BIG DATA ANALYTICS IN FINANCIAL REPORTING AND ACCOUNTING

Idil Kaya[1], Destan Halit Akbulut[2]
[1]Galatasaray University, Istanbul, Turkey.
 ikaya@gsu.edu.tr, ORCID: 0000-0002-9171-5989
[2]Galatasaray University, Istanbul, Turkey.
 dhakbulut@gsu.edu.tr, ORCID: 0000-0002-0705-9553

ABSTRACT

Purpose- This paper aims to discuss the impact of big data analytics on financial reporting and accounting within the institutional framework.
Methodology- The paper's design is a qualitative study based on in-depth interviews with accounting professionals in different industries to determine and analyze potential uses and impacts of big data analytics in financial reporting and accounting.
Findings- The nature of accounting and financial reporting do not alter but traditional methods of recording, collecting and analyzing accounting information change. The revenue recognition in many industries including airways and telecommunication companies needs to process a large volume of data because of the complex billing systems. Furthermore, the big data and analytics present a pressing issue and in the same time a real opportunity for accountants working in forensic and valuation areas.
Conclusion- We concluded that the companies are tracking the policies and procedures of BDA adopted by other firms in trying to assure the legitimacy of their firm and to maintain and enhance their competitive advantages. In addition, financial reporting and accounting professionals try to adapt to the challenges regarding using and mastering new technologies and applications, they need to improve their capabilities and skills in the areas of big data analytics.

Keywords: Big data, big data analytics, financial accounting, reporting.
JEL Codes: M40, M41, M42

1. INTRODUCTION

The developments in the information and communication technologies allow that datasets become more accessible. New types of data arise such as real-time contents and the big data analytics (BDA) help to solve issues between users and preparers of financial reporting and accounting. The purpose of the present paper is to discuss the impact of BDA on financial accounting and reporting. We conducted a qualitative study based on in-depth interviews with accounting academics and professionals in different industries to determine and analyze potential uses and impacts of big data analytics in financial reporting and accounting with institutional theory as our primary theoretical framework. One can say that BDA and financial accounting have common features; the interactions between them could have significant results in the businesses. On the one hand, BDA is described in the literature as a science and technology about examining, summarizing and drawing conclusions from data. Sun et al. (2018) defined BDA as the process of collecting, organizing, and analyzing big data to discover, visualize and display patterns, knowledge, and intelligence as well as other information within the big data. On the other hand, financial accounting is an information system of recording, storing, retrieving, summarizing, analyzing and presenting the financial and economics transactions and events. Consequently, we can argue that the accounting information systems extended with BDA can be an impetus on the management success. This paper proceeds as follows. First, we consider the institutional theory as a framework. Second, we explore the results of the literature review. Third, we present the research method and methodology. Fourth, we illustrate the findings of the in-depth interviews, and we conclude.

2. THEORETICAL FRAMEWORK

We study the use of BDA in financial accounting and reporting   by drawing upon Institutional theory, which has been developed within the academic management literature and widely used in accounting studies. It provides an understanding of how organizations understand and respond to changing social and institutional pressures and expectations. We use the isomorphism dimension and the decoupling dimension of Institutional Theory in explaining compliance with the complex accounting standards and the need for BDA.

DiMaggio and Powell (1983) specify three different isomorphic processes. These are the coercive, mimetic and normative isomorphism. We study the use of BDA in accounting in these three different isomorphic processes. Firstly, according to the coercive isomorphism, the companies will only change their institutional practices because of pressure from the stakeholders upon whom the organization is

dependent. The company is coerced into adopting the existing use of data gathering and analyses to bring these into line with the expectations and demands of its influential stakeholders (use of BDA with the pressures of computing accurate measures in accounting). Secondly, the mimetic isomorphism involves companies searching for imitate information technology practices of other companies for competitive advantages. Because of the coercive pressures from the regulatory bodies, investors and software providers in augmenting the accuracy of its accounts there would be pressure to imitate the use of BDA. Thirdly, regarding normative isomorphism, there are the professional expectations and the forces of using BDA in determining the appropriate measurement and timing of recognition of different elements of revenue, in computing accounting estimates and in measuring the fair value of assets and liabilities. The American Accounting Association(AAA)'s annual meetings named "Accounting *IS* Big Data" conferences offer to its panels on the accounting function of the future, how to prepare it and ever-changing Big Data Ecosystem- Blockchain, Cyber, AI, Tax and Integrated Reporting. The AAA also promotes Big Data education providing teaching materials.

On the other hand, the Institutional theory argues that organizations adopt formal structures and procedures, but actual practices can be very different from these formally and publicly pronounced processes and practices. The gap between formal and informal structures or methods is defined as a decoupling. The actual use of BDA can be decoupled from the apparent (institutional) practices. According to Coyne et al. (2018), Big Data has become more and more meaningful to the accounting, but accountants have little understanding of the steps necessary to convert Big Data into useful information. This creates a deficiency on behalf of accountants assisting in Big Data information governance. Palem (2014) argue that many companies appreciate that they need BDA, but they do not know precisely what they need it for. In most cases, BDA Solution providers bridge the gap between the customers 'needs and Big Data requirements.

3. LITERATURE REVIEW

There is developing literature that illustrates challenges of big data in financial reporting and accounting. This recent literature also identifies the broad problem areas of financial accounting and reporting in the age of big data. Many researchers study how big data technologies and big data analytics help to solve issues between users and preparers of financial reporting and accounting since the datasets become more accessible and new types of data arise such as real-time contents (Al-Htaybat and Al-Htaybat, 2017; Krahel and Titera, 2015; Bhimani and Willcocks, 2014; Sun et al., 2018; Coyne et al., 2018; Griffin and Wright, 2015). Sun et al. (2018) noted that BDA uses data mining to uncover knowledge from a data warehouse or a big dataset to support decision making creating predictive models to forecast future opportunities and threads, and analyzing and optimizing business processes. Hence, the big data analytics offer a capability of capturing "sequential causational and correlational processes" on a real-time basis and may change the financial accounting dramatically and reporting that is legacy-based, relied on structured data and successive layers of summary and aggregation and reports on a periodic basis (Griffin and Wright, 2015). Warren et al. 2015 assert that big data could significantly influence the future of financial reporting and the evolution of generally accepted accounting principles specifically on the reporting of off-balance sheet assets and fair value accounting.

Coyne et al. (2018) analyze the role of accountants in the age of big data. According to these authors, accountants should play a significant role in Big Data information governance since they have a keen ability to identify the informational and control needs of internal and external decision-makers. On the other side, Palem (2014) argued that many companies have become aware that they need big data, but they do not understand truly what they need for it. BDA solution providers somehow handle the gap between the company's perceived need for BDA and its level of comprehension about its scope and come up with a solution. These arguments lead to the following research questions:

Q1. What is the role of the institutional pressures on the change of the Accounting Information Systems in the age of BDA?

Q2. Does BDA augment the accuracy in fair value of assets and liabilities and how?

Q3. What is the role of BDA in key accounting and audit matters, such as revenue recognition and complex accounting estimates?

Q4. Can BDA provide improved financial reports' transparency and their usefulness for decision-making?

4. RESEARCH METHOD AND METHODOLOGY

The current study is a qualitative field based on in-depth interviews with accounting professionals in different industries to determine and analyze potential uses and impacts of big data analytics in financial reporting and accounting through the participants' perceptions. We entered into the field study with institutional theory as our primary theoretical framework. We collected the data via in-depth interviews. The first cycle of data collection realized in April 2018, which comprised semi-structured interviews with the first 8 of participants. The second cycle of data collection commenced in May 2018 and ended at the beginning of June 2018. This second cycle of data collection served to enlarge, develop and validate the findings that were developed as part of the first cycle, and additional interviewees will be included in the study. We also realized a survey based on corporate financial reports. These second data from the corporate reports and audit reports provide different comprehension and serve to triangulate the evaluation of collected data.

We grouped the 8 participants in three different categories. The points we notice while categorizing of our participants are their job position, work experience, and certificate. Accordingly, participant 1, 2, 3, 4, 5 and 6 are in the first category with their work experience for more than 13 years. Participant 7, 8, 9, 10 and 11 take part in the second category with their work experience between 5 and 8 years. In our third category, there are two participants with only 2 years of work experience. Table 1 presents the participants work experience, their certificates and their familiarity with the software and ERP.

Table 1: Characteristics of the Participants

Participant	Job Position	Work Experience	Certificate	Software and ERP Systems used by participants
1	Consultant in a Big4 Audit Firm	38 years	CRMA, CFE, Certified Advanced Koach, Master Degree, Certified Accountant	Excel
2	Professor	37 years	Certified Accountant	Excel
3	Professor	26 years	Certified Accountant	Excel
4	SAP consultant	20 years	Computer Engineer	SAP, Excel
5	CFO	15 years	CMA, CIA, CFE, CRMA	Excel
6	Expert in Borsa Istanbul	13 years		Excel
7	Reporting Chef at Cargo Department	8 years	Master	Excel, SAP
8	Internal auditor	7 years		Excel, SAP
9	Financial Controller	6 years	CMA, CPA	SAP, QlikView, Qlik-Sense, Excel
10	Accountant	5 years	CPA	PARES, DWH
11	Accountant	5 years		SAP
12	Accountant	3 years		SAP
13	Accountant	2 years		SAP

We used an institutional lens to discuss whether companies tend to adopt similar policies and procedures in BDA as those adopted by other firms and whether they try to assure the legitimacy of their firm and to maintain and enhance their competitive advantages. We also critically assessed how participants perceive BDA and its impact on the accuracy of annual accounts.

5. RESULTS AND INTERPRETATIONS

We find similar results with the literature that big data and development of technology is likely to lead to some changes in financial reporting and accounting. In the age of BDA, the nature of accounting and financial reporting are the same but traditional methods of recording, collecting and analyzing accounting information change. Our qualitative study based on in-depth interviews with accounting academics and professionals lead the following findings:

- There are too many changes in information and communication technologies, and the accountants must keep pace with the associated changes, complexities, costs, and risks of adopting them. For example, revenue recognition in many industries including airways and telecommunication companies needs to process a large volume of data because of the complex billing systems. Besides the overall management of the availability of the information, the usability in decision-making, its integrity, quality and security, the presentation of this information on the annual financial reports exposes a big challenge for the accountants. Furthermore, big data and analytics present a pressing issue and in the same time a real opportunity for accountants working in forensic and valuation areas.

- There are many opportunities to link the traditional extended data, as found in ERP's, to new sources of data. Extended ERP systems augment the utility of the accounting records with BDA on assets conditions, features, and characteristics. Processing the big nontraditional data from various sources has a positive effect on the accuracy of financial reports.

- BDA Solution providers have an essential role in the implementation of BDA; typically they understand the company needs and come up with a solution.

- Institutional pressures sometimes have key position on the investment decisions to information technologies. Several companies are tracking the policies and procedures of BDA adopted by other firms in trying to assure the legitimacy of their firm and to maintain and enhance their competitive advantages.

- The accounting academics and professionals try to adapt to the challenges of BDA in terms of using and mastering new technologies and applications. They have become aware that they need to improve their capabilities and skills in the areas of big data analytics.

6. CONCLUSION

Grounded on the literature review on Big Data Analytics in accounting and financial reporting, we formulated our research questions on the extent and the effects of the use of BDA in accounting. We explored the institutional pressures on the adoption and implementation of BDA and its place in key accounting and audit matters, such as revenue recognition and accounting estimates.

As a conclusion, beside the critical role of service providers of Big Data, there are also institutional pressures on the companies to prepare in ever-changing Big Data Ecosystem- Blockchain, Cyber, AI, Tax and Integrated Reporting. Additionally, several companies are searching to imitate information technology practices of other companies for competitive advantages, and the actual use of BDA can be decoupled from the apparent practices.

Acknowledgment

REFERENCES

Al-Htaybat, K., von Alberti-Alhtaybat, L. (2017). Big Data and corporate reporting: impacts and paradoxes. Accounting Auditing & Accountability Journal, 30(4), 850-873.

Bhimani, A. (2015). Exploring big data's strategic consequences. Journal Of Information Technology (Palgrave Macmillan), 30(1), 66-69.

Coyne, E. M., Coyne, J. G., Walker, K. B. (2018). Big Data information governance by accountants. International Journal of Accounting & Information Management, Vol. 26 Issue: 1, pp.153-170, https://doi.org/10.1108/IJAIM-01-2017-0006

DiMaggio, P. J., Powell, W. W. (1983). The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. American Sociological Review, 48(2):147–60.

Griffin, P. A., Wright, A. M. (2015). Commentaries on Big Data's importance for accounting and auditing. Accounting Horizons, 29(2), 377-379.

Krahel, J. P., Titera, W. R. (2015). Consequences of Big Data and formalization on accounting and auditing standards. Accounting Horizons, 29(2), 409-422.

Palem, G. (2014). Formulating an executive strategy for big data analytics. Technology Innovation Management Review, 4(3), 25-34.

Sun, Z., Sun, L., Strang, K. (2018). Big Data analytics services for enhancing business intelligence. Journal Of Computer Information Systems, 58(2) Vasarhelyi, M. A., Kogan, A., & Tuttle, B. M. (2015). Big Data in Accounting: An Overview. Accounting Horizons, 29(2), 381-396.

Warren, J. D., Moffitt, K. C., Byrnes, P. (2015). How Big Data will change accounting. Accounting Horizons, 29(2), 397-407.