Auditing in the era of big data: a literature review

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Abstract

The Big 4 accounting firm are looking for implement the big data analytics in their audit engagements. With the growing investment in from $34 billion in 2013 increasing to $232 billion through 2016 (Gartner 2012). Specially, The Big 4 firms, sees Big Data as an increasingly important part of their assurance practice. The objective of this paper are to give first insight and literature regarding the development of big data analytics and its impact into audit and assurance engagement.

Introduction

Big data and another technology in analysing data to find hidden pattern and predict the result have been researched in the academic journal widely for the last 5 years. Almost every sector and industry in many countries depend on big data in theirs activities (Jin, Wah, Cheng, & Wang, 2015) (Anna & Nikolay, 2015; Kshetri, 2016; Srivastava & Gopalkrishnan, 2015). Data and information resulted from the information system have essential influence on managing processes in all areas of the organization. This ideas can be also scholar’s isues, when the data obtained from the information system became an integral part of scientific and research projects, in which the processes of knowledge creation take place (Koman & Kundrikova, 2016). Big data application in the business and industries are in its implementation for the business intelligence in improving decision making capabilities, faster decision making, understanding of customer needs, developing strategies for launching new products and services, exploring new markets, improving inventory turnovers, reducing customer complaints, and enhancing staff productivity and efficiency (Ram, Zhang, & Koronios, 2016). Despite the newness of the big data domain, a rapidly proliferating body of scholarship is evident across the field of business. This scholarship remains in the preliminary stages of investigating a new phenomenon (Frizzo-Barker, Chow-White, Mozafari, & Ha, 2016).

The potential of Big Data

Big data offers a huge range of research area including the effects of non-scheduled, qualitative “headline news,” as opposed to the regularly scheduled quantitative macroeconomic announcements in the foreign exchange market. News that can be read by a machine and high – frequency, high variety of market data that can be used for future research. This can only happens because the impact of news happens only seconds after the release of the news By studying a wider scope of news, we can get a better and more complete picture of how news will affects the FX market (Li, Wong, & Cenev, 2015).

The world’s data volume is expected to grow 40% per year, and 50 times by 2020, as has been stated in (Waal-Montgomery). It has been predicted that there will be a huge increase in demand for Big Data skills between now and 2020. In addition, it has also been indicated that this demand is expected to grow by 160% in the United Kingdom alone. Walmart processes and imports more than 1 million cus- tomer transactions into databases, and according to estimates, this value involves more than 2.5 PB of data each hour (Waal-Montgomery).
Survey conducted by Gartner found that 73% of its respondents had invested or planned to invest in Big Data in the next 24 months, up from 64% in 2013. Furthermore, corporate investment in Big Data is growing from $34 billion in 2013 to $232 billion in 2016 (Gartner, 2012). Big accounting firms also state that Big Data substantially important for their assurance practices. For example, EY states: "The audit of the future will bear little resemblance to the traditional audit CFOs are accustomed to receiving today. In fact, the way organizations conduct audits will change more in the next 5-10 years given the evolution of technology and analytics. Data analytics, new technology and access to detailed industry information will all combine to help auditors better understand the business, identify risks and issues and deliver additional insights (EY, 2017a, 2017b). The implementation of Big Data Analytics (BDA) would give the internal and external auditors ability in examining the whole companies data to make sure it complied with GAAP, applicable laws, and management's directives-more recently using a variety of automated techniques including generalized audit software and continuous auditing that could scrutinize all transactions of a firm (Janvrin & Weidenmier Watson, 2017). BDA offers significant benefits in terms of improvement in supply chain costs and efficiencies, responding faster to changing environment, providing greater power in relationships with suppliers, and enhancing sales and operations planning capabilities (Gunasekaran et al., 2017).

The big data analytics capabilities has positive and direct impact to the firm performance and the process oriented dynamics capabilities as the mediating factors that affect the relation between BDAC and firm performance. The results show that all the causal links posited by the model are supported (Wamba et al., 2017). On the other hand, current technologies are unable to solve problems occurred in the implementation of big data. New storage, processing, analytics, and efficient data-intensive technologies from the software to the hardware perspective are imminently required (Yaqoob et al., 2016).

The development of science of decision will be enriched by the developments of big data. Big Data will produce bigger value along with the resolutions of current challenges. It is believed that the value of big data will be created by decision-making processes that based on the analytical results of raw data intelligently. Especially, in social science, decisions can be made by not only analytical approaches but also computational ones. (Wang, Xu, Fujita, & Liu, 2016). The management tools for BDA are based on stream and data batch processing, and different parameters are used to compare the performance of the Big Data Analytics tools (Yaqoob et al., 2016). Despite the success of firms in implementing big data, most companies continue to struggle with big data initiatives: Nearly 80% fail to integrate their data fully and 65% consider their data management practices to be weak (Mazzei, 2017).

Moreover, the ability to analyze all population of data, rather than sampling the data, will increase the reliability of the audit result. Similarly, Deloitte Chairman and CEO Joe Ucuuzoglu states (Deloitte, 2015): "At Deloitte we're investing several hundred million dollars in data analytics and artificial intelligence with some cutting-edge applications that we really believe differentiate us and our audit approach. When we use these tools, we're able to get greater coverage. We're able to more quickly identify risks. We're able to complete the audit with a higher level of quality and ultimately deliver a greater level of insight to our clients." Although the variety of BD and the use of BDA enhance the ability to detect fraud and can be used to prevent the making of mistakes, it can also exacerbate discrimination (Janssen, Voort, & Wahyudi, 2017).
**Big Data and Audit**

While Big Data and data analytics are two independent concepts, these two concepts can be interrelated. Data visualization tools in particular, such as Tableau, are growing in popularity as an audit tool. But the focus is still on traditional accounting data and performing traditional audit procedures, such as locating duplicate invoices. Even though accounting scholar discuss the great advantages of Big Data and business practitioners mentioned Big Data in a positive tome during in their presentations and written in the publications, the actual use of Big Data is far beyond current audit activities (Alles & Gray, 2016; Gupta & George, 2016).

As Big Data Analytics (BDA) can offer value to companies in several ways, many scholars highlight the need to understand the path to competitive advantage (Côrte-Real, Oliveira, & Ruivo, 2017). Companies are making investments in big data analytics in order to improve their own decision making process, and they expect auditors to be able to use the tools with big data capabilities to improve the effectiveness and efficiency of audits as well (Early, 2015). Enterprises also could reduce the cost of cloud service utilization to perform big data analytics and maintain knowledge availability, privacy preservation, and secure data sharing functions to build trust between customers and enterprises (Rehman, Chang, Batool, & Wah, 2016). BD challenges to further propose robust solutions to the challenges of acquiring and storing, mining and cleansing, aggregating and integrating, analysis and modelling and interpreting data (Sivarajah, Kamal, Irani, & Weerakkody, 2017).

The developments of Big Data would result to the following achievements in the firms: Techniques will make the processing of Big Data more intelligent. The existing challenges of processing Big Data will not only develop the current status, but also bring new thinking and idea into this emerging fields. More and more sophisticated techniques have been introduced or under-developing to focus on the characteristic of Big Data. (Wang et al., 2016).

In order to implement big data, an issue for the internal auditors, the rise of big data technology implies a need for more IT training. Specifically, basic/advanced training in technology is found to be significantly and positively associated with the extent of IT audits. However, additional investigation is needed to identify the most effective training material to adequately prepare technology-oriented internal auditors to become more familiar with technology and comfortable with IT audits (Abdolmohammadi & Boss, 2010). When designing data integrity auditing protocol great care is needed to ensure that it is efficient and secure and fulfills fundamental requirements. (Garg & Bawa, 2016). In retail industries the BDA enables local knowledge availability, privacy preservation, and secure data sharing functions to build trust between customers and enterprises. In addition, the business model blueprint for early data reduction is presented (Rehman et al., 2016).

There are many advantages associated with using Big Data as a part of audits engagement. A significant way Big Data analytics adds value is by discovering patterns that are not discoverable in limited smaller data sets (such as typical audit samples). As Cukier and Mayer-Schoenberger (2013) state: “It is tempting to understand Big Data solely in terms of size. But that would be misleading. Big Data is also characterized by the ability to render into data many aspects of the world that have never been quantified before; call it ‘datafication.’” For example, location has been datafied, first with the invention of longitude and latitude,
and more recently with GPS satellite systems. Words are treated as data when computers mine centuries' worth of books. Even friendships and “likes” are datafied, via Facebook.”

Most of the data in Big Data can be viewed as leading indicators because they precede accounting transactions from a few days to one or more years. Some of this other data is tightly coupled to future accounting transactions. For example, companies like Boeing and Airbus have backorders for aircraft that will be delivered many years in the future, and hence, that order data is highly correlated with future revenues and costs. Other data may be more loosely coupled to accounting transactions, but still informative. For example, a trend of negative comments in Twitter could signal a future decline of revenue. (Alles & Gray, 2016)

Big Data thus has the potential to be a powerful means of setting and adjusting auditor expectations at the beginning (planning phase) and throughout the audit. Because much of Big Data contents can be separated both physically and conceptually from accounting data, fraudsters are not likely to be able to manipulate all applicable Big Data elements to disguise their fraud. Because of the substantial contents of Big Data and the concept of “100% sampling” (analyzing the whole population (Alles & Gray, 2016).

(EY, 2014) states that the benefit of Big Data is fraud detection. Along those lines, in Brazil it is commonplace for employers to require that employees use a given bank in order that the employer can then check that account for evidence of corrupt practices, such as expenditures in excess of salary. Such practices would never be allowed in most Western nations due to privacy concerns, but this example is indicative of the value added that non-traditional data can provide in a well-defined prediction problem. Given the criticism auditors faced for not issuing going concern opinions for businesses that failed in the recent financial crisis such as Bear Stearns, improving auditor assessment of client risk may be another promising application of Big Data.

**Conclusion**

Big Data is becoming an indispensable resource to many organizations and has the potential to be an extremely valuable resource to financial statement auditors. But that presumption must not be taken as a given without question, skepticism, and further research. Otherwise, there is the danger that Big Data will succumb to the same forces that have stalled the adoption of prior technologies equally extolled in their time as having the potential to transform auditing practice (Alles & Gray, 2016).

**REFERENCES**


