Montclair State University

MONTCLAIR STATE UNIVERSITY

Montclair State University Digital Commons

Department of Accounting and Finance Faculty Scholarship and Creative Works

Department of Accounting and Finance

1-4-2016

Designing CA/CM to Fit Not-for-Profit Organizations

Deniz Appelbaum
Montclair State University, appelbaumd@mail.montclair.edu

Stephen Kozlowski
American Institute of Certified Professional Accountants Durham

Miklos A. Vasarhelyi
Rutgers - The State University of New Jersey, Newark

Joel White
AICPA, Durham

Follow this and additional works at: https://digitalcommons.montclair.edu/acctg-finance-facpubs

 Part of the Accounting Commons, Corporate Finance Commons, and the Finance and Financial Management Commons

MSU Digital Commons Citation

Appelbaum, Deniz; Kozlowski, Stephen; Vasarhelyi, Miklos A.; and White, Joel, "Designing CA/CM to Fit Not-for-Profit Organizations" (2016). *Department of Accounting and Finance Faculty Scholarship and Creative Works*. 45.
https://digitalcommons.montclair.edu/acctg-finance-facpubs/45

This Article is brought to you for free and open access by the Department of Accounting and Finance at Montclair State University Digital Commons. It has been accepted for inclusion in Department of Accounting and Finance Faculty Scholarship and Creative Works by an authorized administrator of Montclair State University Digital Commons. For more information, please contact digitalcommons@montclair.edu.

The current issue and full text archive of this journal is available on Emerald Insight at:
www.emeraldinsight.com/0268-6902.htm

Designing CA/CM to fit not-for-profit organizations

Deniz Appelbaum, Stephen Kozlowski and Miklos A. Vasarhelyi
Accounting Information Systems, Rutgers, The State University of New Jersey, Newark, New Jersey, USA, and
Joel White
American Institute of Certified Professional Accountants Durham, North Carolina, USA

Abstract

Purpose – The purpose of this project is to undertake continuous auditing and monitoring (CA/CM) implementations working with small-to-medium-sized (SME) not-for-profit (NFP) organizations of varying sizes, business purposes and levels of technical sophistication.

Design/methodology/approach – This paper discusses a project using a case study approach with an SME NFP entity.

Findings – The findings support the discussions in the literature regarding CA/CM adoption in organizations, particularly regarding its implementation benefits and challenges.

Research limitations/implications – The project is not complete in that additional case studies could possibly offer additional applicability to the findings.

Practical implications – This case study illustrates the issues inherent with the process of adopting new technologies. It provides insights for others considering adoption of CA/CM tools or protocols.

Social implications – The need for more reliable auditing has never been more urgent than it is today in the NFP environment, and this case study demonstrates how an NFP could address these critical needs of increased reporting accountability and internal controls.

Originality/value – The application of CA/CM is quite interesting and relevant in this modern real-time economy. This case study provides a new area of research in the field of CA/CM and, as such, contributes to the literature.

Keywords Internal controls, Continuous auditing, Audit tools, Continuous monitoring, Not-for-profits

Paper type Case study

1. Introduction

There has been much public attention recently regarding fraud and abuse in the not-for-profit (NFP) sector, for example recent articles appearing in the *Washington Post* (Zapotsky, 2013). The NFP sector has been subject to increasing pressure to conduct internal audits in a more effective and efficient manner. Many large, and generally publicly held, organizations have implemented continuous auditing and monitoring (CA/CM) tools into their internal and managerial activities to some degree (Alles *et al.*, 2008), to support their internal audit function. Small-to-medium-sized (SME) organizations, and especially NFPs, have not had an opportunity to participate in the benefits of CA/CM technology due to

JEL classification – M420

Managerial Auditing Journal
Vol. 31 No. 1, 2016
pp. 87-110
© Emerald Group Publishing Limited
0268-6902
DOI 10.1108/MAJ-10-2014-1118

cost/benefit concerns, a general lack of product designed and priced for smaller organizations and a lack of technical expertise in the organization.

The overall purpose of this Rutgers Accounting Research Center (RARC) case study is to undertake a CA/CM implementation by working with SME NFP organizations. The intent of this case study is to explore whether existing CA/CM tools and techniques can be implemented and generate appropriate analyses in an SME NFP setting. This paper discusses a case study where the project team and case NFP successfully implemented CA/CM protocols in the payroll/human resources (HR) process. The project team envisions that this case study may serve as a benchmark for CA/CM adoption by NFP organizations as well as by consulting organizations that support their NFP clients in undertaking such implementations.

This paper begins with this introduction section, followed by the case study and then the literature review sections. Section 4 outlines the motivation for the overall project, followed by a discussion of the project methodology. Section 6 recounts the case study, with Section 7 highlighting a discussion of this endeavor. Section 8 concludes with general observations and suggestions for areas of future research.

2. Case study methodology

The case study approach, as outlined by Yin (1989, 1999, 2009, 2012), assists in the understanding of complex issues or objects by extending current experience to previous research. Yin defines the case study method as an empirical investigation of a relevant issue in the context of a real-life application. Yin (1984, 2012), and other researchers (Stake, 1995; Eisenhardt, 1989; Simons, 1980) have suggested techniques for case studies, which may be combined as follows (Soy, 1997):

- *Determine and define the research questions*: A case study usually answers one or more questions, typically "why" or "how" (Tellis, 1997). These questions may solidify after conducting a literature review. At this stage, the literature review, the research objectives and the potential target audience should be determined.
- *Select the case and determine data gathering and analysis techniques*: At this phase, attributes for relevant cases are decided, as are the potential approaches for data collection and discovery – these could be interviews, observations, processes, surveys or collection of data (Tellis, 1997). Possible data analysis tools and approaches are also considered, as are possible project designs. Finally, the real-life case is selected.
- *Prepare to collect the data*: Because a case study may generate a large amount of data, advance preparation of databases to assist with categorizing, sorting and storing this information will be necessary (Soy, 1997). Furthermore, researchers should be domain experts regarding the process and case being studied.
- *Collect data in the field*: All methods of research in this phase should be collected and stored for eventual analysis, in formats that can be easily obtained and referenced. Text documents should easily interface with their corresponding structured data or task algorithms (Yin, 2012).
- *Evaluate and analyze the data*: At this stage, the data are analyzed in an exploratory fashion until the best approach is determined. This may be an iterative process, with continual updates from the case entity (Hoffman, 1989).

- *Prepare the report*: Whether targeted for the case or the broader audience, the case study results should be reported in an easily understood, highly visual format (Kohavi *et al.*, 2004). The objective of the case study is to illustrate a complex issue by applying it to a real-life context.

The case study format seems ideally suited for the two research questions of this project:

RQ1. Can existing CA/CM tools and techniques be implemented and generate appropriate analyses in an SME NFP setting?

RQ2. What is the motivation for an SME NFP to implement CA/CM technology?

The first question addresses the issue of "how" and the second, "why". However, further exploration of CA/CM research and the domain of small-to-medium-sized non-profits will be required before determining this feasibility, as is additional discussion of the project motivation. The following Literature review and Motivation sections contribute to the first suggested step in case study methodology.

3. Literature review

CA/CM techniques were first described nearly 25 years ago (Groomer and Murthy, 1989; Vasarhelyi and Halper, 1991) and through use of computer-based technology, applications have been developed that can perform CA/CM analyses. Several research studies have described the benefits of continuous auditing (CA) (Vasarhelyi *et al.*, 2004; Kuhn and Sutton, 2006), studied technical issues of CA/CM adoption (Kuhn and Sutton, 2006), discussed actual applications by businesses (Alles *et al.*, 2004; Hermanson *et al.*, 2006; Alles *et al.*, 2008; Vasarhelyi *et al.*, 2011) and explored the psychological issues regarding its adoption (Hunton *et al.*, 2008, 2010; Gonzalez *et al.*, 2012). CA may be defined as a methodology that enables independent auditors to provide written assurance on a subject matter using a series of auditor's reports issued simultaneously with, or a short period after, the occurrence of events underlying the subject matter (CICA/AICPA, 1999). Continuous controls monitoring (CM) provides a firm's management the ability to measure the effectiveness of the organization's internal controls (Vasarhelyi *et al.*, 2012a). Furthermore, the adoption of CA/CM by organizations has been attributed with offering many improvements such as reduction of accounting errors, more real-time analysis and alerts of anomalies and better audit efficiency and effectiveness (Vasarhelyi *et al.*, 2004; Debreceny *et al.*, 2005; Flowerday and von Solms, 2005; Kogan *et al.*, 1999; Rezaee *et al.*, 2002; Vasarhelyi *et al.*, 2002; Kuhn and Sutton, 2006). The differences between a traditional audit and a fully continuous audit that lead to the touted benefits are shown in Table I (Vasarhelyi *et al.*, 2012a).

Alles *et al.* (2002) describe CA as the application of modern information technologies to standard audit products, whether the audit is internal/operational or external/financial. Originally, the ultimate goal of the CA process was to bring the external audit closer to the everyday internal processes of the client, and further away from the historical annual financial audit (Alles *et al.*, 2008). Over time, however, CA/CM approaches have been mainly championed by internal auditors and less so by external auditors (Gonzalez *et al.*, 2012; Alles *et al.*, 2008). Every case study of CA/CM implementation in the academic literature has been limited to the internal audit function (Vasarhelyi *et al.*, 2012a; Gonzalez *et al.*, 2012; Chan and Vasarhelyi, 2011).

Facets of audit	Traditional	Continuous
Audit objectives	Assurance on the financial reports presented by management	Improvements on data quality Creation of critical meta-controls
Audit approach	Traditional interim and year-end audit	Audit by exception/monitor alerts
Data access	Case-by-case basis Data captured during the audit process (batch, historical)	Complete data access Audit data warehouse, production, finance, benchmarking and error history
Audit automation	Manual processes and separate IT audit	Continuous monitoring and immediate response Most of the audit is automated
Audit and management overlap	Independent and adversarial	Purposeful parallel systems and common infrastructures
Management of audit function	Financial organization supervises audit and matrix to BOD	Centralized and integrated with risk management and compliance and SOX layered with external audit firm
Analytical methods	Financial ratios	Corporate models of main sectors of the business Early warning systems of outliers

Table I.
Characteristics of the traditional and fully continuous audit

Studies by accounting firms have not discussed their own use of CA techniques but about how CA/CM is being implemented (or not) by their clients (PwC, 2006, 2007; KPMG, 2010; KPMG International, 2010; Grant Thornton, 2011). In these surveys, the firms discovered that about 7-13 per cent of their clients had fully operational CA systems and/or tools in place and that another 13-37 per cent had systems and/or tools available but were not deploying them (Gonzalez *et al.*, 2012). Essentially, less than half of the surveyed firms had developed and/or deployed CA/CM systems and tools. As a continuation of these earlier non-academic surveys, Vasarhelyi *et al.* (2012a) conducted a field study on how awareness of CA translates into its adoption at some level by internal auditors. Internal auditors were interviewed and observed in great detail, and it was determined based on the authors' audit maturity model that all of the firms in their study were somewhere between traditional audit and emerging CA/CM – a huge difference from the reported survey results of between 7 and 13 per cent full CA/CM system use. It could very well be that there existed confusion within the survey participants as to the difference between CA/CM system adoption and CA/CM tools adoption. Basically, an organization could be using an audit software such as ACL or IDEA, and incorrectly assume that their use of such a CA/CM tool constitutes a full CA/CM system.

Furthermore, according to Vasarhelyi *et al.* (2004) in an earlier work, this implementation of CA/CM by internal auditors will begin with the automation of existing audit procedures before proceeding to any major alteration of the entire audit process. That is, manual tasks and components would be replaced by CA/CM techniques and/or tools on an individual basis, in an "infancy stage", until the feasibility and potential value of this approach had been verified (Alles *et al.*, 2008). Like any new technology, the biggest hurdle would be the transition from theory to practice (Alles

et al., 2008). This path from the traditional audit to one of the fully mature CA/CM system was then explored in the field study by Vasarhelyi *et al.* (2012a) and its various stages were fleshed out in their audit maturity model shown as Table II.

To summarize, in the paper by Vasarhelyi *et al.* (2012a), the firms and their internal auditors had progressed to Stage 2 of "Emerging CA audit", which entails audit objectives of effective control monitoring, a traditional audit approach with some key monitoring processes, data extractions on cycles, audit management and work paper preparation software use, some integration of audit system core monitoring with management systems, some degree of integration between areas of risk, auditing and compliance with IT audit working independently and analytical methods consisting of key financial ratios at sector and account levels. This is somewhat removed from the characteristics of the full continuous audit, which is an audit by exception of complete, real-time continuous data that is fully integrated with other organization systems and predictive in nature, as depicted in Stage 4 in Table II. As mentioned earlier, several papers investigate the level of current CA/CM technology adoption, where most organizations have adopted computer-based applications and tools but have not progressed further (Vasarhelyi *et al.*, 2012a; Gonzalez *et al.*, 2012).

In the paper Vasarhelyi *et al.* (2012a), several issues were mentioned by internal auditors that impeded progress of CA/CM development:

- lack of or wavering support from management;
- limited access to data;
- limited permission to improve the audit-aid technology; and
- lack of technical proficiency and training of the staff.

In these organizations, cost was not identified as a major barrier for the implementation of CA/CM. In the paper by Gonzalez *et al.* (2012), the authors felt that the ease and clarity of use, the support and encouragement of key organizational members, the annual sales volume versus the performance expectancy and the strength of social influence and its effect on voluntariness of use were strong determinants of the degree of CA/CM adoption by firms. The prominent nature of the constructs of social influence and voluntariness of use implied that the slow adoption of CA/CM may be a result of the lack of socially conducive or coercive pressures by the audit industry. That is, the authors suggested that until CA/CM is championed by the auditing field as a whole, its use will generally lag.

However, to-date, computer-based applications and tools have been effective when applied to essentially continuous processing activities such as are found in the typical enterprise resource planning (ERP) system (Alles *et al.*, 2008, 2006). Most publicly traded firms have established ERP systems. Most firms operate on a real-time basis as part of the real-time economy (Vasarhelyi *et al.*, 2012c). Businesses benefit from useful real-time information that is free from errors, omissions and fraud (Chan and Vasarhelyi, 2011) – however, these data qualities cannot be assured unless the practice of traditional auditing keeps pace via CA/CM. It is very difficult to accurately and efficiently manually audit computerized systems and controls.

Not surprisingly, CA/CM approaches were successfully demonstrated in two pilot programs, one with a firm with highly automated business processes within a modern integrated ERP system, and the other with a firm with a fairly undeveloped level of

Table II. The audit maturity model

Maturity model:	Stage 1	Stage 2	Stage 3	Stage 4
Audit maturity model stages	Traditional audit	Emerging CA audit	Maturing CA audit	Full continuous audit
Audit objective	Assurance on the financial reports presented by management	Effective control monitoring	Verification of the quality of controls and operational results	Improvements in the quality of data Creation of a critical meta-control structure
Audit approach	Traditional interim and year-end audit	Traditional plus some key monitoring processes	Usage of alarms as evidence Continuous control monitoring	Audit by exception
Data access	Case-by-case basis Data are captured during the audit process	Repeating key extractions on cycles	Systematic monitoring of process with data capture	Complete data access Audit data warehouse, production, finance, benchmarking and error history
Audit automation	Manual processes and separate IT audit	Audit management software Work paper preparation software	Automated monitoring module Alarm and follow-up process	Continuous monitoring and immediate response Most of audit automated
Audit and management overlap	Independent and adversarial	Independent with some core monitoring shared	Shared systems and resources where natural process synergies allow	Purposeful parallel systems and common infrastructures
Management of audit function	Financial organization supervises audit and matrix to board of director	Some degree of coordination between the areas of risk, auditing and compliance IT audit works independently	IA and IT audit coordinate risk management and share automatic audit processes Auditing links financial to operational processes	Centralized and integrates with risk management, compliance and SOX/layer with external audit
Analytical method	Financial ratios	Financial ratios at sector level/account level	KPI level monitoring Structural continuity equations Monitoring at transaction level	Corporate models of the main sectors of the business Early warning system

Source: Vasarhelyi *et al.*, 2012

automation and using mainly legacy relational systems (Alles *et al.*, 2008). Both of these pilot studies were conducted with fairly large publicly held, multi-national firms subject to Securities and Exchange Commission (SEC) regulations and reporting requirements. As such, these entities were subject to the requirements of Sarbanes–Oxley (SOX), specifically Section 404, and were facing drastically increased workloads as well as compliance with higher standards for audit accuracy. Both issues were alleviated for these two firms when the manual audit process was replaced with automation (Alles *et al.*, 2008). Both firms expressed a desire for audit automation due to the increased manual workloads to support compliance with SOX (Alles *et al.*, 2008).

However, according to Vasarhelyi *et al.* (2012a), there is no explicit relationship between CA/CM implementation and SOX compliance. The authors report that the technology of CA/CM can help fulfill SOX requirements, as described by their interviewees. CA/CM purportedly facilitates review activities and reduces the time required to meet SOX compliance. In one case, the auditors describe developing a monitoring tool that helped internal auditors work efficiently and effectively and that enabled comparison and benchmarking of internal controls. But, most firms in this field study had not implemented their own in-house version of control assessment, let alone off-the-shelf versions.

4. Motivation

Is a CA/CM implementation only possible or feasible for larger firms that have established ERP systems and are publicly regulated? All of the research to-date would seem to imply that this is the case (Kuhn and Sutton, 2010; Alles *et al.*, 2008), as academic literature has been focused in this direction. There has been no academic literature to-date regarding the application of CA/CM in SMEs, public or private. What about entities who are not under the jurisdiction of the SEC? Alles *et al.* (2008) propose that the demand for CA/CM did not really develop internally until the mandates of SOX began to be felt by public companies; it is not clear where CA/CM adoption would be today without that burden of regulatory compliance. What about smaller enterprises who do not utilize ERP systems? All of the studies have primarily addressed the technicalities of adding CA/CM modules to highly computerized firms (Gonzalez *et al.*, 2012; Vasarhelyi *et al.*, 2012a; Chan and Vasarhelyi, 2011; Hunton *et al.*, 2008). Finally, what would be the challenges and potentialities of converting a manual internal audit procedure to one incorporating CA/CM technology in a less technically developed SME?

Before addressing the challenges of transforming a manual audit procedure in an SME to a CA/CM-enabled audit, it is vital to consider if there could even be a demand for CA/CM in an SME. Some SMEs may have significantly fewer than 100 employees! Would such an SME need CA/CM tools to, for example, audit its payroll? That is, what is the need to automate its manual audit process? After all, according to Alles *et al.* (2002), the key driver for CA/CM is the demand for it. There is no guarantee that CA/CM procedures will prove to be cost-effective or efficient, or that there would be a need for continuous processing (Alles *et al.*, 2002). Furthermore, given the Vasarhelyi *et al.* (2004) earlier prediction that the transformation of the manual audit to a CA/CM process would start with a strategic implementation of specific, targeted tools to certain aspects of the audit, what sort of subsequent result would encourage a desire to develop CA/CM beyond this "infancy stage"? Basically, if the CA/CM transformation begins with applying computer-assisted audit techniques and tools solutions to the existing audit

procedures, why would the SME proceed to take the audit process beyond this level of integration? Interestingly enough, a recent study by Vasarhelyi *et al.* (2012a) confirmed this earlier prognosis with the observation that all of the firms interviewed were still at the "traditional audit stage" or "emerging stage", despite having motivated internal auditors with access to CA/CM tools. Even the two successful pilot programs (Alles *et al.*, 2008) tackled only one component of the audit procedures, and in that paper, the pilots were regarded as "emerging".

Without the requirements of regulations and mandatory reporting that are faced by public entities, the possible motivation for a non-public SME to demand CA/CM applications is important to grasp. For some SMEs, this motivation may prove to be elusive due to cost/benefit concerns. Fortunately, one type of SME – NFP organizations – would seem to immediately possess sufficient incentive to undertake CA/CM approaches. Even though NFPs are not "public" companies, they are regarded in a similar fashion, in that they rely on government grants, memberships and individual donations for their funding. Due to these sources of funding, NFPs are usually required to provide reports of additional auditor monitoring and internal controls (Johnson, 2009; Szymanski, 2003). Donors rely on robust monitoring because they personally do not reap a benefit from their contributions. Therefore, every NFP with more than $25,000 annual revenues must file a Form 990 with the IRS and make it available to the public (Internal Revenue Code 6104(d)(1)(A), 2007). Furthermore, any NFP entities who receive more than $750,000 in government grants or assistance are subject to a Single Audit (OMB A-133[1]). The purpose of this Single Audit is to provide assurance to the granting agency that its funds were used appropriately by the NFP.

Furthermore, NFPs are uniquely susceptible to asset misappropriation, due to a lack of direct ownership and lack of profit motive (Vanderwarren, 2003). In fact, this lack of defined ownership and profit motive creates both control and reporting issues for NFPs (Greenlee *et al.*, 2007). NFPs primarily provide a service, and this service is measured by its effectiveness and efficiency (Gilkeson, 2006). NFPs feel significant pressure to avoid negative publicity and the reporting of even one incident of negligence and/or misappropriation of assets (Gilkeson, 2006) that might possibly be discovered. Such reports have historically led to huge drops in donation levels and fund raising efforts (Greenlee, 2000; Vanderwarren, 2003).

NFPs are also concerned with controlling operating costs, as their revenues are not easy to come by (Gilkeson, 2006). Furthermore, many NFPs are staffed very leanly, with employees undertaking multiple tasks (such as in purchasing) that would normally be segregated in larger firms (Greenlee *et al.*, 2007). Also, they may be staffed with part-time volunteers who are not able to closely monitor the financial transactions (Vanderwarren, 2003; Greenlee, 2000). In either situation, any improvement in the accuracy, cost and efficiency of the external and/or internal audits should be welcomed by NFPs and help compensate for any internal control weaknesses (Vanderwarren, 2003). Additionally, there may be a general lack of technical expertise and a heavy reliance on manual processes and procedures in many NFPs.

This CA/CM implementation case study involves the development of fraud detection rules, scripts and CA/CM routines for payroll/HR processing based on input from the case NFP's management and staff. The subsequent execution of these routines, scripts and rules will provide support for data analyses, including identification of exceptions,

anomalies, trends and areas of risk. The project also entails the development of presentation tools as requested by the case NFP.

5. Project methodology

As noted in the Motivation section, there has been no academic literature to-date describing the application of CA/CM technology to SME organizations. Given this situation, for this present case study, a suitable framework is required to guide the project team. Lau (1997) describes the use of an action research approach in information systems (IS) studies. Hult and Lennung (1980) provide the following definition for action research: "Action research simultaneously assists in practical problem-solving and expands scientific knowledge". In simple terms, action research can be defined as the integration of theory with practice by means of an iterative process that incorporates problem diagnosis, action taken and learning by observation (Lau, 1999). Characteristics of action research that can support IS research include a future-oriented perspective, collaborative in effort between researcher and client system and leading to the development of a system to address the described problem as well as generating new knowledge about the underlying processes (Susman and Evered, 1978).

With the research activity approach as a suitable framework to support the case study, the project team identified the proposed steps to undertake based on the case study framework. As an actual case study would progress, the initially defined steps and actions would be refined, and the model presented here reflects the results of the collaborative effort between the project team and case NFP.

The first steps of identifying the research questions and thoroughly investigating the literature have been conducted. As a second step, desired case attributes were defined. An organization profile was initially developed with which the team would assess potential NFPs for inclusion in the project. The criteria include revenues and/or expenditures in excess of $15 million annually, headcount exceeding 65 employees, a mature accounting system in place, an engaged audit committee that supports the project and the use of generic, third-party accounting, payroll, membership and fundraising software.

An appropriate project methodology was developed as a third step. The project methodology includes both initiation and execution phases and proceeds as follows, once the NFP has agreed to participate:

- the project team gains an understanding of the NFP's processing scenario for the selected application area by means of interviews and questionnaires;
- the team and NFP agree on appropriate data sources for the testing and the format in which the data will be presented to the team;
- the team presents typical testing scenarios and agrees with the NFP as to which scenarios to initially pursue;
- the team and NFP agree on appropriate analytics software to use for the testing; and
- the team implements the solution and generates appropriate tools to present the testing results.

These steps of the desired methodology are in alignment with the procedures for case studies as outlined earlier.

The full initiation phase includes activities related to soliciting client participation in a case study, the finalization of required contracts and other documents and a presentation of the intended methodology for the particular case study. For the purposes of this paper, the discussion of project initiation will focus on the following collaborative activities between the project team and NFP:

- knowledge transfer from NFP to project team describing the NFP's processing scenario for the selected application area by means of interviews and questionnaires;
- identification of appropriate data sources and format in which the data will be presented for testing;
- agreement on the initial testing scenarios to be undertaken; and
- selection of appropriate analytics software to use for the testing.

One activity in particular in the initiation phase involves the review with the NFP of questionnaires that the project team has prepared in advance. Questionnaires are used to efficiently and effectively gain an understanding of the NFP's specific operations and the data for which the CA/CM tools will be designed and deployed. The questionnaires originated from literature reviews and from those used by one of the team members when used in a systems consulting role. The project team believes that the use of questionnaires is particularly applicable, given the possible technical limitations of the target NFP's staff, as the questionnaires will elicit responses that otherwise might be overlooked. Examples of questions posed to the NFP during the interview process are listed in Table III.

Another important activity in the initiation procedure is that of a review with the NFP of possible tests that can be undertaken with appropriate data as provided by the NFP. This activity reflects documenting what will be undertaken in "action taken" as

Table III. Example questions for the NFP interview

Question	Purpose	Typical response
How many employees do you pay?	Indicative of volume of data and activity anticipated	Numeric
How many employees are salaried and how many are hourly?	Impacts testing routines that perform recalculations	Numeric
Who is your payroll provider?	Identify major/minor provider and if the project team has worked with data from this provider before	Provider name
Is payroll interfaced with other systems?	Indicative of level of NFP automation and other databases that may be relevant for testing	NFP narrative
How is payroll information collected and entered (Master file, Timesheet, Other)?	Indicative of level of NFP automation and may indicate areas to target for testing	NFP narrative
Which payroll/HR files does the NFP have access to?	Indicative of ease of collecting data	NFP narrative
What tests are the NFP currently running to test for duplicate transactions, etc.?	Indicative of testing to focus on with CA/CM tools	NFP narrative

defined in the action research approach. The initial list of potential tests is drawn from a review of audit assertions and their corresponding substantive analytical procedures as provided by several of the CA/CM application providers. This review of existing tests provides a foundation for the review and decision of which processes to undertake, as the NFP staff may have limited familiarity with the numerous CA/CM analytical techniques available to draw from. For future case studies, as each new NFP is interviewed and tests defined, the original list of procedures could be expanded so that a more robust listing evolves which can then be utilized for future NFP implementations. Examples of such tests are listed in Table IV.

Subsequent to agreement on the initial tests to be run, the NFP will review with the project team the data available on which the testing will be based, again, a part of "action taken". The specific data tables, attributes and their source will be identified. Sources typically include third-party applications, such as payroll providers; client systems, such as accounting packages[2]; and other non-automated NFP sources, particularly manually prepared and maintained spreadsheets. The attributes of each data source are reviewed to identify those required to support the proposed CA/CM testing. The format of the source data is reviewed to determine if the proposed CA/CM tool can act on the data as-is or if the data need to be reconfigured into a more suitable format. When identifying the various data sources used for CA/CM testing, the project team also prefers to source or configure each table in a consistent format, such as MS Excel or CSV, to standardize the input into the CA/CM tool. The project team discusses data issues with the NFP in a collaborative manner to ensure NFP understanding of the data requirements, especially for those NFPs whose staff may not have an extensive background in databases and database design. When configuring data the project team requires, the NFP remove or encrypt any sensitive attributes, such as employee personal details in payroll/HR tables. Examples of typical data attributes, for payroll/HR testing, are listed in Table V.

Once initiation activities are completed, the project advances to execution. The procedure for the execution phase is depicted in Figure 1.

Test	Purpose
Stratify payment amounts, hours worked, and check dates	Identify unusual trends and exceptions
Reconcile salaried employee pay from one period to the next	Identify unauthorized changes
List all employees working more than 40 hours a week	Identify possible fraudulent time reporting
Compare payroll files to HR files to match all deductions for insurance and 401K	Identify anomalies between databases
List possible duplicate payments based on the same day and same employee number	Identify duplicate payments
Review the sequence of check numbers for gaps	Identify possible fraudulent activities
Check for employees receiving paychecks after termination	Identify paychecks to terminated employees

Table IV. Example tests to undertake

Upon receiving the data extracts, the project team reviews the format of each attribute to ensure it coincides with that required by the CA/CM tool and reconfigures individual attributes as needed, for example date format criteria.

After review and reconfiguration by the project team as required, the resultant data are loaded into the selected CA/CM tool, representing the next step in "action taken". For this case study, the case NFP's internal audit group had already implemented one of the more commonly used audit analytics tools and the case NFP requested the project team use that tool in configuring the requested payroll/HR tests. This activity may include configuration of "projects" in the CA/CM tool into which the data can be loaded, and thus translated by the CA/CM tool into a format suitable for testing purposes. Working within the CA/CM tool, the project team next reviews existing routines as provided by the tool and selects and configures those as identified by the NFP, such as testing for duplicate records. The CA/CM tools generally provide pre-defined, standard routines such as tests for duplicates, missing records in a sequence and others.

For specialized or highly sophisticated testing, the project team utilizes the programming (macro) capabilities within the CA/CM tool and develops customized testing routines. The project team makes every effort to develop specialized routines using the capabilities provided within the CA/CM tool and if needed will reconfigure the NFP-provided data to fit the capabilities of the tool. The project team minimizes the amount of data reconfiguration needed, as such an action would only increase the complexity in the resultant testing procedure and increase the level of NFP effort and sophistication required to provide data to the CA/CM tool. Custom routines or macros as developed in the CA/CM tool typically include tests for which data attributes from two or more sources will be compared for consistency. A typical example of such a test requires the comparison of the employee contribution per cent for 401K[3] (or other voluntary[4]) contributions. Examples of tests undertaken for the project are displayed in Table VI.

With data defined and provided, and tests identified and configured, the execution phase will now evolve into an iterative process where the project team launches the testing routines in the CA/CM tool, obtains and analyzes results, presents and discusses results with the NFP, alters the testing routines and/or the data as required and re-runs the analytics. From the perspective of action research theory, these activities represent the culmination of "action taken" leading into "learning by observation". During this iterative process, the NFP will alter the data extracts to provide data more supportive of the current tests or newly defined tests, and the project team will alter the existing tests

Table V.
Example data attributes for payroll/HR testing

Attribute	Purpose
Employee ID	Test for duplicate payments
Hours (regular, overtime, sick, vacation)	Recalculation tests
Regular earnings (salary, hourly rate)	Recalculation tests
Dates (check, hire, termination)	Test for pay before hire date, pay after termination date
Employee contribution percent (401K, FSA, savings)	Recalculation tests
Employee contribution amount (401K, FSA, savings)	Recalculation tests
Effective date of contribution change	Test for timely contribution changes taking effect

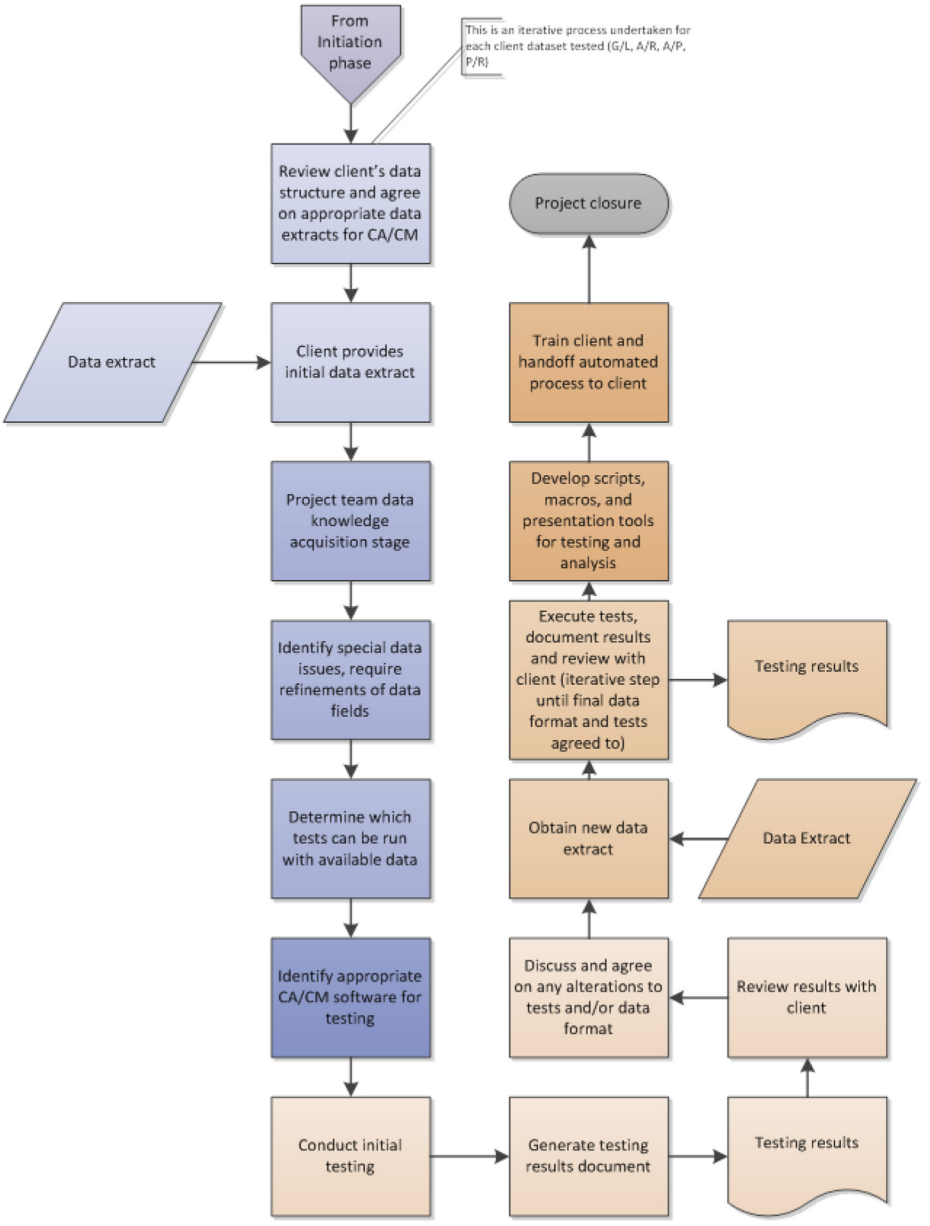

Figure 1.
Project execution activities

and/or configure new tests based on NFP requests. The project team will allow for numerous iterations to ensure the NFP gains an understanding of the underlying procedures to provide a smooth hand-off at the conclusion of the project. The project team anticipates that this iterative process may encompass approximately a six-month

Test	Purpose	Script
Duplicates by employee and amount	Identify possible duplicate payments to employees in one pay cycle	Pre-defined duplicates test as configured in the CA/CM tool, based on employee ID (test 1) and check amount (test 2)
Check date after termination date	Identify payments to terminated employees after termination	"Check Date" > "Termination Date"
Overtime pay at least half of salary amount	Identify possible overpayments to employees	'Overtime Amount' >= 'Regular Pay'/2
New hire pay before hire date	Identify payments prior to employment commencing	'Check Date' < 'Hire Date'
Payments without any benefits deductions	Verify that benefits deductions are being recorded properly	Search for payment/check where all 'Benefit Deduction' fields are -0-
Termination date match	Verify the termination date coincides in both HR and payroll system databases	'H/R Termination Date' <> 'Payroll Termination Date'

Table VI.
Example tests for payroll/HR

period for payroll/HR testing, due to the nature of the structured and unstructured interview process (Hoffman, 1987, 1995). The project team envisions that for applications with a somewhat less sensitive nature than payroll/HR, the iterative process can possibly be cut in half. As the project team gains familiarity with the overall process, the timeframe should also decrease.

After the individual tests and data structure are finalized with the case NFP, the algorithms and scripts will be run and output the analytics. The team plans to also review the data for other anomalies and outliers. The intent is to develop a script that allows the case NFP to execute the tests and receive analytics in as efficient manner as possible. Ideally, the case NFP will implement their customized scripts and tests in a preventative application as well as detective application. The final reports to management can then discuss the effects of combining preventative tests with detective tests. The final report or closing report of the case study will discuss the depth of knowledge analysis required for the task, the degree and extent of the testing and development of the scripts, the process of script integration and analysis of results and implications of this case study for both the non-profit sector and academic literature.

6. The case study

The case NFP was a US-based, national professional organization that requested that Rutgers develop a CA/CM prototype in the area of payroll and HR benefits processing. Specifically, the team was asked to perform testing in the payroll and HR areas as requested by the case NFP and provide visualizations of the ensuing results. Although the project initially began as detective tests, the project team also developed predictive analytic routines with the support of the case NFP.

This case NFP has offices in North Carolina, New Jersey and New York. It has about 750 employees and 400,000 voting members whose dues contribute to about half of its revenues. In the fiscal year of 2014, it had annual operating revenue of about $235 million, with a positive cash flow of $1.56 million. Its revenue stems mainly from

membership dues, conferences, publications and other industry-related services. Although they were in the process of integrating their ledgers and audits to a new cloud-based ERP system, they were dissatisfied with the current payroll/HR solution, as this process was still quite manual and heavily reliant on involved third-party reporting.

The team met and worked primarily with internal audit staff for the duration of the project. The team met initially to present a list of Payroll/HR tests that had been previously developed. Review of this list elicited feedback from the case NFP as to which tests applied to their situation and which did not. The case NFP provided information relevant to areas they wished to have investigated and the team developed tests to support the case NFP's requests. This test development phase lasted for four months. As the case NFP had licensed and was using ACL audit software for several internal activities, the case NFP and project team agreed to configure the CA/CM tests using this product.

The project team was provided ten different reports bimonthly for the next four months that represented payroll, 401K and benefits information from the case NFP and its third-party providers. These third-party providers process payroll and benefits and administer the 401K plan. During the initial interviewing phase, ten tests were determined to be of interest to the case NFP (Table VII). The team would then be able to develop customized scripts of the ten processes as requested by the case NFP, and develop and refine these in an iterative fashion, as suggested in the software development industry (Larman, 2003; Boehm, 2000). Basically, scripts are being generated, tested, improved and refined based on the bimonthly tests and on the feedback regarding the results from internal audit management.

Additional managers from payroll and HR were brought in at a later phase, to validate the tests and to suggest refinements to the queries.

Ultimately, scripts were developed for both the predictive (monitoring) phase and the detective (auditing) phase. For the monitoring phase, the team received the payroll report before it was provided to the payroll processor, as well as the most current benefits and 401K reports. The tests were similar to the detective phase tests, except for the deletion of the Termination Date Match Test #5 and an addition of a test that matches the preprocess regular salary amount to the employee master file. It is expected that the predictive procedure will identify most issues; however, best practices for CA/CM internal controls suggest that a detective procedure be included as well. There exists about a four-day lag between the time that the predictive test layer is applied and the payroll is processed. It is quite possible that the data could be altered during this period, either intentionally or unintentionally. The detective layer is necessary as a further internal control.

The scripts were formulated to generate separate reports in Excel for each test type in the detective procedure. The project team was also tasked to automate the compilation of these test results into one tabulated file that would not only layer in the new test results progressively, but also generate graphs that illustrated trends in the data. This process was scripted as an Excel macro which could be customized as required by the NFP.

The case NFP has implemented the payroll audit scripts into its procedures. A manual process that once required hours can now be run in only a few minutes. The results for management reporting, which the project team also generated as a tabular file, are also a product of scripting. The main challenge of scripting is the necessity of

Table VII.
Initial case NFP tests

Test #	Description	Summary	Risk
1	Duplicates by employee ID and amount	Identify duplicate checks for an individual employee within a pay period by filtering on employee ID, and additionally, another filter is then applied for duplicate amounts and <> 0	An employee is paid twice in the same period
2	Check date after termination date	Identify payments with a termination date that is prior to the current pay period and an amount in the Other Pay field. Using the gross wages table, a filter is applied testing whether check date precedes hire date fields	An employee continues to be paid after they no longer work at the NFP
3	Other pay	Identify checks in the gross wages table that include an 'other pay' item, by pay period. This is determined by filtering for any amounts <> 0 in the 'other pay' field in the Paychex gross wages file, by pay period	An employee's pay amount is at a greater risk of being inaccurate given it has been manually changed
4	Overtime pay	Identify checks paying for overtime that is at least half or more of salary amount	An employee is taking advantage of the overtime rules to generate additional income
5	Termination date match	Compare separation date from Oracle to termination date as listed on the Paychex gross wages file by pay period and output Paychex records. Filter and reduce the term file first by dates	An employee continues to be paid after they no longer work at the AICPA or is paid the wrong amount on their last check
6	Hire date test	Merge hire date (current EE) information with Paychex gross pay data to determine if any payments were made to an employee before their hire date. Then check date < hire date	An employee first check is not accurate
7	Benefits pay hire date	Benefits deductions should not occur until the 1st of the month following hire, unless the employee starts on the 1st of the month. This is filtered by first determining if the benefit start date is later than the hire date. Then a secondary filter is applied where the benefit start date is 1-30 days after the hire date	An employee's benefit selections are not reflected in their paycheck and thus they will not receive the benefit
8	Hourly wages for new hires	New hires starting after the first day of the pay period are paid by the day and those starting before the pay period are paid additional days	A new employee's pay is at a greater risk of being inaccurate given it is their first check and for a smaller period
9	Health savings account (HSA)/Flexible savings accounts (FSA) tests	New hires with HSA/FSA plans should not have these deductions occurring before the 1st of the following month. This test looks for any such deductions that may have occurred	An employee's benefit selections are not reflected in their paycheck and thus they will not receive the benefit
10	401K tests	The payroll and 401K files are merged to verify if the percentage of contribution matches, particularly for contribution % changes. This test will determine which EE contributions do not match the new percentage times the regular salary, other pay, overtime and incentive	An employee's updated 401K and Roth 401K percentage is not reflected in their paycheck. Additionally, this could impact the NFP's employer match amount

using a standard format for the tables and field names, as scripts are quite sensitive to any deviations.

The internal auditor staff at the client was highly motivated to integrate these automated payroll/HR scripts within their ERP system, once employees are trained to use the audit software. Although the client wanted to capture as much information as possible in a real-time CA/CM environment, much of the payroll and its associated transactions and data cannot be real-time or continuous, but can only be batch-processed by definition. So although the scripts were executed automatically, the process was not continuous. Despite this limitation, there is the potential within this case NFP for transitioning to a completely automated CA/CM system with the other ledgers.

Additionally, the internal audit staff has implemented these automated audit tools with the preliminary batch reports that are generated before the payroll is processed, as a predictive measure. So, in this case, the CA/CM tools are being adopted in a predictive as well as in a detective manner, thus providing complete payroll risk assurance and monitoring in an automated fashion. It may very well be that this application of CA/CM tools is the best solution for the batch-oriented nature of payroll processes.

7. Results and discussion

7.1 General challenges of the project

Due largely to the nature of the target SME NFP, there are several challenges that the team needed to assess to determine how final project negotiation and initial project development and implementation stages could occur. It is anticipated that these following challenges may be typical for an advisor of many SME NFPs. The lack of technical expertise and funding available to support IT technology at many SME NFPs is reflected in the systems in place, especially outdated application software and/or database systems where there is little if any external or internal knowledge or support available. Understanding the design and function of little-known systems was a challenge to the project team, but had to be undertaken for a successful project.

The organizational procedures over not only the IT applications but business processes in general may also be outdated, may be poorly documented and may not have evolved to identify contemporary fraud schemes. Outdated organizational processes may conceal fraudulent activities currently underway.

All of these situations entailed an extended learning curve period for the team and could in the future possibly extend the project timeframe such that actual testing and analytical activities may be curtailed by a case NFP weary of the time spent to-date on the project. That is, if a future project NFP is not as motivated, the project could fizzle before results are produced. However, early on in this case study, the team prepared an analysis of excessive overtime pay within payroll cycles. This was an exploration of the NFP data that did not require complex scripting. The team easily identified a pattern of repetitive, excessive overtime charges for a particular employee and brought this finding to the attention of the NFP. The NFP had not been aware of this situation before, found this analysis highly useful and followed-up on the situation. From a managerial auditing perspective, where the most cost-efficient use of assets and employees are important, this was a beneficial finding for the NFP. Furthermore, this finding was presented early in the project, establishing value of the project for the NFP as advised by Kohavi (2001). Although CA/CM software does not typically require the magnitude of

investment required for an ERP system, the lack of proper funding for IT systems at the case NFP may also impede the NFP's ability to acquire and implement such software.

A significant challenge during the development, implementation, and preliminary analysis of each project was the slightly changing configurations of the data extracted and provided to the team. For example, the team received data for each payroll processing cycle (at the 15th and 31st of each month) over a period of several months. There would be slight variations in the position of the fields within the records, constant variations in the table and field names, with additional fields being included in the extracted records inconsistently. These issues were eventually resolved, but they highlight the necessity for table and data formatting standards. In fact, the AICPA recently released (AICPA Assurance Services Executive Committee, Emerging Assurance Technologies Task Force, 2013) their audit data standards (ADSs) which suggest field names for both flat and XBRL formats; however, neither of the two major commercial audit software vendors has incorporated the ADSs in their products (CA/CM tools) as of the time of this case study. Given that much time and effort was expended by the NFP and the RARC team to standardize the data and tables for each bi-weekly data provision, the benefit of an industry-wide adaption of these ADSs is apparent. Furthermore, if these ADSs could be implemented within many ERP systems, this general issue of data portability and formatting could be largely resolved.

Another challenge presented by the projects undertaken to-date is one of project development. Incremental development usually slices the project execution phase into sub-phases, where each sub-phase works on one aspect of the audit and/or script development. That is, there ideally is an initialization phase of knowledge acquisition followed by incremental phases of product redesign and refinement (Larman, 2003). Or, it could be thought of as the following phases: planning, collaboration (iterative) and delivery.

8. Conclusion

This paper discusses a recently concluded project of the RARC that was focused on the application of CA/CM approaches in the SME NFP environment, in an effort to understand the degree in which adoption of CA/CM may or may not feasibly support the NFPs with their reporting requirements. The two research questions which this paper addresses are:

RQ1. Can existing CA/CM tools and techniques be implemented and generate appropriate analyses in an SME NFP setting?

RQ2. What is the motivation for an SME NFP to implement CA/CM technology?

Furthermore, this study hopes to provide a greater understanding of the circumstances and impetus that would lead to a demand for CA/CM in SME NFPs beyond that of simply CA/CM tools adoption that typifies the emerging stage, to that of a full continuous audit.

RQ1 has been answered by the successful implementation of CA/CM tools by this case NFP in its ERP system. The fact that the tool is being used incrementally and not continuously is a result of the inherent nature of the payroll data – it is typically processed on a defined schedule (i.e. bimonthly, biweekly). The limitations of the "continuous" audit in this case are not due to the nature of the NFP but the nature of payroll. So, in an NFP motivated to adopt CA/CM tools in its systems, this project has

demonstrated that it is beneficial to do so and that such tools generate appropriate analyses, even in an SME NFP setting.

RQ2 regards the motivation of such an NFP to undertake this endeavor and may be beyond the scope of this project, although it would seem that a strong level of motivation is required to adapt CA/CM tools. That is, a high level of motivation is probably required to see the NFP through all of the possible challenges and pitfalls of incorporating this conversion. This level of motivation may stem from several factors, such as desire for accountability to donors or members, pressure from auditors to increase controls and transparency or perhaps a basic initiative to upgrade to the latest integrated cloud platform.

Regardless, the potential impact and implications of this study are noteworthy and contribute to the wealth of CA/CM literature, even if there will be additional NFP case studies. The process of defining a full continuous audit for these smaller enterprises, the process of outlining the implementation and evolution from a manual audit to one of CA/CM in the SME NFP environment and the process and observation of CA/CM tool development in the case NFP have been a demanding and robust endeavor and worthy of discussion. The questions raised about CA/CM as this project has evolved have been provocative as well as worthy of additional research.

According to the CICA/AICPA report of 1999, CA/CM is a process that enables auditors to provide written assurances on any subject or data simultaneously to, or shortly after, its generation or after the occurrence of the underlying events (CICA/AICPA, 1999). Vasarhelyi *et al.* (2012b) state that:

> Continuous auditing is a progressive shift in audit practices towards the maximum possible degree of audit automation as a way of taking advantage of the technological basis of the modern firm in order to reduce audit costs and increase audit automation.

They then proceed to discuss how the development of CA/CM requires a basic reform in all aspects of the audit, from the kind of tests conducted, how alarms or alerts are handled and how reports are generated, how often and to whom – to name just a few of the changes. To become continuous and more real-time, full CA/CM techniques rely heavily on fully developed ERP systems and business intelligence platforms – many of which may be quite simplistic or patch-work in an SME NFP. One of the primary challenges of this study is the visualization or mapping of the transformation of a manual audit procedure that predominates in many SME NFPs to that of a fully functional CA/CM process.

Traditionally, in most of the literature, CA/CM has been treated as a concept rather than a tool or practice (Vasarhelyi *et al.*, 2012a). So if a firm declares that it has a CA/CM system in place, it has not been clear to what degree or what processes are automated. The first effort to measure this process was detailed by Vasarhelyi *et al.* (2012a), where the authors customized the technology adoption life cycle model of Bohlen and Beal (1957) and Rogers (1962) for the audit. The Roger's formula of first "R&D", second "introduction", third "growth" and finally "maturity" was extended as follows to describe the following stages:

- the traditional audit;
- the emerging CA audit;
- the maturing CA audit; and
- the full continuous audit.

In their study, even among highly motivated firms with advanced ERP systems and business intelligence capacities, CA had not evolved beyond the second stage. That is, even large firms had not budged past the steps of simply automating existing audit practices and the low-hanging fruit (Alles *et al.*, 2006). So the question begs, will any of these SME NFPs adopt CA/CM beyond the second stage of the emerging CA audit?

For example, an overwhelming curiosity exists in the team as to how and or when an SME NFP would adapt CA/CM approaches beyond the emerging stage. This NFP project remained in the second stage due to the batch process nature of payroll and not due to a lack of ability to apply the tools in a more real-time continuous fashion. Basically, would the NFP sector perform any differently than the large public firms who, despite great motivation and interest in CA/CM, are not beyond this second stage? What sort of environment or impetus would need to exist for an NFP to progress to the third stage, that of audit maturity? Would such a progression occur with more ease in a less technically evolved and less complex environment, more typical of a smaller business or NFP firm and not of a large firm?

Additional NFP case studies beyond this recently concluded project have just begun. However, the required development of this project scope and framework approach, as well as many of the challenges associated with it, can contribute to the literature on CA/CM. Issues such as the tepid demand in organizations for CA/CM beyond the emerging stage (Vasarhelyi *et al.*, 2012a), the slow adoption by the industry of the AICPA's ADSs and the need for CA/CM adoption standards and models are all areas for additional research beyond this immediate study.

Notes

1. The US Office of Management and Budget (OMB) A-133 Compliance Supplement provides the requirements for auditing federal assistance and federal grant programs, including the recipients of such programs.
2. It is anticipated that due to the small size of the prospective case study organizations, the benefits provided by an ERP system will not offset the cost and support requirements involved, and as such these organizations will at most have implemented only packaged accounting solutions.
3. A 401K is a defined-contribution retirement plan as defined in subsection 401(k) of the US Internal Revenue Code. Contributions from an employee's paycheck, on a pre-tax basis, are deposited in one or several investment portfolios as provided by the employer, who may optionally contribute to the plan. NFP organizations can also provide such a plan to their employees, as defined under subsection 403(b) of the IRS code.
4. For voluntary deductions which the employee could change during the year, as some deductions were limited to an annual change or at a change-of-life event only.

References

AICPA Assurance Services Executive Committee, Emerging Assurance Technologies Task Force (2013), "Audit data standards, base standard", available at: http://aaajournals.org/doi/pdf/10.2308/isys-10277

Alles, M., Brennan, G., Kogan, A. and Vasarhelyi, M.A. (2006), "Continuous monitoring of business process controls: a pilot implementation of a continuous auditing system at Siemens", *International Journal of Accounting Information Systems*, Vol. 7 No. 2, pp. 137-161.

Alles, M.G., Vasarhelyi, M.A. and Kogan, A. (2004), "Principles of analytic monitoring for continuous assurance", *Journal of Emerging Technologies in Accounting*, Vol. 1 No. 1, pp. 1-21.

Alles, M., Kogan, A. and Vasarhelyi, M. (2002), "Feasibility and economics of continuous assurance", *Auditing: A Journal of Practice & Theory*, Vol. 21 No. 1, pp. 125-138.

Alles, M., Kogan, A. and Vasarhelyi, M. (2008), "Putting continuous auditing theory into practice: lessons from two pilot implementations", *Journal of Information Systems*, Vol. 22 No. 2, pp. 195-214.

Boehm, B. (2000), "Spiral development: experience, principles, and refinements", Special Report CMU/SEI-2000-SR-008, July 2000, available at: http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA382590

Bohlen, J.M. and Beal, M. (1957), "The diffusion process, special Report No. 18", *Agriculture Extension Service, IA State College*, Vol. 1, pp. 56-77.

Chan, D. and Vasarhelyi, M. (2011), "Innovation and practice of continuous auditing", *International Journal of Accounting Information Systems*, Vol. 12 No. 2, pp. 152-160.

CICA/AICPA (1999), "Continuous auditing", *The Canadian Institute of Chartered Accountants*, Research Report, Toronto.

Debreceny, R., Gray, G., Ng, J., Lee, K. and Yau, W. (2005), "Embedded audit modules in enterprise resource planning systems: implementation and functionality", *Journal of Information Systems*, Vol. 19 No. 2, pp. 7-27.

Eisenhardt, K.M. (1989), "Building theories from case study research", *The Academy of Management Review*, Vol. 14 No. 4, pp. 532-550. doi: 10.2307/258557.

Flowerday, S. and von Solms, R. (2005), "Continuous auditing: verifying information integrity and providing assurances for financial reports", *Computer Fraud & Security*, Vol. 2005 No. 7, pp. 12-16.

Gilkeson, N. (2006), "For-profit scandal in the nonprofit world: should states force Sarbanes-Oxley provisions onto nonprofit corporations?", *Georgetown Law Journal*, 831, 2006-2007, available at: http://heinonline.org (accessed 5 January 2014).

Gonzalez, G., Sharma, P. and Galletta, D. (2012), "The antecedents of the use of continuous auditing in the internal auditing context", *International Journal of Accounting Information Systems*, Vol. 13 No. 3, pp. 248-262.

Grant Thornton (2011), "Looking to the future: perspectives and trends from internal audit leaders", available at: www.grantthornton.com/staticfiles/GTCom/Advisory/Advisory%20publications/CAE%20survey/CAE-Survey-2011.pdf

Greenlee, J. (2000), "Accountability in the information age", *New Directions for Philanthropic Fundraising*, Vol. 2000 No. 27, pp. 33-50.

Greenlee, J., Fischer, M., Gordan, T. and Keating, E. (2007), "An investigation of fraud in nonprofit organizations: occurrences and deterrents", *Nonprofit and Voluntary Sector Quarterly*, Vol. 36 No. 4, p. 676.

Groomer, S. and Murthy, U. (1989), "Continuous auditing of database applications: an embedded audit module approach", *Journal of Information Systems*, Vol. 3 No. 2, pp. 53-69.

Hermanson, D., Moran, B., Rossie, C. and Wolfe, D. (2006), "Continuous monitoring of transactions to reduce fraud, misuse, and errors", *Journal of Forensic Accounting*, Vol. 7, pp. 17-30.

Hoffman, R.R. (1987), "The problem of extracting the knowledge of experts from the perspective of experimental psychology", *AI Magazine*, Vol. 8 No. 2, p. 53.

Hoffman, R.R. (1989), "A survey of methods for eliciting the knowledge of experts", *ACM SIGART Bulletin*, (108), pp. 19-27.

Hoffman, R.R., Shadbolt, N.R., Burton, A.M. and Klein, G. (1995), "Eliciting knowledge from experts: a methodological analysis", *Organizational Behavior and Human Decision Processes*, Vol. 62 No. 2, pp. 129-158.

Hult, M. and Lennung, S. (1980), "Towards a definition of action research: a note and bibliography", *Journal of Management Studies*, Vol. 17 No. 2, pp. 241-250.

Hunton, J., Libby, D., Libby, J., Mauldin, E. and Wheeler, P. (2010), "Continuous monitoring and the status quo effect", *International Journal of Accounting Information Systems*, Vol. 11 No. 3, pp. 239-252.

Hunton, J., Mauldin, E. and Wheeler, P. (2008), "Potential functional and dysfunctional effects of continuous monitoring", *The Accounting Review*, Vol. 83 No. 6, pp. 1551-1569.

Internal Revenue Code 6104(d)(1)(A) (2007), "US Code, Title 26, Subtitle F, Chapter 61, Subchapter B, IRC 6104(d)(1)(A)" available at: www.gpo.gov/fdsys/pkg/USCODE-2011-title26/pdf/USCODE-2011-title26-subtitleF-chap61-subchapB-sec6104.pdf

Johnson, D. (2009), "Seeking meaningful nonprofit reform in post Sarbanes-Oxley World", *Saint Louis University Law Journal*, Vol. 54 No. 1, pp. 187-240.

Kogan, A., Sudit, E. and Vasarhelyi, M. (1999), "Continuous online auditing: a program of research", *Journal of Information Systems*, Vol. 13 No. 2, pp. 87-103.

Kohavi, R. (2001), "Mining e-commerce data: the good, the bad, and the ugly", *Proceedings of the Seventh ACM SIGKDD International Conference on Knowledge DIscovery and Data Mining*, *San Fransisco, CA*, August 26-29, ACM, New York, pp. 8-13.

Kohavi, R., Mason, L., Parekh, R. and Zheng, Z. (2004), "Lessons and challenges from mining retail e-commerce data", *Machine Learning*, Vol. 57 Nos 1/2, pp. 83-113.

KPMG (2010), "Continuous auditing and monitoring: are promised benefits now being realized?", available at: www.kpmg.com/BE/en/IssuesAndInsights/ArticlesPublications/Documents/Continuous%20Auditing%20and%20Monitoring.pdf

KPMG International (2010), "What is driving continuous auditing & continuous monitoring today?", KPMG International Cooperative, available at: www.kpmg.com/PL/pl/services/Advisory/Ryzyko-i-zgodnosc/Ciagly-Audyt-i-Ciagly-Monitoring-CACM/Documents/What-is-Driving-Continuous-Auditing-Continuous-Monitoring-Today-secured.PDF

Kuhn, J. and Sutton, S. (2006), "Learning from WorldCom: implications for fraud detection through continuous assurance", *Journal of Emerging Technologies in Accounting*, Vol. 3 No. 1, pp. 61-80.

Kuhn, J. and Sutton, S. (2010), "Continuous auditing in ERP system environments: the current state and future directions", *Journal of Information Systems*, Vol. 24 No. 1, pp. 91-112.

Larman, C. (2003), "Iterative and incremental development: a brief history", *Computer*, Vol. 36 No. 6, pp. 47-56.

Lau, F. (1997), "A review on the use of action research in information systems studies", *Proceedings of the IFIP TC8 WG 8.2, International Conference on Information Systems and Qualitative Research*, *May 31-June 3*, *Philadelphia, PA*, Springer Science + Business Media, Dordrecht BV, pp. 31-68.

Lau, F. (1999), "Toward a framework for action research in information systems studies", *Information Technology & People*, Vol. 12 No. 2, pp. 148-176.

PwC (2006), "State of the internal audit profession study: continuous auditing gains momentum", available at: www.pwc.com/us/en/internal-audit/assets/state_internal_audit_profession_study_06.pdf

PwC (2007), "State of the internal audit profession study: pressures build for continual focus on risk", available at: www.pwc.com/us/en/internal-audit/assets/state_internal_audit_profession_study_07.pdf

Rezaee, Z., Sharbatoghlie, A., Elam, R. and McMickle, P.L. (2002), "Continuous auditing: building automated auditing capability", *Auditing: A Journal of Practice & Theory*, Vol. 21 No. 1, pp. 147-163.

Rogers, E. (1962), *Diffusion of Innovations*, Free Press, New York, NY.

Simons, H. (1980), *Towards a Science of the Singular: Essays About Case Study in Educational Research and Evaluation*, University of East Anglia, Centre for Applied Research in Education, Norwich.

Soy, S.K. (1997), "The case study as a research method", unpublished paper, University of Texas, Austin.

Stake, R.E. (1995), *The Art of Case Study Research*, Sage Publications, Thousand Oaks, CA.

Susman, G. and Evered, R. (1978), "An assessment of the scientific merits of action research", *Administrative Science Quarterly*, Vol. 23 No. 4, pp. 582-603.

Szymanski, W.K. (2003), "Allegory of good (and bad) governance: applying the Sarbanes-Oxley Act to Nonprofit Organizations", *An. Utah L. Rev., 1303*.

Tellis, W. (1997), "Application of a case study methodology", *The Qualitative Report*, Vol. 3 No. 3.

Vanderwarren, K. (2003), "Financial accountability in charitable organizations: mandating an audit committee function", Kent College of Law, IL Institute of Technology, Chicago Rev. 77, p. 963, available at: http://heinonline.org (accessed 5 January 2014).

Vasarhelyi, M., Alles, M. and Kogan, A. (2004), "Principles of analytic monitoring for continuous assurance", *Journal of Emerging Technologies in Accounting*, Vol. 1 No. 1, pp. 1-21.

Vasarhelyi, M., Alles, M., Kuenkaikaew, S. and Littley, J. (2012a), "The acceptance and adoption of continuous auditing by internal auditors: a micro analysis", *International Journal of Accounting Information Systems*, Vol. 13 No. 3, pp. 267-281.

Vasarhelyi, M., Alles, M. and Williams, K. (2012b), "Continuous assurance for the now economy: a thought leadership paper for the Institute of Chartered Accountants in Australia", available at: http://raw.rutgers.edu/docs/previousprojects/Continuous_Assurance_for_the_Now_Economy_-_2nd_draft%20mav.pdf

Vasarhelyi, M. and Halper, F. (1991), "The continuous audit of online systems", *Auditing-A Journal of Practice & Theory*, Vol. 10 No. 1, pp. 110-125.

Vasarhelyi, M.A. and Halper, F.B. (2002), "Concepts in continuous assurance", *Researching Accounting as an Information Systems Discipline*, pp. 257-271.

Vasarhelyi, M., Teeter, R. and Krahel, J. (2012c), "Audit education and the real-time economy", *Issues in Accounting Education* 25 No. 3, pp. 405-423.

Vasarhelyi, M., Warren, J., Jr, Teeter, R. and Titera, B. (2011), "Embracing the automated audit", working paper, Rutgers Business School, Newark, NJ, available at: http://raw.rutgers.edu/MiklosVasarhelyi/Resume%20Articles/PROFESSIONAL%20PAPERS/P39.%20Embracing%20the%20Automated%20Audit_Journal%20of%20Accountancy.pdf

Yin, R.K. (1984), *Case Study Research: Design and Methods*, Sage, Newbury Park, CA.

Yin, R.K. (1999), "Enhancing the quality of case studies in health services research", *Health Services Research*, Vol. 34 No. 5, pp. 1209-1224.

Yin, R.K. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage, Thousand Oaks, CA.

Yin, R.K. (2012), *Applications of Case Study Research*, 3rd ed., Sage, Thousand Oaks, CA.

Zapotsky, M. (2013), "National Science Foundation IT Worker pleads guilty to stealing more than $94,000", *The Washington Post*, 5 December, 2013.

Further reading

Davis, F. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.

The Economist (2002), "Special report: the real-time economy. How about now?", 31 January 2002, available at: www.economist.com/node/949071

Stephens, J. and Flaherty, M. (2013), "Millions lost by nonprofits, with little explanation", *The Washington Post*, 27 October.

Corresponding author

Deniz Appelbaum can be contacted at: denizappelbaum@gmail.com

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: **permissions@emeraldinsight.com**

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.