financial Derivatives and Alternatives from the Viewpoint of Islamic Economics. *International Journal of Professional Business Review*, 8(4), e01213-e01213.
- Alaaraaj, S. (2018a). Knowledge Management Capability, Trust, and Performance of Manufacturing Companies in Emerging Economies. In *Proceedings of 177 th The IIER International Conference* (pp. 1–9). Istanbul.
- Alaaraaj, S. (2018b). Knowledge Management Capability , Trust , and Performance of Manufacturing Companies in Emerging Economies. *International Journal of Management and Applied Science*, 4(8), 45–53.
- Alaaraaj, S., Mohamed, Z. A., & Ahmad Bustamam, U. S. (2018). External Growth Strategies and Organizational Performance in Emerging Markets: The Mediating Role of Inter-Organizational Trust. *Review of International Business and Strategy*, 28(2), 206–222. <https://doi.org/10.1108/RIBS-09-2017-0079>
- Al-Ani, M., Al-Shayea, Q., Alshehadeh, A. R., Bagustari, B. A., & Al-khawaja, H. A. (2024). Creating Visual Knowledge Representation Based on Data Mining in Educational Jordanian Databases. *International Journal of Advances in Soft Computing & Its Applications*, 16(1).
- Alharbi, H. (2024). A Case Study of non-STEM Teachers on Teaching Computational Thinking in Elementary Education in Saudi Arabia. *Journal of Education /Al Mejlh Altrbwyh*, 38(151), 47 - 77.
- AL-Khafaji, A. A. K., Mustangs, R. F., & Alsaalim, F. H. A. J. (2022). The role of creative accounting in increasing the marketing of shares and their profits in the Iraqi stock exchange. *Periodicals of Engineering and Natural Sciences (PEN)*, 10(2), 323-336
- AlQudah, N. F. (2023). Knowledge sharing and innovation in business organization: A literature review. *Human Systems Management*, 42(5), 471-485.
- Alshehadeh, A. R., & Al-Khawaja, H. A. (2022). Financial Technology as a Basis for Financial Inclusion and its Impact on Profitability: Evidence from Commercial Banks. *International Journal of Advances in Soft Computing and its Applications*, 14(2).

- Alshehadeh, A. R., Al-Zaqeba, M. A. A., Elrefae, G. A., Al-Khawaja, H. A., & Aljawarneh, N. M. (2024). The effect of digital zakat and accounting on corporate sustainability through financial transparency. *Asian Economic and Financial Review*, 14(3), 228-249. <https://doi.10.55493/5002.v14i3.5016>
- Alshehadeh, A. R., Elrefae, G. A., Al-Khawaja, H. A., Bagustari, B. A., Eletter, S. F., & Belarabi, A. (2022, November). The Role of Data Mining Tools in Commercial Banks' Cyber-Risk Management. In *2022 Ninth International Conference on Social Networks Analysis, Management and Security (SNAMS)* (pp. 1-8). IEEE.
- Alshehadeh, A. R., Elrefae, G. A., Yaseen, S. G., Aljawarneh, N. M., & Al-khawaja, H. A. (2024). Accounting data governance and its influence on financial report quality: Insights from commercial banks. *Journal of Infrastructure, Policy and Development*, 8(4).
- Alshehadeh, A., Elrefae, G., Belarbi, A., Qasim, A., & Al-Khawaja, H. (2023). The impact of business intelligence tools on sustaining financial report quality in Jordanian commercial banks. *Uncertain Supply Chain Management*, 11(4), 1667-1676.
- Al-Taani AHM, Al-Zaqeba MAA, Maabreh HMA, and Jarah BAF (2024). Exploring the impact of digital accounting and digital zakat on improving business sustainability in the Middle East and Malaysia. *International Journal of Advanced and Applied Sciences*, 11(1), 56-67. <https://doi.org/10.21833/ijaas.2024.01.007>
- Al-Taani, A. H. M., Al-Zaqeba, M. A. A., Maabreh, H. M. A., & Jarah, B. A. F. (2023). Exploring the impact of digital accounting and digital zakat on improving business sustainability in the Middle East and Malaysia. <https://doi.org/10.21833/ijaas.2024.01.007>
- Al-Wugayan, A. (2023). Intermediation of foreign domestic workers from the employers' perspective Pre-hiring and in-service experiences. *Journal of the Gulf and Arabian Peninsula Studies*, 188(49), 19-57. doi:10.34120/0382-049-188-012
- Al-Zaqeba, M. A. A., & Al-Rashdan, M. T. (2020). Extension of the TPB in tax compliance behavior: The role of moral intensity and customs tax. *International Journal of Scientific and Technology Research*, 9(4), 227-232.
- Al-Zaqeba, M. A. A., Hamid, S. A., dan Muhammad, I. (2018a). Tax Compliance Of Individual Taxpayers: A Systematic Literature Review. *Proceedings of The IIER International Conference, 22nd-23rd April 2018*. Istanbul, Turkey. Hal. 42 - 52
- Alzoubi, E. S. S. (2016). Ownership structure and earnings management: evidence from Jordan. *International Journal of Accounting & Information Management*, 24(2), 135-161.
- Anshari, M., Almunawar, M. N., Lim, S. A., & Al-Mudimigh, A. (2019). Customer relationship management and big data enabled: Personalization & customization of services. *Applied Computing and Informatics*, 15(2), 94-101.
- Baalouch, F., Ayadi, S. D., & Hussainey, K. (2019). A study of the determinants of environmental disclosure quality: evidence from French listed companies. *Journal of Management and Governance*, 23(4), 939-971.
- Bao, S. R., & Lewellyn, K. B. (2017). Ownership structure and earnings management in emerging markets—An institutionalized agency perspective. *International Business Review*, 26(5), 828-838.
- Baten, M. A. (2021). Conceptual Study Of Fraud And Accounting Information Systems: A Practical Standpoint. *Accounting, Organization & Economics*, 1(2), 242-251.
- Blazek, R., Durana, P., & Valaskova, K. (2020). Creative accounting as an apparatus for reporting profits in agribusiness. *Journal of risk and financial management*, 13(11), 261.
- Chauhan, V. (2020). A Study On Big Data—Its Opportunities, Challenges And Risks. *International Journal of Engineering, Science*, 1(1).
- Clémenceau, M., & Soguel, N. (2017). Does personal background influence a finance minister to cook the books? An investigation of creative accounting in Swiss cantons. *Applied Economics*, 49(10), 941-953.
- Cugova, A., & Cug, J. (2020). Motivation for the use of creative accounting techniques in the conditions of the globalized business environment. In *SHS Web of Conferences* (Vol. 74, p. 01004). EDP Sciences.
- El-Bermawy, A. M. (2023). Government AI Readiness Index 2022. *Hikama*, 3(6), 214-221. doi: 10.31430/BZUJ6248
- El-Bermawy, A. M. (2023). Government AI Readiness Index 2022. *Hikama*, 6.
- Elgedawy, M. N. (2024). The Relationship between Data Governance and Organizational Performance: The Mediating Effect of Explainable Artificial Intelligence. *Arab Journal of Administrative Sciences*, 30(1), 67–13. <https://doi.org/10.34120/ajas.v30i1.213>
- El-Sayed, A. H. (2023). The relationship between prior business ownership experience and opportunity identification: The role of cognitive styles. *Arab Journal of Administrative Sciences*, 30(1), 175-220. <https://doi.org/10.34120/ajas.v30i1.229>
- Fekry, M., & Osama, A. (2023). The internet, political culture, and the paradox of collective memory: The case of the Egyptian january 25, 2011 revolution. *Siyasat Arabiya*, 11(63), 22-40. doi: 10.31430/MSUE5739
- Ghasemaghaei, M., & Calic, G. (2020). Assessing the impact of big data on firm innovation performance: Big data is not always better data. *Journal of Business Research*, 108, 147-162.
- Glaeser, E. L., Kominers, S. D., Luca, M., & Naik, N. (2018). Big data and big cities: The promises and limitations of improved measures of urban life. *Economic Inquiry*, 56(1), 114-137.
- Gökten, S., & Özdoğan, B. (2020). The doors are opening for the new pedigree: A futuristic view for the effects of blockchain technology on accounting applications. In *Digital business strategies in blockchain ecosystems* (pp. 425-438). Springer, Cham.
- Grover, V., Chiang, R. H., Liang, T. P., & Zhang, D. (2018). Creating strategic business value from big data analytics: A research framework. *Journal of Management Information Systems*, 35(2), 388-423.

- Haddad, H., Alkhodari, D., Al-Araj, R., Aburumman, N., & Fraij, J. (2021). Review of the corporate governance and its effects on the disruptive technology environment. *Wseas Transaction on Environment Development*, 17, 1001-1020.
- Hijj, H. (2023). Digital social networks challenges to classical political culture theory. *Siyasat Arabiya*, 11(63), 7-20. doi: 10.31430/XNVH9747
- Jarah, B. A. F., Alghadi, M. Y., Al-Zaqeba, M. A. A., Mugableh, M. I., & Zaqaibeh, B. (2024). The influence of financial technology on profitability in Jordanian commercial banks. *Humanities and Social Sciences Letters*, 12(2), 176-188.
- Jarah, B., Jarrah, M., & Al-Zaqeba, M. (2022). The role of internal audit in improving supply chain management in shipping companies. *Uncertain Supply Chain Management*, 10(1), 13-18.
- Jebril, I., Al-Zaqeba, M., Al-Khawaja, H., AlObaidy, A., & Marashdah, O. (2024). Enhancing estate governance using blockchain technology through risk management in estate governance of business sustainability. *International Journal of Data and Network Science*, 8. doi:10.5267/j.ijdns.2024.3.002
- Kaba, A., Eletter, S., Elrefae, G. A., Alshehadeh, A. R., & Al-Khawaja, H. A. (2024). Students' academic performance before, during, and after COVID-19 in F2F and OL learning: The impact of gender and academic majors. *International Journal of Data and Network Science*, 8(2), Pages 667 – 678, DOI 10.5267/j.ijdns.2024.1.011
- Kumar, D., Kumar, P., & Ashok, A. (2020). Introduction to multimedia big data computing for IoT. In *Multimedia Big Data Computing for IoT Applications* (pp. 3-36). Springer, Singapore.
- Lieb, N. (2018). Opportunities of blockchain for industry 4.0—energy impacts for the industrial Internet of things (Doctoral dissertation, Wien).
- Maatouq, J. (2023). Compositional Patterns and their Impact on the Achievement of Informational Purposes in the Algerian Mawlidiat of the Prophet. *Arab Journal for the Humanities*, 161(41), 143-178. doi:10.34120/0117-041-161-005
- Malkawi, R., Alzaqebah, M., Al-Yousef, A., & Abul-Huda, B. (2019). The impact of the digital storytelling rubrics on the social media engagements. *International Journal of Computer Applications in Technology*, 59(3), 269-275.
- Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. (2020). Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities. *Information & Management*, 57(2), 103169.
- Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *The British Accounting Review*, 51(6), 100833.
- Mudel, S. (2015). Creative Accounting and Corporate Governance:—A Literature Review. Available at SSRN 2708464.
- Mulford, C., & Comiskey, E. (2002). *The Financial Numbers Game: Detecting Creative Accounting Practices, USA*: John Wiley & Sons, Inc.
- Nagata, K., & Nguyen, P. (2017). Ownership structure and disclosure quality: Evidence from management forecasts revisions in Japan. *Journal of Accounting and Public Policy*, 36(6), 451-467.
- Okoye Emma, I., & James Obioma, N. (2020). Impact of Creative Accounting Techniques on Firm Financial Performance: A Study of Selected Firms in Nigeria.
- Oussous, A., Benjelloun, F. Z., Lahcen, A. A., & Belfkih, S. (2018). Big Data technologies: A survey. *Journal of King Saud University-Computer and Information Sciences*, 30(4), 431-448.
- Qirem, I. A. E., Alshehadeh, A. R., Al-Khawaja, H. A., Elrefae, G. A., Jebril, I., & Alshehadeh, S. A. (2023). The Impact of Sustainability Accounting on Financial Reporting Quality: Evidence from the Pharmaceutical and Chemical Sectors on the ASE. *Journal of Logistics, Informatics and Service Science*, 10(4), 62–71.
- Richins, G., Stapleton, A., Stratopoulos, T. C., & Wong, C. (2017). Big data analytics: Opportunity or threat for the accounting profession?. *Journal of Information Systems*, 31(3), 63-79.
- Sahasranamam, S., Arya, B., & Sud, M. (2020). Ownership structure and corporate social responsibility in an emerging market. *Asia Pacific Journal of Management*, 37(4), 1165-1192.
- Shaaban, T. (2024). The Effectiveness of Speech-Language Intervention on Expressive Vocabulary and Social Communication in Preschool-Aged Children with Language Delay. *Journal of Education /Al Mejlh Altrbwyh*, 38(150), 39 - 64.
- Shatnawi, M., Masadeh, A., Alsawalhah, J., & Al-Zaqeba, M. (2024). Corporate environmental responsibility and corporate performance in Jordan. *Uncertain Supply Chain Management*, 12(1), 307-314. <https://doi.org/10.5267/j.uscm.2023.9.020>
- Shubailat, O., Al-Zaqeba, M., Madi, A., & Ababneh, A. (2024). Customs intelligence and risk management in sustainable supply chain for general customs department logistics. *Uncertain Supply Chain Management*, 12(1), 387-398. <https://doi.10.5267/j.uscm.2023.9.013>
- Sima, V., Gheorghe, I. G., Subić, J., & Nancu, D. (2020). Influences of the industry 4.0 revolution on the human capital development and consumer behavior: A systematic review. *Sustainability*, 12(10), 4035.
- Škoda, M., Lengyelalussy, T., & Gabrhelová, G. (2017). Creative Accounting Practices in Slovakia after Passing Financial Crisis. *Copernican Journal of Finance & Accounting*, 6(2), 71-86.
- Soda, M., Makhoulouf, M., Oroud, Y., Alshehadeh, A., Omari, R., & Al-Khawaja, H. (2023). Does the audit quality have any moderating impact on the relationship between ownership structure and dividends? Evidence from Jordan. *Uncertain Supply Chain Management*, 11(4), 1789-1800.

- Suoniemi, S., Meyer-Waarden, L., Munzel, A., Zablah, A. R., & Straub, D. (2020). Big data and firm performance: The roles of market-directed capabilities and business strategy. *Information & Management*, 57(7), 1033-65.
- Tewari, A., & Gupta, B. B. (2020). Security, privacy and trust of different layers in Internet-of-Things (IoTs) framework. *Future generation computer systems*, 108, 909-920.
- Tommasetti, R., da Silva Macedo, M. Á., Azevedo de Carvalho, F. A., & Barile, S. (2020). Better with age: Financial reporting quality in family firms. *Journal of Family Business Management*, 10(1), 40-57.
- Udin, S., Khan, M. A., & Javid, A. Y. (2017). The effects of ownership structure on likelihood of financial distress: an empirical evidence. *Corporate Governance: The international journal of business in society*, 17(4), 589-612.
- Verma, S., & Bhattacharyya, S. S. (2017). Perceived strategic value-based adoption of Big Data Analytics in emerging economy: A qualitative approach for Indian firms. *Journal of Enterprise Information Management*, 30(3), 354-382.
- Véron, N., Autret, M., & Galichon, A. (2019). "Creative Accounting" and the Fairness Conundrum. *Hors collection*, 47-73.
- Wairange, L. R. (2019). The Link Between Corporate Governance Failure and the Collapse of Major Private Companies in Kenya (Doctoral dissertation, University of Nairobi).
- Wilkin, C., Ferreira, A., Rotaru, K., & Gaerlan, L. R. (2020). Big data prioritization in SCM decision-making: Its role and performance implications. *International Journal of Accounting Information Systems*, 38, 100470.
- Zobi, M., Al-Zaqeba, M., & Jarah, B. (2023). Taxation and customs strategies in Jordanian supply chain management: Shaping sustainable design and driving environmental responsibility. *Uncertain Supply Chain Management*, 11(4), 1859-1876. <https://doi.10.5267/j.uscm.2023.6.005>



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