International Journal of Accounting Information Systems 28 (2018) 59–76

Contents lists available at ScienceDirect

International Journal of Accounting Information Systems

journal homepage: www.elsevier.com/locate/accinf

Understanding usage and value of audit analytics for internal auditors: An organizational approach☆

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ARTICLE INFO

Keywords:
Audit analytics
Audit technology adoption
TOE

ABSTRACT

Although internal auditors are increasingly aware of the importance and value of audit analytics, prior research indicates that the use of audit analytics is below expectation. This paper uses the Technology-Organization-Environment (TOE) framework to identify and examine factors at the organizational level that influence post adoption usage of audit analytics, as well as whether using audit analytics improves the performance of the internal audit process. Data were collected from clients of a major audit software vendor. Results indicate that application-level usage is influenced by management support, technological competence, and standards, while professional help, technological competence, and application-level usage drive feature-level usage. Finally, both application-level and feature-level audit analytics usages improve the performance of the internal audit process.

1. Introduction

The use of analytics in the auditing domain has been emphasized by both practitioners and academia (Audimation, 2011; PWC, 2012; Wang and Cuthbertson, 2014; Cao et al., 2015). Audit analytics is defined as a science of "discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit" (AICPA, 2015). Audit software vendors[1] have developed many analytics tools to improve audit quality and enhance assurance. Some general data analytics software packages[2] are also being employed in the audit process. The usage of audit analytics not only increases operational efficiency by reducing costs (KPMG, 2012), but also helps quickly identify potential fraud and anomalies, thereby providing a higher level of assurance (EY, 2014).

Audit analytics provides benefits to both external and internal auditors. However, it creates unique opportunities for internal auditors to assess potential risks, identify operational inefficiency, and provide insights (PWC, 2012; Schneider et al., 2015). First, internal auditors conduct much broader tasks than external auditors, such as investigation on financial and operational matters, fraud

☆ We thank CaseWare International for generous supports of this study, and the participants from 24th Annual Research Workshop on Strategic and Emerging Technologies and the 33rd World Continuous Auditing and Reporting Symposium for comments.

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[1] Examples of those audit software vendors include CaseWare International, Inc. and ACL Services, Ltd.
[2] Examples of those general data analytics software packages include R, WEKA, and SAS.

https://doi.org/10.1016/j.accinf.2017.12.005
Received 7 December 2016; Received in revised form 28 November 2017; Accepted 20 December 2017

risk evaluation, etc. (Araj, 2015; Carcello et al., 2017). Therefore, internal auditors should have more demands on the use of audit analytics in order to accomplish those tasks in an efficient and effective manner. Second, internal auditors usually have more frequent access to business accounting data, to which audit analytics can be employed to quickly detect anomalies and fraud. Finally, although current regulations for external auditors neither encourage nor prohibit the use of analytics, external auditors are likely to focus on the procedures that are explicitly required to satisfy regulatory requirements. By contrast, regulations for internal auditors are less strict than those for external auditors, allowing more flexibility in exploring various audit analytics tools. Not surprisingly, analytics are expected to become a core capability of internal auditors (Deloitte, 2016), and many researchers have devoted much effort into incorporating analytics to internal audit. For example, Thiprungsri and Vasarhelyi (2011) developed an analytical model to detect outliers from group life insurance claims. Kim and Vasarhelyi (2012) used analytics to identify potential fraud in the wire transfer payment process. Jans et al. (2014) demonstrated how internal auditors could use process mining of event logs as a new type of analytical procedure to detect deficient controls.

Although internal auditors are increasingly aware of the importance and value of audit analytics (Teammate, 2012; KPMG, 2015), surveys show that audit analytics is not being fully utilized by the majority of companies (AuditNet, 2012; EY, 2014; KPMG, 2015). Many auditors are not able to effectively incorporate audit analytics in their work and therefore only use it on an ad-hoc basis. While some articles (EY, 2014; KPMG, 2015) attempted to explore the barriers to the adoption of audit analytics, limited academic research has examined the actual usage level and the factors that result in the differences in its use.

The objective of this paper is to examine organizational factors that have an impact on audit analytics post-adoption usage at both the application-level and the feature-level, and whether using audit analytics improves the performance of internal audit. Prior studies have investigated use of technology in the audit process, such as general Computer Assisted Auditing Tools and Techniques (CAATTs) (Braun and Davis, 2003; Bierstaker et al., 2014; Mahzan and Lymer, 2014) and continuous auditing (Gonzalez et al., 2012; Vasarhelyi et al., 2012). However, compared to general CAATTs,[3] audit analytics requires special auditor knowledge and skills, which leads to new challenges. For example, audit analytics usually involves more advanced statistical techniques or data analytics tools (e.g. data mining) than general CAATTs (Brown-Liburd et al., 2015), of which most auditors have limited knowledge; therefore understanding those techniques could be a challenge. Failure to fully understand audit analytics could result in misuse of the methodology, as well as misinterpretation of its results. In addition, audit analytics is usually employed with large amounts of data, which could increase information load, and thereby affect decision-making processes of auditors (Schneider et al., 2015). The difficulty of extracting useful information from a large amount of data could impede auditors from using analytics on a frequent basis. Understanding factors that impact the usage of audit analytics could provide insights to management, regulators, and audit analytics software vendors.

In this paper, we use the Technology-Organization-Environment framework (hereafter the “TOE framework”) (Tornatzky et al., 1990) to examine the determinants and extent of audit analytics usage, as well as whether using audit analytics improves the performance of the internal audit process. Following prior literature (Harrison and Datta, 2007; Kim et al., 2009; Sun, 2012), we distinguish audit analytics usage at the application-level from that at the feature-level. Application-level audit analytics usage refers to the extent to which audit analytics software is used by auditors. For example, application-level audit analytics usage is considered high when software that enables audit analytics is used frequently in the majority of audit processes. Feature-level audit analytics usage, on the other hand, is a composite measure that considers specific audit analytics techniques (feature of software), such as summarization, regression, Benford's Law, etc., and the frequency of their usage. We hypothesize that technological competence, IT complexity, firm size, management support, standards, and professional help will have an impact on application-level audit analytics usage. Furthermore, this paper posits that application-level usage, professional help, and technological competence have positive influences on feature-level usage. Finally, the use of audit analytics at both levels improves the performance of internal audit. Our empirical results indicate that technological competence, management support, and standards are positively associated with application-level audit analytics usage, while application-level usage, professional help, and technological competence have positive impacts on feature-level usage. Both application and feature-level usage improve the performance of the internal audit process.

The main contributions of this study are threefold. First, we believe that this is the first paper to examine the determinants and extent of audit analytics usage, and whether it improves the internal audit function. Our results provide insights to management, regulators, and vendors to potentially facilitate the incorporation of audit analytics into internal audit. Second, new constructs are proposed to measure audit analytics usage. In our model, audit analytics is examined from two perspectives: application-level and feature-level (Harrison and Datta, 2007), which few prior studies (Kim et al., 2009) have accomplished. The paper is also consistent with recent IS research that emphasizes the importance of understanding the usage of application features (Sun, 2012). Third, this paper examines factors that influence audit analytics usage via an organizational approach. It fills a gap in the literature as few research studies have examined, at the organizational level, the acceptance and use of technology by the audit profession (Rosli et al., 2012; Vasarhelyi et al., 2012).

The remainder of this paper proceeds as follows: Section 2 provides background on information technology adoption. Section 3 reviews literature and develops hypotheses. Section 4 identifies data collection and the method employed. Empirical results are presented in Section 5. Discussion of results is provided in Section 6. The last section concludes this paper and identifies future research.

[3] CAATTs are defined as “any use of technology to assist in the completion of an audit. This definition would include automated working papers and traditional word processing applications as CAATTs” (Braun and Davis, 2003).