The Hype of Big Data Analytics and Auditors

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Abstract

In the era of fast-tracking digitization and unconventional big data analytics, business models are being reshaped and they impact auditing amongst auditors. This viewpoint paper takes into account the procedures underlying on big data and its analytics in driving the evolution of business and identifies some of the unresolved issues and concerns on auditors, especially in the context of cognitive tasks. The paper continues to focus on the current spate of discussions on big data and auditing profession. It explains the nature of big data and its characteristics as well as the output types. This paper also tries to find answers for what is new in it, how it assists the auditors along with some unresolved issues and concerns. Since big data analytics is the future, auditors need to reshape themselves in terms of skills and competencies to meet the emerging technological challenges.

Keywords: Big Data, Big Data Analytics, Auditors, Unresolved Issues

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1. Introduction

The emerging technologies are driving several changes in accounting and auditing fields. The Institute of Chartered Accountants of England and Wales (ICAE& W) argued that "It is critical for audit profession to keep pace with these changes and be proactive in understanding how new technology trends can tranform the audit approaches". Among such technologies, big data analytics is of great importance for accounting and auditing professionals and educators. Therefore, the objective of this paper is to critically examine issues, concern and challenges arising from the big data analytics to auditing professionals.

2. Big Data Defined and Its Characteristics

Collecting, mining and exploiting the data which are available from a wide variety of sources have become the demanding tasks for the organisations. Big Data Analytics (BDA) is a growing methodology for helping the organisations in this regard. Big Data crunches massive volume of data obtained from internal and external sources (Jiang and Zhang, 2015). Big data refers to massive volume of structured, semi-structured and unstructured data that is so large that it is very difficult to process using traditional data processing techniques. Big data comprises of extremely large data sets that may be analyzed using emerging technologies to reveal patterns, trends and relationships. According to Connolly (2012), big data includes the following and can be formulized as follows:

Big Data = Transactions + Interactions + Observations

For example, transactions data are ERP data. Interactions data are tweets or facebook posts. Observations data come from Internet of Things IOT) such as GPS, CCTV or monitoring data.
Big Data also have five Vs characteristics, which are listed below:

- Volume (magnitude of data in multiple terabytes and petabytes)
- Variety (structural heterogeneity in a dataset)
- Velocity (the rate at which data are generated and the speed at which it should be analyzed and acted upon)
- Value (attribute of big data - low value density)
- Veracity (unreliability inherent in some sources of data)

Moreover, Big Data Analytics has been defined as a comprehensive way to retrieve, process and analyze the '5 Vs' data-related characteristics in order to create valuable intelligence insights for continual value delivery, performance assessment and forging competitive advantages (Bumblauskas et al., 2017).

3. Big Data Analytics

There are five types of Big Data Analytics that may help the businesses and professionals. These are indicated below:

- Descriptive (What is happening?).
- Diagnostic (Why did it happen?)
- Discovery (What do I learn?)
- Predictive (What is likely to happen?)
- Prescriptive (What should I do about it?)

4. What is New About Big Data Analytics (BDA) for Auditors?

The incapability of traditional database management system in handling wide data formats coming in high volume in real time paved the way for the big data technologies. They help the firms to go for real time intelligence extracted from high volume of data. The need for evidenced-based decision making, especially by auditors, is taken care by the intelligent processes which bring out the meaningful insights from the data. They are capable of processing high volume of wide variety of data with unimaginable speed to bring out high value information for decision making. Figure 1 shows the five processes grouped under two main categories, namely data management and analytics. Methods, tools and processes used to crunch the data and generate business intelligence are referred as analytics. Thus, the Big Data Analytics can be seen as a sub-process of within the all-inclusive processes of 'insight extraction' for big data (Gandomi and Haider, 2015).
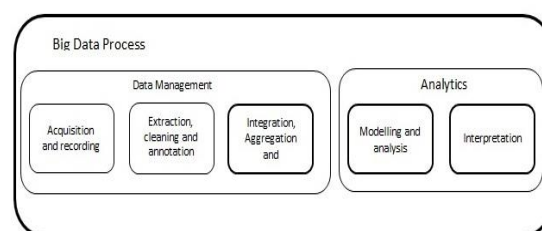

Figure 1. Big Data Process

Source: Gandomi, A. and Haider, M., (2015). "Beyond the hype: Big data concepts, methods, and analytics", International Journal of Information Management, 35 (2), pp. 137–144.

It is posited that, in conventional analytical procedures, there is absolute comparisons of accounts balances with prior year balances, budgets with forecasts, ratio comparisons and trend analysis (CFRR, 2017). On the other hand, it is claimed that BDA has depth and it is much broader compared to conventional analytical procedures. Audit data analytics involve applications of powerful software tools and statistically complex procedures. There are several bottlenecks / barriers that hinder the implementation of BDA for auditing system

(Shukla and Iana, In press). Accounting firms are coming out to say that, big data is becoming an essential part of their assurance practices (Alles and Gray, 2016). For example, Ernst&Young (EY) states: "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. Moreover, the ability to review and analyse entire sets of data, rather than applying sampling techniques, will help bring more confidence to the audit."

As such, in data handling, data sources are different from the analytics used on them. Figure 2 shows the relationship between the data sources and techniques in the audit domain.

Figure 2. Data source and techniques in auditing

Traditionally, the auditing firms are using the manual data capture of the transactions, to generate the standard outputs for the auditing practioners. When the globalisation and complex supply chains entered the business, the firms are forced to capture the data from the source of transaction, automatically. Centralised processing are taking place to crunch the data. When the volume of data started increasing expoentially, conventional method analysis could not cope with the expectation of the business, including auditing. Real-time instaneous results have become the necessity to beat the competion. On the other side, technological advancements are taking place in handling the big data optimally and at the same time generating intelligence that were not possible earlier. So the firms moved to predictive analytics, visualisation etc. Similar trend is also noticed in the non-conventional non-financial data. Storage and retrival have become challenges for the volume of data generated / captured.

With the advent of social media and Internet of Things (IOT), lots and lots of semi-structured and unstructured data started pouring in. The conventional methods of data handling are not good enough to manage such huge and variety of data, particularly to auditing and accouting. The sheer volume and variety are forcing the firms to move towards advanced methods of analysis.

The tools available to the auditors may include cluster analysis, predictive models, data layering, visualizations, and "what if" scenarios. For example, with audit data analytics, auditors may be in a sound position to predict more accurately and reliably about the going concern position of the clients or their credit worthiness, collectibility of account receivaables etc.

Under the future vision of auditing, public companies would give auditors access not just to a sample of their transactions, but to their entire general ledger and their databases. Using theise tools, auditors will have the capability to access, and look the entire gamut of data, not merely summary data.

5. Benefits Claimed from Big Data Analytics for Auditors

As specialists in their domain, accountants / auditors have distinct proficiency in business intelligence, regulatory compliance, and internal controls and thereby recognizing them as treasured collaborators in managing data assets (Coyne et al, 2018). Currently, lot of discussions are taking place among accounting and auditing academicians, researchers, and practitioners on how big data is going to transform the audit planning, processes, techniques, evidence, documentations, reports as well as auditing professionals' skills. Competencies and the training requirements are discussed as well. Because of this reason, there is a growing concern among auditing professionals that, big data and its analytics are opening up new opportunities and challenges (Appelbaum et al, 2018). It is claimed that, big data is going to affect tremendously the work of internal auditor and financial statement audit (external auditors). However, it is claimed that auditing profession would be the last to adopt new technologies, be it any (Appelbaum et al., 2018). More said so, it is to be accepted that big data techniques and analytics would be a high value item for the auditing profession, where rigorous analytical procedure and audit techniques are combined to produce results unknown so far (Gepp et al., 2018). At the same time, inappropriate analysis of big data can be a disaster landing in misleading conclusions (Rajaraman, 2016). Because of the interesting and valuable information could be extracted from the so called big data, many firms are vouching for big projects in all functional areas (Oussous et al., 2017).

A few authors claim that, big data may assist the auditors in the following areas:

- Providing audit evidence through a comprehensive analysis of organizations' general ledger systems
- Assisting them in risk assessment through identification of anomalies and trends, and comparison with industry data
- Testing complete sets of data instead of taking sample testing
- Planning proper field works for auditors
- Fraud detection and improving other forensic accounting
- Using predictive models to improve forecasting
- Sound judgement on clients' going concern issue

Institute of Internal Auditors (IIA) Research Foundation stated that, Big Data Analytics may be useful in performing internal audit functions such as compliance, fraud, risk assessment, detection and investigation, operational performance and internal controls.

6. Unresolved Issues and Concerns

Researchers and professionals, however, have not yet lucidly shed light on the following questions:

- What are the tools or approaches available for Big Data Analytics that can make Big Data useful in auditing work?
- Which of these tools are the most promising?
- Should auditing standards be modified in order to facilitate these tools?
- What are the specific and general skills and competencies needed for auditors to apply them under Big Data enviornment?
- Does Big Data Analytics enhance audit efficiency?
- Does Big Data Analytics increase audit quality?

The emergence of new and non-conventional data pose higher demand on internal and external reporting, and make organisations to face the new risks. This draws the attention of the regulators and the organisations, which have to take care of them. More information challenges and control risks have started arising because of the 3Vs of big data, namely volume, velocity and variety. Big Data Analytics is not a mere job of Information Technology (IT) professionals alone. The accounting experts and audit professionals who know the intricacies of accounting and auditing, have an exemplary knowledge on them, grasp the needs of the top management / decision makers and know regulatory compliance in terms of information needs should collaborate with IT professionals to develop and maintain the information systems. While accounting and auditing professionals have the required knowledge, they have to upgrade their knowledge with new skills through education and training (Coyne et al, 2018).

A few researchers and practititioners suggest that, the emerging data analytics approaches that may assist with the audit process are **Deep Learning, Text Mining, Blockchain accounting/smart contracts, Predictive Analytics, R Programming, Hadoop and Structured Query Language (SQL).** However, in the absence of clearly identified data analytical apparoaches, this is presenting a big challenge on how to appropriately train and educate future auditors. The reason is that, it has implications for the pre- and post-qualifications that professional accounting and audiiting bodies presently catered to. Therefore, empirical as well as case studies research are urgently needed to answer these grey areas.

7. Concluding Remarks

No doubt, big data is emerging as a valuable resource to organizations in today's context. It offers high potential to be an extremely valuable resource for internal and external auditors. However, there are certain unresolved issues and concerns which need to be tackled as soon as possible. These are listed below:

1. There are still concerns about the reliability and integration of big data.

2. Security for big data in the storage may be a concern. Because, aggregate big data may include sensitive information as well as toxic data. Therefore, confidentiality of big data is important for both clients and regulators. So far, literature or practitioners review do not provide much solutions to these emerging problems.

Additionally, many companies fear of releasing data because of risk of cyber security threat. Companies want to make absolutely sure that, they control their data and this is a big challenge for auditors as they have the right to access such data. So, they need to recognize and understand that, their clients' data are very secured.

3. A strong case needs to be made that, there are audit decisions that fit big data scope and scale (Alles and Gray, 2015).

4. For auditors to perform analytics in auditing, they should be able to extract their clients data efficiently and in a cost effective manner. In a multiple accounting systems within the same company, extraction of data may be a pain taking process, particularly in the case of an unfamiliar accounting system (Sidhu and Balasubramaniam, 2018). In big data environment, there could be complexities of data extraction and data mapping. The reason is that, auditors would need structured and unstructured, financial and non-financial data.

5. There is still lack of a theory for BDA and its wider applications in auditing. In this context, Athey (2013) argued the following:

"I think what is true is that when you have large amounts of data, if you ask it the right questions, you have a greater ability to let the data speak, and so you can be much less reliant on assumptions. But you still need a strong conceptual framework to understand what's coming out.".

6. A few researchers and auditors believe that, pursuing software and functionality may not be the appropriate direction in Big Data Analytics. Instead, auditors should think more about the questions they can ask and address. This is so, because there may be a danger for auditors to take big data correlations at face value and they may not question these big data correlations sufficiently.

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