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**A Comparative Study between the Opportunities
Resulting from Incorporating Big Data into the
Accountancy Profession and the Associated
Requirements and Challenges.**

Prepared by

Asmaa Abd El-razik Zaki Abd El-rahman

Assistant Lecturer in the Accounting & Auditing Department-English Section,
Faculty of Commerce- Port said University

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Abstract

As a result of the increasing amount of information that has been made available due to developments in communications and computing technology, the use of the Internet and remote sensing, the so-called big data has appeared. It is a relatively new concept that appears to be used practically in every aspect of human life at the time. This vast amount of data being produced, stored and made available from multiple sources has thus become a major source of strength for any organization. Professional entities (e.g. CGMA, IMA, KPMG, E&Y) have also started to focus on big data and its role in accounting transformation. Accountants can also utilize this huge amount of data to improve their profession. In light of this, this research aims to illustrate the opportunities that big data offers to the accountancy profession, the requirements that is necessary to utilize big data in accountants' function, and challenges that must be taken into account in an attempt to overcome them. The study indicated that Big data can provide opportunity to accountants to improve their work in terms like (prediction accuracy, performance measurement, cost management& planning, supporting informed decision). The study also confirmed that accountants must develop their skills through adopt data analysis skills besides their accounting skills to enjoy the advantages of big data and to keep their jobs in light of the continuous developments in technology. Accounting curricula also should be modified to absorb information technology and data analytics techniques.

Key Words: Big Data analytics, Accountancy Profession, Opportunities & Challenges of Big data

Research Problem

With the diversity of data sources and their widespread use under the Fourth Industrial Revolution, the term bigdata has spread. Big Data is a relatively new concept that appears to be used practically in every aspect of human life at the time (Vasarhelyi, M. et al., 2015). Professional entities (e.g. KPMG, Ernest & Young, Deloitte, Chartered Global Management Accountant-CGMA, and Institute of Management Accountants-IMA) have also started to focus on big data and its role in accounting transformation. In practical terms, many organizations around the world have entered the golden age of data and earning many benefits. Accountants can also utilize this huge amount of data to enhance their ability to get correct insights and to improve their profession. Therefore, in this research we will focus on the opportunities that big data offers to the accountancy profession, the requirements that is necessary to utilize big data in accountants' function, and challenges that must be taken into account in an attempt to overcome them.

Research Objectives

In light of the research problem raised in the previous paragraph, this research aims to discuss the opportunities that big data offers to the accountancy profession. The requirements and challenges of utilizing big data in the accountancy profession will also be addressed.

Research Structure

In light of the research problem and its objectives, the research plan is divided into the following:

- 1. Big Data Opportunities for The Accountancy Profession**
- 2. Requirements and Challenges of Integrating Big Data into the Accounting Profession**



First: Big Data Opportunities for the Accounting Profession

Since technological advancements are reshaping business and accounting world, it is worthy for accounting and finance professionals to take advantage of information technology (Wang, Y. & Wang, Z., 2016). Big data is consider one of the emergent technology that has attracted the attention of many researchers in the field of accounting (Griffin, P& Wright, A., 2015; Vasarhelyi, M. et al, 2015; Wang, Y. & Wang, Z., 2016; Arnaboldi, M., et al., 2017; Cockcroft, S. & Russell, M., 2018; Coyne, E etal., 2018 Dewu, Kh. & Barghathi, Y., 2019; El-dalahmeh, S., 2021; Sarkar, S., et al., 2021).

(Arnaboldi, M., et al., 2017) illustrated that one possible way to assess the function of social media and big data is to determine whether it is considered as an object (data and information) or considered as a process (process of generating data and information). In respect to their intersection with accounting practices, we may also think about whether technologically enabled networks constitute a target of accounting practices, or a medium through which accounting practices take place. The former claims that the main factors driving the profession of accounting today are social media and big data. The latter claims that social media and big data are included into accounting practice while also enabling its modification. (Table 2.1) summarize this viewpoint and provides the associated research area for each category.

(CGMA, 2014) confirmed that big data is considered as a part of digital technologies that has the ability to threatens many high-skilled jobs. In support for this viewpoint (Arnaboldi, M., et al., 2017) illustrated that accountants seem to be in the background while other performers (e.g. digital officers and communication and marketing managers) enter the world of performance measurement through big data and social media objects. in this regard (CPA Canada, 2019) recommended that accountants must take on the role of digital evangelists and integrate the technology shift into their strategic and operational plans.

Table 2.1: Social Media, Big Data and Accounting Intersections

		Conceptualising the relationship with accounting - social media and big data as ...	
		A medium of ACC.	A target of ACC.
Conceptualising social media and big data as...	An object (the data)	Research focus: new performance indicators based on social media data and big data	Research focus: governance of social media and big data information resources
	A process (generating data & information)	Research focus: social media and big data's alteration of information and decision-making processes	

Source: Adapted from (Arnaboldi, M., et al., 2017)

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From the opposite point of view, (CGMA, 2014) presented an important message to the management accountant, stating that *"management accountants do not need to feel that the only way to survive in a new era of digital data is to become a data scientist. This is a highly specialised and technical area that is not necessarily in the management accounting space"*(p.7). They added that the greatest opportunity for management accountants is to leverage their mix of accounting and



analysis skills with their understanding of the business to work as business partners. This enables them to gain professional credibility and have a place at the decision-making table as a trustworthy source of management information.

The function of accountants must develop to go beyond the simple reporting of historical key performance indicators (KPI) and the providing of periodic predictions. By utilising Big Data, advanced analytics solutions can improve forecasting accuracy and timeliness, establish new KPIs for performance measurement and management process, and provide a better understanding of emerging market trends. (CPA Canada, 2019).

Compared to financial accounting, management accounting focuses more on prediction and informed decision. (Rikhardssona, P. & Yigitbasioglu, O., 2018) illustrated that there are a lot of unknowns when it comes to the function of management accountants in analytics-driven organizational strategies. Big data clearly offers management accountants a new opportunity to play an effective role in creation of data and decision support. The role of management accounting may integrate into a broader analytical role in the organization, along with business process analytics, customer analytics, and environmental analytics.

(Appelbaum, D., 2017) explained that since management accountants typically use information derived from accounting records to aid business managers, it is expected that the availability and usage of big data and analytics by organisations would have an influence on the managerial accounting profession. In general, management has little willingness to wade through complicated analyses and reports. Even if the enterprise system is supposed to support complicated forecasts and optimizations, management accountants are anticipated to be able to clearly transmit these results with absolutely understood visualization tools. Depending on big data and analytics, management accountants are capable of more than just monitoring KPI of historical reports.

(Wang, Y. & Wang, Z., 2016) illustrated that digitalization (data analytics) can improve managerial accounting functions in three

areas:1) cost management, 2) performance evaluation and risk management and 3) planning and predictions. Regarding cost management in age of big data it is likely that cost management don't based only on the internal business operation figures but expand to include the industry supply chain data. data about suppliers, partners, or even competitors (with large volume and unstructured format) are needed to support strategic management. For performance evaluation and analysis, it is critical to determine the objectives first for the evaluation process. Since data analytics seek to find hidden patterns, performance evaluation objectives might be combined with a number of objectives other than sales growth and cost reduction. Furthermore, using data mining in risk control can help firms perceive unknown risk aspects and improve their risk management capabilities.

Regarding planning and predictions, (Wang, Y. & Wang, Z., 2016) illustrated that data analytics technology could contribute to analysis of the external information arrived at any time and improve the forecast accuracy. Actually, various fresh information on the operation of the business and its external marketplaces might emerge at any time. The use of data mining technology would aid in the analysis of current data and increase prediction accuracy. As a result, big data analytics would strengthen the management accounting function, it serves as a reliable backup for decision-makers and enhances a company's competitive advantage.

Regarding Managerial accountant function, (Rikhardssona, P. & Yigitbasioglu, O., 2018) illustrated that In this new world where end-users have better access to data and may utilize sophisticated user-friendly analytical tools to provide decision-relevant information, management accountants may need to take on new roles and give up their monopoly on the reporting function. It is likely that management accountants will no longer be the responsible for the management reporting systems. Rather, they would (i) provide a consultative role to end-users, aiding them in the selection and interpretation of decision-relevant data and (ii) take a more active part in assisting IT employees in selecting the features of BI&A solutions suitable for end-users in



order to identify the greatest fit between the BI&A system's capabilities and the requirements and characteristics of users within the firm.

(Bhimani, A.& Willcocks, L., 2014) argued that if management accountants take advantage of big data environment, this new type of data collection (high volume, high variety, high velocity) can provide management with a completely different level of knowledge that contributes to the decision-making process. In the same context ((Li, Y., 2018) illustrated that real-time data obtained through RFID, GPS, Internet applications and sensors can be included in the analysis of Management accounting data, which will assist companies in providing real-time management reports and increase the accounting functions efficiency and effectiveness.

Regarding the time-saving benefit gained through big data analytics (Arnaboldi, M., et al., 2017) stating that "The most complex modelling and estimation tasks that accountants and auditors may encounter are such that the processing of datasets of just several hundred megabytes may require years of computing". In this regard (Gärtner, B. & Hiebl, M., 2018) explained that big data technologies can help in saving time during data analysis. Detailed analysis takes less time just by one click, which help managerial accountants in offering better support for decision-making, sharing in creating a competitive advantage and adding value for the company.

Taken together, it can be concluded that big data environment could provide many opportunities to accountants through their professional practices and may even transfer them to a new age with new roles and functions. One critical point to consider is that big data will have a greater impact on the managerial accountant function because their work relies more on data, whether internal or external, predictions, and supporting informed decisions rather than just reporting historical data. However, to take advantage of the opportunities associated with integrating big data into accounting practices, we must raise a question about the requirements needed to deliver an appropriately skilled generation of accountants to gain the advantages raised by the big data age, and what are the challenges of providing these qualifications.

Second: Requirements and Challenges of Incorporating Big Data into the Accounting Profession

The revolution of data joined with firms' desire to exploit it is driving significant changes in the required skillset for accounting professionals. Recently, educational institutions are thinking about how to catch up with these requirements, while accreditors adjust standards to reflect shifts in desirable skill sets (Sarkar, S., et al., 2021).

In 2018, the Association to Advance Collegiate Schools of Business (AACSB) adjusted its accreditation standards. Standard A5 (standard A7 previously) focuses on developing skills required for the integration of information technology and the emerging trends in the accounting curricula. According to this standard, *“accounting degree programs integrate current and emerging accounting and business practices in three primary components within the curricula”*:

- *Information systems and business processes including data creation, manipulation/management, security, and storage.*
- *Data analytics including, for example, statistical techniques, clustering, data management, modeling, analysis, text analysis, predictive analytics, learning systems, or visualization.*
- *Developing information technology agility among students and faculty, recognizing the need for continual learning of new skills needed by accounting professionals. (AACSB, 2018, P. 27)*

In this regard, (CPA Canada, 2019) reinforces this point by illustrating that accountants will need to acquire competences in IT to adapt to the big data environment, which enables them to comprehend and engage with the organization's information system. Additionally, accountants should focus on understanding data correlations and patterns, which calls for a deep perception of statistical techniques like regression analysis, determining sample sizes, and hypothesis testing. Accountants also must be aware of data contextualization or identifying



what questions to ask about the data. Most occupations, including accountants, will require a basic understanding of coding. It won't be enough for accountants to depend on programs like Excel to analyze huge volumes of data. Accountants would benefit from learning how to deal with databases directly using programming languages like SQL, R, and Python, instead than depending entirely on data scientists for each request. Accountants will also need to know how to utilize visualization tools like IBM Cognos BI, SAP Business Objects, Tableau, and Microsoft Power BI to provide reports that convey fresh insights to management.

(Dzuranin, A., et al., 2018) proposed three approaches for incorporating big data analytics into the accounting curriculum: 1) the focused approach; 2) the integrated approach ; and 3) the hybrid approach. The focused approach comprises a stand-alone data analytics course that help student to get knowledge about data gathering, Storage and use, data mining and data security. according to the integrated approach, data analytics are woven into current accounting courses through utilizing software tools like tableau, ACL, and IDEA. The key drawback of this approach is that accounting courses already contain a wealth of information that is specifically pertinent to the CPA exam. Finally, the hybrid approach which comprises both the focused approach the integrated approach. according to this approach a standalone data analytics course is included, besides promote the inclusion of analysis concepts in already-existing accounting courses.

Empirically (Dewu, Kh. & Barghathi, Y. (2019) investigated whether universities' current accounting programs can produce accounting graduates who are proficient at using big data in the accounting profession. The study is based on interviews that were conducted with two groups of individuals (professors and practitioners). The sample of the study consists of 5 accounting professors and 10 practitioners. All participants are located in Dubai, except for 2 participants from Nigeria. The study results illustrated that Big Data was found to be absent from the accounting curriculum, depriving students of critically important skills and knowledge. Due to this, newly

graduated accountants are unskilled when it comes to BDA in the workplace and require extensive training to be able to handle it. The study added that the accounting curriculum was very theoretical, which has been hampered their usage of computers and software at work. Finally, Both Professors and practitioners of accounting agree on the necessity to include BDA urgently in the curriculum as it now forms a crucial component of accounting organizations.

In fact, the process of integrating big data into accounting curricula is not easy and may be accompanied by many challenges. (Sarkar, S., et al., 2021) provided evidence from two different institutions regarding the challenges of integrating big data analytics into the accounting curriculum. Regardless of the differences between the two institutions, the challenges were almost identical and concentrated on a) the lack of faculty with the appropriate skills and lack of training to up-skill current staff in analytical techniques; b) the time-consuming and challenging nature of learning new analytical techniques. There were also other challenges unique to one institution, including a lack of incentives for faculty staff to upskill and infrastructure challenges (e.g. students' computer problems and software license management).

In the same context (Zhang (2018) illustrated that faculty accounting staff might not be familiar with the technologies currently in use in the profession. Therefore, it could be necessary to hire more specialised professors or provide current staff with extra training. The study also added that students may benefit from experiential learning opportunities if case studies are given more attention.



Conclusion

The main aim of the study is to illustrate the effect of integrating big data into the accountancy profession through focusing on both the opportunities and challenges of integration. In light of that, the study concluded the following:

- **Big data can provide opportunity to Accountants to improve their work in terms of (prediction accuracy, performance measurement and evaluation, cost management& planning, supporting informed decision; saving time in analysis).**
- **Accountants must develop their skills through adopt data analysis skills besides their accounting skills to enjoy the advantages of the big data age and to make them keep their jobs in light of the continuous developments in technology.**
- **Accounting curricula should be modified to absorb information technology and data analytics techniques (e.g. data creation, statistical techniques, predictive analytics, clustering, text analysis).**
- **Lack of faculty with the appropriate data analytical skills represent one of the key challenges which hinder the provision of a qualified generation of accountants to take the advantage of data age.**

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