

**Economic Theory**

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**ACCOUNTING IN THE ERA OF BIG DATA:  
CASE STUDIES AND FRAMEWORKS****Abstract**

The increasing volume, velocity, and variety of data generated in today's digital economy have given rise to new opportunities and challenges for the field of accounting. Big data has the potential to revolutionize accounting practices by providing a wealth of information that was previously unavailable. However, to fully realize the potential of big data, it is essential to develop a theoretical framework for analyzing and evaluating the data. This paper presents a theoretical framework for analyzing big data in accounting. The framework includes considerations related to data quality, data privacy, and ethics. The paper concludes by discussing the implications of big data for accounting practice and research, and by offering recommendations for future research in this area.

**Key Words:**

Big data; accounting; theoretical framework; data quality.

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1 figure, 17 references.

### **Problem Statement and Literature Review**

Over the past few years, there has been an explosion of data generated by individuals, organizations, and machines. This phenomenon, commonly known as big data, has revolutionized the way we understand and analyze various aspects of our lives (Duan et al., 2019). The field of accounting is no exception to this trend, as large amounts of data are now being collected and analyzed to inform decision-making processes. The rise of big data in accounting has created a pressing need for a theoretical framework to guide its analysis and evaluation (Thanasas et al., 2022). While big data has enormous potential to improve the efficiency and accuracy of accounting processes, it also presents challenges and limitations that must be taken into account. A theoretical framework can help accounting practitioners and researchers to make sense of these complex issues, and to develop effective strategies for leveraging the power of big data in the accounting profession (Thanasas et al., 2022). Theoretical frameworks are important tools for understanding complex issues and guiding decision-making processes. They provide a systematic way to approach problems and challenges and help to ensure that decisions are based on sound reasoning and evidence. In the case of big data in accounting, a theoretical framework can help practitioners and researchers to navigate the complexities of this emerging field and to develop effective strategies for leveraging its potential (Theodorakopoulos et al., 2022). This paper seeks to provide a comprehensive overview of the role of big data in accounting and to offer a theoretical framework that can guide its analysis and evaluation, as well as to contribute to a deeper understanding of this rapidly evolving field.

## Methodology

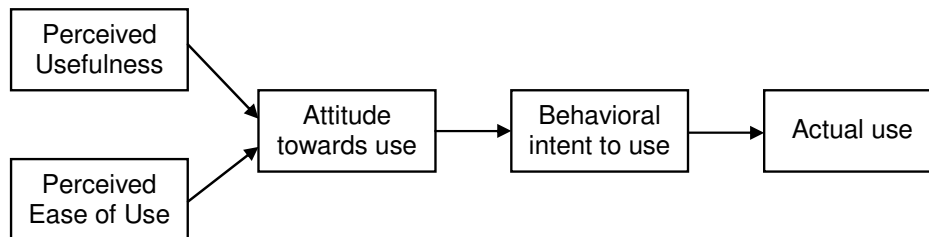
Accounting professionals have long relied on theoretical frameworks to inform their work and guide their decision-making. With the advent of big data, it has become increasingly important to develop a theoretical framework that can effectively integrate the unique characteristics of big data into accounting practice. In this section, we provide an overview of different theoretical frameworks that have been developed for big data analysis in accounting and explain the specific framework that will be used in this paper.

One popular theoretical framework for big data analysis in accounting is the Information Quality (IQ) Framework (Gharib & Giorgini, 2019). This framework emphasizes the importance of data quality and provides a structure for assessing and improving data quality across different dimensions, including accuracy, completeness, timeliness, and consistency. The IQ Framework has been widely used in accounting research and practice, as it provides a comprehensive approach to data quality assessment and management.

Another theoretical framework that has been used in big data analysis in accounting is the Activity-Based Costing (ABC) framework (Maiga, 2014). This framework is used to allocate costs to specific activities, products, or services based on their consumption of resources. ABC is particularly useful for analyzing large amounts of data and identifying patterns and trends that would be difficult to discern using traditional accounting methods.

The specific theoretical framework proposed in this paper is the Technology Acceptance Model (TAM). TAM is a well-established theoretical framework that has been widely used in information systems research to predict and explain user acceptance of new technologies. TAM consists of two key components: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which a technology is perceived to be useful in achieving specific goals or tasks. Perceived ease of use refers to the degree to which a technology is perceived to be easy to use. In the context of big data analysis in accounting, the TAM framework can be used to evaluate the effectiveness of big data technologies and applications. Specifically, the perceived usefulness component of the TAM framework can be used to evaluate the extent to which big data analysis can improve accounting practices and decision-making. The perceived ease of use component of the framework can be used to assess the ease with which accounting professionals can integrate big data into their daily work routines. The figure below presents the original technology acceptance model – TAM (Davis et al., 1989).

Figure 1

**Original technology acceptance model – TAM**

Source: Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982–1003. <http://www.jstor.org/stable/2632151>

In summary, the development of a theoretical framework for big data analysis in accounting is essential for effective and efficient data analysis. Different frameworks can be used depending on the specific needs of the organization, but the TAM framework provides a useful starting point for evaluating the effectiveness of big data technologies in accounting practice.

## Research Results

### Implications for Accounting Practices and Procedures

Big data analysis has the potential to revolutionize accounting practices and procedures by providing accountants with access to a wealth of data and insights that were previously unavailable. In this section, we will explore some of the ways in which big data analysis can be used to enhance existing accounting practices and procedures (Danescu et al., 2014).

One key area where big data analysis can be particularly beneficial is financial reporting (Lunawat et al., 2021). By analyzing large volumes of financial data, big data analytics tools can help to identify trends, anomalies, and patterns that may not be immediately apparent through traditional accounting methods.

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This can help to improve the accuracy and completeness of financial reports, as well as provide insights into potential risks and opportunities.

Another area where big data analysis can be valuable is fraud detection and prevention (Aslam et al., 2022). By analyzing transactional data and identifying unusual patterns or behaviors, big data analytics tools can help to detect and prevent fraudulent activities, thereby safeguarding the financial integrity of organizations. In addition, big data analysis can also be used to enhance the efficiency and effectiveness of accounting processes such as budgeting and forecasting. By providing accountants with access to real-time data and insights, big data analytics tools can help to improve the accuracy and timeliness of financial projections, as well as enable more informed decision-making. Furthermore, big data analysis can be used to support strategic decision-making (Netz et al., 2020) by providing accountants with insights into market trends, customer behavior, and other key factors that can impact the financial performance of organizations. By analyzing large volumes of data from a variety of sources, big data analytics tools can help to identify opportunities for growth and improvement, as well as potential risks and challenges.

Thus, big data analysis has the potential to significantly enhance existing accounting practices and procedures by providing accountants with access to a wealth of data and insights that can be used to improve the accuracy, efficiency, and effectiveness of financial reporting, fraud detection and prevention, budgeting and forecasting, and strategic decision-making (Theodorakopoulos et al. 2022). The potential impact of big data analysis on the accounting profession and its practitioners is significant. With the increasing amount of data available, there are vast opportunities to improve the accuracy and efficiency of traditional accounting practices. Big data analysis can provide insights into financial trends, patterns, and anomalies that were previously difficult or impossible to detect with traditional methods. One of the most significant impacts of big data analysis on accounting is the potential to automate many of the mundane and repetitive tasks that have historically been performed by accountants. This includes tasks such as data entry, reconciliations, and financial statement preparation (Chen et al., 2019). With the help of machine learning algorithms and artificial intelligence, these tasks can be completed faster and with greater accuracy, freeing up accountants to focus on more complex and strategic tasks.

Another potential impact of big data analysis on accounting is the ability to improve risk management practices. By analyzing large volumes of data, accountants can identify and assess potential risks more effectively, allowing them to take appropriate action to mitigate those risks before they become significant issues. Furthermore, big data analysis can also enhance decision-making processes within the accounting profession (Theodorakopoulos et al., 2022). With access to real-time data, accountants can make informed decisions quickly and effectively. This can be particularly useful in situations such as mergers and acqui-

sitions, where timely and accurate information is crucial for making sound business decisions.

However, the implementation of big data analysis in the accounting profession also presents some potential challenges. One of the most significant challenges is ensuring data accuracy and security. With so much data being processed and analyzed, there is a risk of errors or fraudulent activity going unnoticed. Additionally, ensuring the security of sensitive financial data is critical, as any breaches could have severe consequences for both individuals and organizations.

Another challenge is the potential impact on employment within the accounting profession. As automation and artificial intelligence become more prevalent, it is likely that some traditional accounting roles will become redundant. This could lead to job losses and a shift in the skillset required for success in the accounting profession (Thanasas, 2013).

The potential impact of big data analysis on the accounting profession is substantial. While there are certainly challenges to be addressed, the benefits of increased accuracy, efficiency, and strategic decision-making make it a highly valuable tool for practitioners in the field. As such, it is likely that big data analysis will continue to play an increasingly important role in accounting practices in the years to come.

### **Presentation of Case Studies and Examples of Big Data Analysis in Accounting**

In recent years, big data analysis has been used in various accounting applications. The following are some examples of how big data has been applied in accounting.

1. *The case of the SEC* using big data analytics to identify financial reporting anomalies and detect fraud in a public company is a prime example of the potential impact of big data analysis in accounting (Cao et al., 2015). Traditional methods of detecting fraud, such as manual auditing and sampling, can be time-consuming, costly, and often miss critical irregularities. With the advent of big data analytics, however, accountants can analyze vast amounts of data in real-time, identify unusual patterns, and flag potential fraud with greater accuracy and efficiency. In the SEC case, the agency used machine learning algorithms to analyze large volumes of financial data, such as balance sheets, income statements, and cash flow statements. The algorithms compared the company's financial data to industry benchmarks and identified significant anomalies that raised red flags. The SEC then conducted further investigations and discovered that the company

had overstated its revenue and income, leading to enforcement action against the company and its executives.

The implications of this case are significant for the accounting profession. Big data analytics can enhance the effectiveness and efficiency of fraud detection and prevention, potentially saving companies and investors from significant losses (Thanasas, 2013). Moreover, as accounting software and tools become more sophisticated, accountants can use big data analysis to improve internal controls and mitigate the risk of financial statement fraud. However, the use of big data analytics in accounting also raises ethical concerns. For example, who has access to the data, and how is it collected and analyzed? How do accountants ensure the accuracy and integrity of the data, and how do they ensure the privacy and security of the data? These ethical considerations must be addressed to ensure that big data analysis is used responsibly and for the benefit of stakeholders.

In conclusion, the SEC case is just one example of how big data analysis can be used to enhance fraud detection and prevention in accounting. The potential impact of big data analysis on the accounting profession is significant, and as such, it is essential that accountants develop the necessary skills and tools to leverage the power of big data responsibly. Additionally, the ethical considerations surrounding the use of big data in accounting must be carefully considered and addressed to ensure that the profession upholds its integrity and serves the public interest.

2. *KPMG Clara* is a data analytics tool developed by KPMG (Ucoglu, 2020), one of the Big Four accounting firms, to help financial institutions automate the process of analyzing large volumes of financial data. The tool uses big data analytics techniques to identify trends, patterns, and insights that can be used to enhance financial reporting. It can analyze data from multiple sources, such as accounting systems, financial statements, and other sources of financial information. The tool is designed to be user-friendly and accessible to non-experts. It allows users to upload data in different formats, and then generates visualizations and reports that can be easily understood by financial professionals. The reports can be customized to fit the specific needs of the user and can be used to identify areas where financial performance can be improved. KPMG Clara has been used by several financial institutions, including banks and insurance companies. For example, the tool has been used by a major bank to automate the process of analyzing loan applications. By using KPMG Clara to analyze data from loan applications, the bank was able to identify patterns and trends that helped it to make more informed lending decisions. The tool has also been used by insurance companies to automate the process of analyzing claims data, which has helped to improve claims processing times and reduce fraud.

The use of big data analytics tools like KPMG Clara in financial analysis and reporting has several benefits. First, it can help financial institutions to identify patterns and trends that may be missed using traditional analysis methods. Sec-

ond, it can help to reduce the risk of errors in financial reporting, by automating the process of data analysis and reducing the need for manual data entry. Finally, it can help financial institutions to make more informed decisions about lending, investing, and other financial activities (Gultom et al., 2021).

However, there are also potential risks associated with the use of big data analytics in financial analysis and reporting. For example, the use of algorithms to analyze financial data may result in unintentional biases, if the data used to train the algorithms is biased. Additionally, the use of big data analytics tools may lead to the automation of certain tasks, which could potentially lead to job losses in the accounting profession. While big data analytics tools like KPMG Clara have the potential to revolutionize financial analysis and reporting, it is important for accounting professionals to carefully consider the implications of these tools and ensure that they are used ethically and responsibly.

The case study of KPMG Clara demonstrates the potential implications of using big data analysis in accounting. By automating the process of analyzing large volumes of financial data, KPMG Clara can enhance the accuracy and efficiency of financial reporting. This can have several implications for the accounting profession and its practitioners. Firstly, it can lead to greater transparency in financial reporting, which is crucial for building trust between stakeholders and ensuring compliance with regulatory standards. By identifying trends, patterns, and insights that may be missed through traditional analysis methods, KPMG Clara can help prevent financial misstatements and errors that could negatively impact the reputation of the accounting profession. Secondly, it can free up time and resources for accountants to focus on higher-level tasks such as strategic decision-making and providing value-added services to clients. This can lead to a shift in the role of accountants from data entry and analysis to strategic advisors and consultants. Lastly, it can result in a competitive advantage for accounting firms that are early adopters of big data analysis technology. By offering clients innovative solutions such as KPMG Clara, firms can differentiate themselves in a crowded market and attract new business. However, the use of big data analysis in accounting also raises ethical considerations such as data privacy, security, and accuracy. It is crucial for accounting firms to establish clear guidelines and protocols for handling sensitive financial information and ensuring the accuracy and integrity of their analysis methods.

3. *Deloitte Analytic Insights* is a data analytics platform that uses big data to provide real-time insights into potential risks and vulnerabilities in an organization's operations (Chien, 2020). The platform can analyze vast amounts of data from various sources, including financial reports, market data, and social media, to identify potential threats to an organization's reputation, financial stability, and overall business operations. The platform uses advanced analytics tools, such as machine learning and natural language processing, to identify patterns and anomalies in the data that may indicate potential risks. For example, it can analyze social media data to identify negative sentiment about a company, which



may signal a potential risk to its reputation (Gopalkrishnan et al., 2012). It can also analyze financial data to identify patterns that may indicate fraudulent activity or financial irregularities. By providing real-time insights into potential risks, Deloitte Analytic Insights can help organizations take proactive measures to mitigate these risks before they cause significant damage. For example, it can help organizations identify and respond to cyber threats, detect fraudulent activity, and ensure compliance with regulatory requirements. The use of big data analytics in risk management can help organizations improve their decision-making processes and reduce the likelihood of significant losses due to unforeseen risks. It is essential for accounting firms and practitioners to stay up-to-date with the latest trends and tools in big data analysis to provide their clients with the best possible services in risk management.

The case of Deloitte Analytic Insights demonstrates the potential of big data analytics to enhance risk management in accounting. By providing real-time insights into potential threats and vulnerabilities, the platform can help organizations identify and mitigate risks more effectively. This can lead to improved decision-making, more efficient use of resources, and ultimately, better performance and profitability. Additionally, the use of big data analytics in risk management can enhance the reputation and credibility of accounting firms and their clients, as it demonstrates a commitment to proactive risk management and transparency. However, it is important to note that the adoption of big data analytics in risk management requires significant investment in technology, personnel, and training. Furthermore, there may be ethical and privacy concerns associated with the collection and use of large amounts of data, which must be addressed to ensure responsible and ethical use of big data analytics in accounting.

## Conclusions

As we have seen in this paper, big data analysis has the potential to transform the accounting profession by enhancing existing practices and procedures. With the help of advanced technologies and automated tools, accounting professionals can now analyze vast amounts of financial data in real-time, detect fraud, improve financial reporting, and enhance risk management. These capabilities can lead to more accurate financial reporting, better decision-making, and reduced risk for organizations. Nevertheless, the adoption of big data analysis in accounting also presents some challenges, including the need for specialized skills, data privacy concerns, and ethical considerations. Therefore, it is important for accounting professionals to consider these challenges while integrating big data analysis into their practices.

To sum up, the broader implications of big data analysis in accounting are significant. The ability to analyze large volumes of data in real-time can help ac-

counting professionals to stay ahead of the curve and provide more value to their clients. With the right strategies and tools, big data analysis can help accounting professionals to make better decisions, improve their services, and ultimately transform the accounting profession.

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