

The integration of Big Data and accounting

IT solutions and smart devices have invaded our business, academic and personal lives. Massive volumes of data are stored as structured and unstructured every day and trillions of gigabytes of data are created around the hour. Internet-of-Things and machine learning convert almost everything to be smart, creating an unprecedented amount of data in different formats quickly. Consequently, the “Big Data” terminology has emerged during the last 10–15 years. Big Data can be defined as “A massive amount of data streaming in different formats from several sources and requires advanced analytics to be analysed to provide credible valuable insights in real-time.” Unlike traditional data, Big Data has several dimensions known as “Vs” such as volume, velocity, variety and veracity. Volume refers to the quantity and volume, Velocity refers to the speed at which data is created, analysed and stored, Variety refers to the diversity of data sets, whereas Veracity refers to producing credible and free from error outcomes (Alles, 2015; Warren *et al.*, 2015; Zhang *et al.*, 2015).

However, a primary challenge of Big Data is that the traditional data analytics and information systems are not able to process such a vast amount and timely streaming data. Big Data sets need advanced analytics, storage solutions, complicated algorithms, advanced artificial intelligence (AI) solutions and other mathematical models to get valuable insights. The technology companies such as Google and IBM provide advanced Big Data solutions from time to time to enable companies to extract valuable insights from processing Big Data, especially the unstructured part. Big Data is a fortune for those who know how to use it properly. However, diversified analytics are needed, such as predictive, descriptive and prescriptive analytics.

We believe in a straight and direct relation between Big Data and accounting. Data is the heart of accounting. Accountants need data to meet different financial reporting requirements, assess and manage risks, measure the performance, prepare corporate budgets and apply activity-based techniques. At the age of Big Data, accountants have challenges dealing with massive amounts of available data. The same challenges apply to auditors. How could auditors review and audit an enormous volume of transactions for a big company like Amazon? It is argued that Big Data solutions could help auditors to audit the whole population rather than taking a sample, which could increase the audit assurance level to 100%. On the other hand, some accounting techniques may suffer from data limitations or inaccurate predictions and estimations, such as ABC, Corporate Budgeting and risk measurement. Big Data predictive analytics could increase the accuracy of these techniques. The big question is how Big Data could improve the outcomes of these accounting techniques? Big Data as technology is argued to help improve the financial reporting quality (Al-Htaybat and Alberti-Alhtaybat, 2017), the efficiency of performance measurement techniques, the audit quality, the assurance level, and the reliability and sufficiency of audit evidence (Brown-Liburd *et al.*, 2015), besides the effectiveness of risk assessment and measurement, and the prediction and accuracy of corporate budgeting. However, empirical evidence to support these arguments is required.

The primary objective of this special issue is to shed light on the potential integration of Big Data and accounting and auditing. We believe that these special issue articles will encourage and stimulate an academic investigation and research on Big Data and accounting among researchers, practitioners and Big Data fans. The following are some ideas and conclusions of the special issue five articles. Aboud and Robinson (2021) present



an explanatory study on fraudulent financial reporting and data analytics. The study investigates how data analytics could help in fraud prevention and detection. A qualitative approach was applied through a survey sent to 73 Irish businesses asking a variety of questions. The responses show that 88% of the surveyed Irish businesses apply Big Data analytics, but only 35% use Big Data analytics for fraud detection and prevention purposes. Besides, 85% believe in the benefits of using Big Data analytics as an extremely effective or very effective tool to detect or prevent fraud. However, the surveyed businesses expressed their concerns about implementing advanced Big Data analytics to prevent or detect financial statements fraud.

For one of the balanced-scorecard (BSC) performance evaluation perspectives, Elkmash *et al.* (2021) conduct an experimental investigation of how could Big Data analytics affect the effectiveness of customers' performance measurement. The study results conclude that Big Data and its analytics can help in reducing the cost and time required for customers' data analysis and improving the companies' ability to benefit from the customers' unstructured data. However, future research can extend this study by investigating how Big Data could improve the effectiveness of performance measurement using other perspectives of BSC.

Basuony *et al.* (2021) adopt a Big Data analytics approach using RapidMiner equipped with machine learning, data mining and predictive analytics, which allowed to visualize multi-dimensional relations between disclosure practices among different companies. The study advises researchers to pay attention to Big Data analytics and how to understand the corporate disclosure practices and understand the implications of its influence on stakeholders. From an auditing perspective, Hamdam *et al.* (2021) examine how auditors' judgment and decisions could be improved in a Big Data environment. The study presents a conceptual framework built on the cognitive theory to help predict the relations between data visualization, data processing, task complexity and auditors' judgment. They argue that to get effective auditors' judgment; there is a need for a better visualization integration of Big Data. The study presents two main assumptions;

- (1) data visualization could improve auditors' judgment; and
- (2) intuitive data processing mode could help to improve auditors' judgment compared to deliberative data processing mode.

The task complexity is assumed to have influence, where the low task complexity could improve the positive effect of data visualization on auditors' judgment. Overall, advanced conceptual frameworks should be developed to help understand how Big Data and its analytics could improve the outcomes of accounting and auditing.

Finally, McBride and Philippou (2021) attempt to explore the involvement of Big Data in accounting Masters courses and the influence of Big Data on accounting education. They apply an exploratory qualitative approach. The study identified four sets of skills required to increase the effectiveness of the Big Data implementation: questioning and scepticism, critical thinking, understanding and ability to analyse and communicating results. Generally, the job market lacks accountants holding a mixed knowledge of accounting, finance, analytical skills, programming and advanced analytics. Highly skilled accountants who can benefit from the Big Data sets and convert the massive amount of data into valuable insights have become an urgent necessity. The recent developments in information technology entail radical changes in business curriculums to allow students to learn a diversified set of skills, including programming, communication and negotiation.

This special issue attempts to shed light on the integration of Big Data and accounting practices and curriculum development. Research on integration of Big Data and accounting,

auditing and management has become crucial. Fans of Big Data and researchers can contribute by investigating the effectiveness of adopting Big Data solutions and their effect on accounting outcomes, how Big Data could develop the audit quality and increase the assurance level and what are the challenges that auditors face when they are responsible for auditing financial reports of a client with more than 100 million transactions a day? How will Big Data and AI technology change the shape and procedures of accounting and auditing is another interesting question. Recently, several companies adopted digital transformation strategies, an interesting research question is what is the role of Big Data solutions in this regard?

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Further reading

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