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Exploring Continuous Assurance In Practice: Preliminary Insights

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EXPLORING CONTINUOUS ASSURANCE IN PRACTICE: PRELIMINARY INSIGHTS

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Abstract

The concept of continuous assurance is not new, with a history spanning close to three decades in various guises. Recently there has been renewed attention in the area due to compliance imperatives, trends in governance and risk, anti-fraud measures and technological advances. However significant uncertainty surrounds the practicalities of how continuous assurance may be effectively implemented into an organisation's governance, risk and compliance (GRC) landscape for auditors and managers. The aim of this paper is to report on the first stage of a research study investigating the adoption and implementation of continuous assurance in an Australian company. A socio-material practice perspective is adopted and Power's (2007) concept of organised uncertainty is explored to progress thinking in continuous assurance theory and practice. Key findings emerging from this study include the heterogeneous and fluid nature of continuous assurance, the duality of mobility involving system dependencies and audit independence, and the unanticipated usages and politics of information.

Keywords: continuous assurance, socio-materiality, GRC, internal audit

1 INTRODUCTION AND BACKGROUND

The concept of continuous assurance (CA) is not new with a history spanning close to three decades in various guises. During this period development in the area has largely been conceptual with limited uptake in practice (Alles et al. 2008). Recently there has been renewed attention in the area as organisations examine ways to move beyond a static and cyclical approach to audit and risk assessment, driven by compliance imperatives, trends in governance and enterprise risk management, changing disclosure requirements, antifraud measures, the need for ongoing monitoring processes, integrated business processes and technological advancements (Coderre 2005; Brown et al. 2007; COSO 2009; Hunton & Rose 2010; KPMG 2010; PwC 2011). A recent survey of chief audit executives in Fortune 250 companies in the United States, conducted by PricewaterhouseCoopers, identified "continuous auditing or monitoring" activities as the leading factor in producing significant increases in internal audit responsibilities over the next five years (PwC 2011, 23) and the use of related software applications more than doubling by 2012 (p. 47). This raises questions about the transformative effect on established audit practices (Vasarhelyi et al. 2010a).

CA traverses different disciplinary fields incorporating accounting, audit and assurance, information technology and operations management and consequently is underpinned by a diverse body of research (Brown et al. 2007, 2). However, recent reviews of the literature have identified the need for more alternative theoretical perspectives and empirically based studies of adoption and implementation (see for example Brown 2007; Alles et al. 2008; Kuhn & Sutton 2010) as there is limited guidance and yet significant uncertainty surrounding the practicalities of how CA may be effectively implemented into an organisation's governance, risk and compliance (GRC) landscape for both auditors and managers (De Aquino et al. 2008)

The aim of this paper is to report on the first stage of a research study investigating the adoption and implementation of CA in an Australian wholesale organisation. Broadly, a socio-material practice perspective is adopted, drawing theoretical insights from Actor-Network Theory (ANT) (Law and Singleton 2005; Latour 2005) as well as Power's (2007) concept of 'organised uncertainty' to explore how CA is locally and collectively realised. In doing so two key objectives are served. Firstly, a detailed description of a CA implementation is provided. Secondly, an alternative theoretical perspective is explored to complement the more dominant logical modelling, prescriptive and economic based models used in existing CA research.

The structure of the remainder of this paper is organised as follows. In the next section current usages and labels used in CA is reviewed for the purpose of clarifying its meaning in this paper. The research framework follows in section 3. Section 4 describes the research approach. Sections 5 and 6 provide the case description and interpretation. Finally, section 7 discusses the research implications, limitations and conclusion.

2 LABELS AND DEFINITIONS: AN OVERVIEW

There are a variety of labels used to describe activities in this area, such as continuous assurance, continuous auditing, continuous monitoring and continuous control monitoring; sometimes used interchangeably. Whilst this has been acknowledged by different authors (see for eg. Brown et al. 2007; Alles et al. 2008) to date there has been limited critical examination of current usages and how the linkage between 'continuous' and for example assurance has been conceptualised in the literature. The aim in this section is to examine a chronology of seminal scholarly papers and practitioner standards as set out in Table 1. Whilst the literature is not exhaustive it serves the purpose of realising a more informed understanding of CA in the context of this paper that is conceptually distinct from previous work.

Author	Year	S[1]/P	Label(s) Continuous (C)				Temporal view	Description(s)					Focus	
			As[2]	Au[3]	Mon[4]	Other		S[7]	F[8]	M[9]	T[10]	Other	F[11]	Other
Koch	1981	S				Continuous & Intermittent Simulation (CIS)	Real time					"auditing **technique** that simulates the instruction execution of the application at the time the application is processing a transaction		Transactions
Vasarhelyi & Halper	1991	S				process audit methodology (CAPM) & Process Audit System (CPAS)	Continuous (eg. daily)	√		√		"audit by exception"		Database systems
CICA/ AICPA	1999	P		√			Near or real time			√				Data underlying the "subject matter"
Elliot	2002	S	√				Not explicit					A **tool** that "embeds learning from the results of applying past and … contemporaneous procedures"		Networked & inter-connected
Vasarhelyi	2002	S	√				"or near real time"					"… **an aggregate of objectively provided assurance services** … may provide different forms of attestation including point-in-time, evergreen and continuous."		Corporate information processes
Turoff et al.	2004	S	SU[6]	√	SU		"or close to a real time basis"					"… a **type of auditing** which produces results simultaneously"		Emergency preparedness
Vasarhelyi et al.	2004	S	√				Not explicit			√				"analytic monitoring of corporate business processes"
Coderre (IIA)	2005	P	√	SA[5]	SA	control assessment (CCA) & risk assessment (CRM)	"dependent upon the underlying business"		√			**CAs** – framework . **CAu** – **method** used to perform audit related activities along a continuum "ranging from **CCA** to **CRM**." **CMon** – management process		Controls & risks
Brown et al.	2007	S		√			No distinctions about frequency of procedures or time intervals.					**All encompassing label**. Two components: "an IT structure for data processing and storage;" and "…type of analytic monitoring methodology"		Literature review

Author	Year	S[1]/P	Label(s) Continuous (C)				Temporal view	Description(s)					Focus	
			As[2]	Au[3]	Mon[4]	Other		S[7]	F[8]	M[9]	T[10]	Other	F[11]	Other
Hunton et al.	2008	S			√		"(near) real-time basis"					"…**processes** [that] use automated routines to examine accounting transactions and to report unusual variations, exceptions…"	√	
Dutta & Koritala	2010	P		√		…controls monitoring (CCM)						No separate descriptions. Relates to **capabilities** incorporating: automated controls; and control monitoring		Risk and control
Gartner (Caldwell & Proctor)	2010	P		√	√	…controls monitoring (CCM)	"near-real-time basis"				√	CCM is a set of "emerging GRC **technologies**" to support the monitoring of controls of **financial processes.**" Therefore supporting **CMon** for financial managers and **CAu** for internal auditors.	√	
Hunton & Rose	2010	S		√	√		"(near) real time"				√	**CAu:**"Historically … use of **embedded software modules**. **CMon**: "does not necessarily involve assurance…"		Transactions and controls
ISACA	2010a	P		√	√		"near or real-time basis"					"… **IT process(es)** that operate as an integrated part of a business process." CMon: management CAu: IA.		Control failures
ISACA IT Guidance 42	2010b	P	√	SA	SA		"uninterrupted"					CAs: **monitoring approach**. Combination of CAu (assurance professionals) and CMon (management process)		Controls and risk
Kuhn & Sutton	2010	S	√	SA	SA	… reporting (CR)	"real-or near real-time"				√	**CAs: Macro-level**. **CAu**: application of technologies for financial audit. **CMon**: management responsibility.	√	Statutory & non statutory
Vasarhelyi et al.	2010b	S		√		controls monitoring (CCM), data assurance (CDA), risk monitoring & assessment	"real-time"					Three elements of CAu: (1) **CCM**: periodic evaluation & testing of controls by IA. (2) **CDA**: verification of the integrity of data flows through the IS. (3) **CRMA**: "dynamically measure risk & provide input for audit planning"		Data, risk and controls

Table 1 Labels and descriptions of continuous assurance

1. S/P Scholarly/Practitioner Literature
2. As Assurance
3. Au Auditing
4. Mon Monitoring
5. SA Sub category of continuous assurance
6. SU Sub category of continuous auditing
7. S System
8. F Framework
9. M Methodology
10. T Technology
11. F Financial Transactions

As seen in Table 1, CA is represented as a system, framework, methodology and technology. Further, there are contested meanings with the words continuous, assurance, auditing, monitoring and assessment. For example, 'continuous' is described in terms of real time and 'near' real time, used to differentiate the frequency of auditing procedures or the interval in the issuance of a report, for example short interval basis (daily, weekly) "evergreen" (always available) or on demand (when required by the user) (Turoff et al. 2004) as well as to describe a continuum of activities (Coderre 2005). The label 'assurance' was used as an all encompassing term or presenting a meta view (eg. Coderre 2005; ISACA 2010b; Kuhn & Sutton 2010) with 'auditing' as a subset; itself represented in terms of the application of information technologies for financial audits in contrast to "wider non statutory products or services" (Kuhn & Sutton 2010) or to differentiate activities performed by auditors (eg. Coderre 2005). Alternatively, assurance was viewed as a component of auditing distinguished by its focus on data or transactions (Vasarhelyi et al. 2010b) or in the context of financial reporting and the types of reports produced (Turoff et al. 2004). Auditing and monitoring were distinguished on the basis of whether it was a tool of audit or management (Caldwell & Proctor 2010; ISACA 2010b; Kuhn & Sutton 2010). Finally, in some instances monitoring and assessment were conflated with the term control and additional distinctions made. For example, continuous control monitoring was viewed as a governance, risk and compliance (GRC) technology to support the monitoring of financial application controls and CMon and CAu activities performed by financial managers and auditors respectively (Caldwell & Proctor 2010). Further, Caldwell and Proctor (2010) adopted the term "controls automation and monitoring" to refer to a broader set of processes and technologies that incorporated infrastructure (eg. configuration management and network access), systems (eg. identification and access) and other application control areas (eg. segregation of duties (SOD) and "rules that govern transactions and behaviours"). Finally, the term continuous control assessment was viewed as part of the continuous auditing method and representing one end along a continuum of audit activities, the other end relating to continuous risk assessment (Coderre 2005; Vasarhelyi et al. 2010b).

Alles et al. (2008) made the observation that practitioners attached "less significance" to the meaning of CA, focusing on the application of techniques and the value created. Further, roles of internal and external auditors in implementing CA are determined in practice and dependant on the unique circumstances of each organisation. Such views partly go towards explaining the practice perspective brought to this study. Paradoxically, it is also a standard of practice developed by the Institute of Internal Auditor's (Coderre 2005) that provides a comprehensive description and detailed distinction between assurance, auditing, monitoring and assessment based on different levels of analysis (business systems, processes, activities, transaction and events), responsibilities (management and audit) and activities along a continuum of control and risk that is adopted in this study,

Specifically the conceptualisation used in this paper is given the label **continuous assurance** revealing the all encompassing meaning set out by Coderre (2005) as well as its socio-material, emergent and situated nature that is discussed further in section 3. To avoid confusion other labels such as continuous auditing are used where necessary to reflect the geneology and terminology adopted by other authors and/or case study participants.

3 PERSPECTIVES: PRACTICE BASED VIEW AND ORGANISED UNCERTAINTY

Continuous assurance (CA) theory typically consists of prototype systems, prescriptive frameworks and standards for implementation (Brown et al. 2007 for a detailed review). While these may be useful references for organisations in establishing CA, such views assume some purposive action in the pursuit of common goals, such as defined CA objectives and provide limited understanding of the CA process itself, representing it as unproblematic and predictable. Further, the limited number of empirical studies that have been conducted have tended to use economic based theories to explain, for example, the economic feasibility of CA (El-Masry & Reck 2008) or its impact on managerial

behaviours (Hunton et al. 2008). While such views provide valuable insights, they assume that management is capable of recognising the need for and intrinsic value of CA based on some taken for granted economic imperative, downplaying the context-specificity of CA and the situated and micro-level practices involved in constructing and producing particular organisational outcomes.

In this study, a practice-based view is adopted to reveal the local practices and situated accomplishments of CA so as to assist in developing guidance that is driven by the needs of particular circumstances requiring particular types of CA. There are different perspectives that may characterise what Orlikowski (2010, 135) refers to as the "entanglement of practice." It is beyond the scope of this paper to discuss the different views in detail (see for example Schatzki et al. 2001). Rather, insights from Actor Network Theory (ANT) (Latour 1999; Latour 2005; Law & Singleton 2005) are used to inform the study. Hence CA is conceptualised as emergent assemblages or collectives of human and non human actors. In doing so emphasis is shifted to the socio-material practices of CA viewed as complex and routine activities that are situated in ongoing assurance practices that unfold over space and time. Further, the following ANT concepts are used to follow the actors, tracing specific modes of CA, and to analyse how these specificities are managed technically, socially, ethically and politically: translation, the "means by which we articulate different sorts of matter;" enrolment, the "process by which an actant is seduced, manipulated or induced into the collective;" and mobilisation "of actants inside the collective, which adds fresh unexpected resources, resulting in strange new hybrids" (Latour 1999, p.194).

In addition, Power's (2007) concept of 'organised uncertainty' is explored because of its specific focus on control practices and risk management. 'Organised uncertainty' is defined by Power (2007, 202-203) as "an inherently paradoxical idea, which signifies that efforts to construct a knowledge of things as risks creates new forms of uncertainties." Hence, defining "a fixed concept of internal control" is viewed as "less interesting" than observing how the "idea in its various institutional manifestations" shapes "managerial and regulatory practices, practices which will produce definitions for their own operational purposes" (p. 61). That is, new categories of risk management, internal control and internal audit, in the context of CA, lead to new conceptions of assurance practice and create contests for professional ownership by for example, accountants, internal audit and IT professionals.

Given this theoretical framing, the overarching research question is articulated as follows:

How is CA translated, mobilised and shaped in Australian organisations?

4 RESEARCH DESIGN

This research is the first stage in a broader program aimed at assisting organisations in the adoption and implementation of CA. The first stage consists of three phases. Phase one was conducting a literature review covering the academic and practitioner literature for the purpose of identifying key themes and concepts to assist in designing the theoretical framework. Phase two consists of an in depth case study, focusing on the internal audit group. Results from this phase will assist in focusing future research efforts. That is, phase three, which will involve interviewing a wider set of stakeholders in the case site. The second stage of the research will involve conducting additional case studies for comparative purposes.

4.1 Interpretive case study approach

The theoretical perspectives that underpin this study require an interpretive based case study approach (Stake 1995). That is to provide rich descriptions and detailed descriptions of CA so as to draw out the ambiguous and contextualised meaning of CA in practice, in terms of both the way it is used and the techniques, procedures and systems used.

4.2 Case site, data collection and analysis

The case site is a wholesaler in Australia, identified as an early adopter of CA practices. The case site has been given an alias, 'Wholesaler' for reasons of anonymity and confidentiality. Primary data was collected from interviews with the Group Audit Manager and an internal auditor, identified as key stakeholders in the design of CA. Interviews were transcribed, six hours in total. In addition, secondary data comprising a presentation and discussion at an internal audit networking group meeting as well as publically available information on the organisation's web site also contributed to the data collected. Content analysis and descriptive coding (Saldaña 2009) were used in the first stages of coding to identify key events and actions arising from the case materials.

5 CASE DESCRIPTION

The purpose of this section is to provide a detailed description of the events and actions that surrounded the implementation of continuous assurance (CA) in Wholesaler. There are three subsections: history and local setting; nature of and design of CA; and how CA became practiced.

5.1 A short history and local setting

Wholesaler is a marketing and distribution company operating in the wholesale industry. It has over 5000 employees and operations across Australia and New Zealand. Wholesaler has four major business divisions catering to a specific sector of wholesaling and is currently listed in the top 100 companies on the Australian Stock Exchange. It has an explicit set of core values that underpin the business incorporating championing the customer, added value for stakeholders, responsibility and accountability, empowering employees and supporting communities.

The company originated in the 1920s as a family business and grew significantly primarily through acquisitions over a forty year period between the 1950s and early 1990s. These acquisitions enabled Wholesaler to expand its operations across the east coast of Australia and later into other parts of Australia and Asian markets. Throughout this time, Wholesaler was a strong investor in technologies ranging from punch card computers and forklifts in the 1950s, to electronic data interfaces for retailer ordering in the 1970s through to scanning and retail management systems in the 1980s.

The poor economic climate in the 1990s, combined with the rapid expansion program, impacted poorly on Wholesaler's operations resulting in significant losses in the mid to late 1990s. A new CEO was appointed during this period who embarked upon restructuring the balance sheet, selling off freehold property and reducing inventory to bring bank debt down to a more manageable level and return the company to a profitable position. While bank indebtedness improved, the measures to improve profitability proved less successful.

In the late 1990s, an international company acquired a controlling interest in Wholesaler. Following the acquisition, the company name was changed as well as the composition of the Board of Directors and senior executive team. Existing business operations were reviewed and new strategies designed around key strengths identified as supplier relations, financial controls, inventory management, information technology, management expertise, customer relations and a core activity focus. Some of the key initiatives implemented involved restructuring four business divisions, technology investments including a new warehouse system and strengthening retail and supplier relationships. Wholesaler has returned to profitability and grown through further acquisitions.

5.1.1 The warehousing and enterprise systems: Complex and changing

The warehousing and accounting information system at Wholesaler is complex, with a number of legacy systems, and change. Generally, the warehouse management system interfaces with the enterprise mainframe systems and a third midrange system. The operations of the mainframe systems are gradually being subsumed by the midrange system as it is progressively rolled-out across the

various operational divisions. These systems manage the key enterprise processes (purchases and sales). Basically, as conveyed by the Group Audit Manager

> "[the customer] orders arrive through an electronic "mailbox" and are then downloaded to one of the enterprise platforms. The orders are then passed to the warehouse management system and picking and order assembly occurs at that point. Once an order is complete the enterprise platforms then pass the transactional data to the financial software for posting to the general and subsidiary ledger."

Complexity arises, as each of the enterprise systems are used in different parts of the business because of previous acquisitions or specific requirements unique to the business division. As noted above, the midrange system is being progressively rolled-out with a view to ultimately decommissioning the legacy mainframe systems. Included in the recent implementation was a GRC solution, whereby the "rule sets were defined as [the system] was being rolled out."

More recently the business has developed a data warehouse facility. A key driver was the need to aggregate data in a meaningful way as each legacy system provided different views of the enterprise data.

5.1.2 The internal audit (IA) group

The internal audit (IA) group consists of ten staff members. The international risk management standard ISO 31000 is essentially the basis for their audit methodology. The "continuous auditing" work is performed by the Group Audit Manager and one other internal audit staff member, together with third party contractors.

5.2 The nature of "continuous auditing" and its design in Wholesaler

5.2.1 Continuous auditing and monitoring: An "inferential process"

The Group Audit Manager described "continuous auditing" as "an inferential process," involving "100% reviews of data sets to look for evidence about control operations," that is "controls testing is performed by inference." A distinction was made between continuous auditing and continuous control monitoring based on who was performing the task on behalf of whom,

> "I distinguish between continuous auditing and continuous monitoring. Continuous monitoring occurs when we are providing a service to management, so they can more effectively monitor transactional data flows vis-à-vis the effectiveness of their control structure. A useful example is the potential for duplicated invoices. The business processes many thousands of invoices. The continuous monitoring output goes to Accounts Payable management who review the potential exceptions. Over time, control improvements have been implemented to respond to perceived gaps in the control structure identified through the Continuous Monitoring activity. Continuous Auditing in contrast, occurs when IA uses the output for its own auditing purposes."

Put simply, "continuous auditing is performed by auditors for auditors and continuous monitoring may be performed by anybody." That is, in using Vasarhelyi et al.'s (2004) "Hierarchy of Auditing" the "continuous auditing" system, managed by the internal audit department, was used for primary and secondary monitoring processes. The primary monitoring and control process is the "the managerial internal control process" where decisions relating to control exceptions are made in terms of "whether a management action, a signal to the audit process, or a stronger alarm may be warranted (p. 11). The secondary monitoring process is "the external audit (or assurance) process" similar to the primary monitoring processes but distinguished on the basis that the "monitoring entity is independent" (p. 11). However, in providing a service to management there are implications in terms of business improvement and managing audit independence; a point returned to later in this discussion.

5.2.2 "It's about the data," and a "robust and sustainable architecture"

A critical issue for Wholesaler with the continuous auditing system was data in terms of its integrity, multiple formats and access

> "[It] … is not only the variability of the data, the challenge often revolves around obtaining the data on a timely basis. The IT area is, quite properly, concerned with the security of enterprise data and good relations and trust are imperative in ensuring access."

A second key area identified was the need for a "robust architecture."

> "Many people try and do this with Excel and you just can't - not for any lengthy periods. You really need an architecture that allows for consistent retention of exception data and its reliable delivery to end users (with regards to Continuous Monitoring processes)"

There are three layers to the "continuous auditing architecture" in Wholesaler:

1. ACL Direct Link™ for SAP is used to extract data from the SAP tables
2. ACL applied analytics is used to analyse transactions
3. Symsure/CaseWare is used to manage workflows associated with the assignment and management of exceptions through their assignment to specified users and their ultimate resolution.

Where non SAP data is involved, other techniques are used to upload information to the CA system. A Window scheduler is used to schedule the data extraction and analysis on a daily basis.

An identified need for workflow arose as the exceptions arising from the transaction analysis were not being actioned,

> "Potential duplicate invoicing exceptions were being placed in spreadsheets on a daily basis in common directories. This approach was partially effective. However, it was difficult to monitor workflow and periodic clean-up exercises were required."

The system also needs to be scalable, to accommodate the number of logical operations being performed on the data,

> "The continuous auditing environment processes several individual billion tests a night e.g. each invoice is checked against several million prior records. The platform we are using is capable, but it is beginning to explore its limits with respect to being able to manage an ever growing test load…in short, it's beginning to run out of head-room in terms of processing. The CA environment is becoming analogous to a production environment with all its demands and associated risks."

The hardware, software and scalability issues surrounding continuous auditing are viewed as the responsibility of the internal audit department as the IT department sees it as "end user" computing. Finally, controls are built around the continuous auditing system itself, incorporating documentation, backup and disaster recovery arrangements, human resources, independent reviews and third party technical support.

5.2.3 Scripts and audit tests: "Continuous auditing is a tool of the imagination"

There are more than eighty audit tests performed through continuous auditing on a daily automated basis. The Group Audit Manager describes the environment as a "tool of the imagination" with respect to the potential for the selection of value-added tests. However, he points out that developing the tests requires an understanding of the underlying business rules. Hence pre-written (or "potted") scripts from technology vendors were viewed as potentially problematic given the variety of different business rules that could render the results of a prewritten test invalid or misleading. Further, more complexity arises in organisations with multiple business divisions as the control system may not be uniform across the business or may vary in effectiveness depending on local culture.

Identifying tests in the earlier stages was completed more on an ad hoc basis. However, as audit intelligence has grown over time, the design of tests and scripts has matured into "logical buckets" described as: fraud prevention and detection; policy compliance; controls effectiveness; asset protection; and continuous planning.

5.3 How continuous auditing was translated and mobilised in Wholesaler

5.3.1 The early period: "the periodic stock take is like a dog's breakfast"

The decision processes in the earlier stages to adopt continuous auditing were ad-hoc, opportunistic, and made by the Group Audit Manager,

> "… the original initiative arose due to a need to provide useful data to the business in the context of stock accounting. There were gaps in the interface from the warehouse management system that made stock accounting problematical. Continuous auditing was developed initially to fill a gap by scraping the costed warehouse information from the legacy systems and providing it to the financial accountants as well as the warehouse operational staff who previously only had access to un-costed warehouse adjustment data. It's been bottom up development rather than a top down strategic approach…"

5.3.2 Exploiting technological capabilities: From audit to exception management

The control testing performed by internal auditing evolved into a service for other parts of the business, referred to as "continuous control monitoring" (CCM). The technologies enabled other areas of the business to monitor and act on control exceptions in their business on a daily basis,

> "through SymSure's workflow, supervisors can now review what is in their queues and how quick the exceptions are being actioned. Staff are required to attach action and reason codes to the exceptions as they are flagged for closure. In some cases, exception reports were available, however, the reality is that a lot of exception reports are put in a "big blue binder. [They] get put in the corner of the room with the best of intentions. The use of the customer facing Symsure application management is a real time view of the exception management process, which I think is a very powerful thing."

In using SymSure the Group Audit Manager identified additional usages to assist the business,

> "I put it to the vendor of the SymSure software that the product is really a tool for "total exception management". It doesn't have to be just IA loading exceptions into the application. It can be used for a range of other exception monitoring opportunities."

An example of the extension of this CCM usage is the routing of a large number of costing exception reports through Symsure. The complex legacy environment had variable levels of data input control and there were inevitable errors. The business had developed a large number of exception reports. Staff were performing well with respect to the management of these exception reports, however the number of the reports was onerous and they were not always formatted in the most favourable way so as to facilitate review and resolution,

> "With management's permission, we routed these reports through the Continuous Monitoring environment. The department logs on with SymSure and, rather than killing a forest every day the reports are being reviewed and actioned on line. The approach has a number of benefits for management including the ability to monitor the workflow of the exceptions through the review and resolution process."

A further benefit not anticipated was that a number of the exception reports were quite old and poorly formatted or they contained large amounts of un-prioritised data. By using ACL the department has been able to redesign the reports so as to provide differing views of the data or to create additional logical operations to better highlight potential issues.

However in serving multiple purposes, issues about audit independence, accountabilities and responsibilities arose. The Group Audit Manager commented that whilst "continuous auditing" was a catalyst to improve business operations and gain buy in from business, once that was achieved it was necessary for the business units to take ownership; a point further explored below.

5.3.3 The unanticipated use of information: "this is not production John"

Providing continuous monitoring services, such as the warehouse adjustments, enabled by the continuous auditing system, had unintended consequences in terms of unknown dependencies. The Group Audit Manager, recalled an incident when,

> "…we had a server failure, one of the staff went on leave ... and CA failed. One of the things that we were unaware of was that the warehouse adjustment data was also being used for the preparation of KPIs that were being passed to a divisional CEO We had to engage an expert to help us reconstruct some of our data so we had continuity."

This incident not only highlighted the need for a robust architecture but also raised independence considerations as the CA system is "becoming increasingly production like." The Group Audit Manager discussed the need for a strategy in moving forward, to balance business improvement with the need for independence and to encourage business units to manage their own monitoring solutions.

5.3.4 Building relationships and adding value: recasting the internal audit image

As the breadth and depth of continuous audit applications expanded so have the relationships with the external auditor and other business units begun to change,

> "It's starting to bring us closer together. Also continuous control monitoring has brought us closer together with the business as well, because they see it as a genuine value add…"

The internal audit group is working with their external auditor to scope the control testing work with SAP. For example, the

> " … [external auditor] in the first part of the roll out of SAP did a blueprint… They identified a number of key GL controls they would like to see in place. We're looking at starting at that level, getting confirmation through continuous controls monitoring …"

This is slowly recasting the image of the internal audit department as an agent of change and business improvement. In addition,

> "In terms of savings to the group, it's at least paying for internal audit on an annual basis. We're looking at 100 per cent of all invoices on a daily basis and editing them. It's very substantial here. We have a purchase of $10 billion a year and 100 per cent tests of all the manual transactions. We're doing 100 per cent auditing rather than samples."

5.3.5 Building intelligence and expanding capabilities: from opportunistic to strategic behaviour

As the use of continuous auditing applications grew in Wholesaler, so did the need for a more systematic approach to designing audit tests and developing the necessary talent and skills in the internal audit team. "Phone book" sized reports and information overload focused attention on the need to reduce the scope of "the more complex tests." The Group Audit Manager, reflected

> "We did a quick calculation the other day ... For every invoice that comes in, it's matched against every other invoice for the day. That file of invoice gets attached to the last five years' invoices. Each invoice gets tested against, at the moment it's the last 18 months' invoices. Each invoice goes through several million comparisons. You might have several thousand invoices on a daily basis. On that basis alone, the numbers become very substantial."

A current risk identified by the Group Audit Manager is that apart from himself, there is one other internal audit staff member with knowledge and expertise of the continuous audit system. This exposure has focussed attention on the need to develop and retain internal audit capabilities.

In moving forward, the Group Audit Manager is also looking at expanding the "continuous auditing" work to areas such as system privilege management (FireFighter in SAP) and log management in the IT department. Further, the Group Audit Manager described the current phase as "we're at the end of the beginning" and in moving forward wanting to bring "some more structure around continuous auditing strategically..."

6 CASE INTERPRETATION

The purpose of this section is to synthesise a perspective on CA drawing from the case material.

6.1 The heterogeneous and dynamic construction of CA

CA was revealed in Wholesaler as multifaceted and fluid. It was an assemblage of technical actors such as legacy systems, warehouse adjustments, new enterprise systems, scripts and software applications, and human actors, such internal auditors, business unit managers and technology vendors. These actors mutually influenced and were progressively shaped be each other, a folding of time, space and agents. For example, tests were run daily, monitoring procedures were designed based on previously identified exceptions, data quality issues arose for the internal audit and Master Data Group, and the technical capability expanded from control to exception management. Hence the nature of CA constantly shifted and was negotiated through processes of use involving audit practices and the situated experiences of multiple actors.

6.2 Translating the idea of CA into practice: a multi-stage process and a duality of mobility

The implementation of CA was a multi-stage, bottom up and in its early stages an opportunistic process. There was no specific organisational, information system or audit objectives. Rather it involved a translation process where the nature of CA constantly shifted and was renegotiated. In the early stages, it was very much opportunistic involving the Group Audit Manager who identified a space to improve monitoring practices of warehouse adjustments. This process, in some cases unknowingly, became intertwined with the need from other organisational units to for example access better quality information. Hence CA became an enroller of users and a heuristic device appropriated by business units for reasons other than audit and control. A duality of mobility arose in that there was a dependence on the CA system for information yet also a need for audit independence, as for example the Master Data Group transitions from the CA system to its own server and applications. In its later stages, a more strategic and systematic approach is being adopted as audit intelligence has grown through the recursive process of designing scripts and tests; the development of technical proficiencies; and a broader understanding of information needs and uses.

6.3 CA as organised uncertainty

The CA system in Wholesaler attracted different and diverse images. That is, it was not only interpreted differently by different people, but it also assumed an identity of data quality. The design of CA and development of procedures and routines created intertwined relationships and new forms of uncertainties in terms of unanticipated uses of information and issues of independence. That is, the subject (eg. audit objectives) and objects (eg. scripts) of CA were constructed alongside the design of the system itself and transformed the audit environment into distinctive types of procedures (eg. exception management) and technologies (eg. workflows) that could be audited.

7 IMPLICATIONS, LIMITATIONS AND CONCLUSIONS

This paper set out to explore how CA is framed and shaped in organisations and found it constituted and constituted by assemblages of technical and human actors where the nature of CA constantly changed and was renegotiated. The study is not without its limitations. Firstly, the participants consisted of the Group Audit Manager and an internal auditor. Hence this paper offers only a partial testimony of the events. Other organisational members in Wholesaler need to be interviewed to understand how they have interpreted the CA implementation. In addition, comparative case studies are required to examine similarities and differences in implementation patterns. The study has also raised a number of research implications and future research directions.

CA was revealed as a multiplicity conceptually and in practice. This highlights a limitation of the more traditional view of audit based on the 'moral hazard' gap between owners and managers (Vasarhelyi 2002, p.262). Whilst highlighting the potential of a socio-material practice based view, further exploration of the concepts of socio-technical assemblages and organised uncertainty may serve to stimulate further interest and debate for advancing CA theory; an ongoing and recognised need (Vasarhelyi 2002; Brown et al. 2007).

The translation and mobilisation of CA into practice was shown as a multi-stage, bottom up and opportunistic process. What started as a warehouse adjustment problem identified by the IA group grew over time into an analytical monitoring capability of over eighty scripts, a combination of technologies and exception management reporting adopted by business departments. This contradicts the more accepted view in the literature where CA is represented as a top down model "built upon the strategic and operational goals of the enterprise" (Marks 2010). However, further empirical research is required to examine how CA is enacted in different organisational contexts and over time to develop a richer understanding of CA designs, technologies, implementations, usages and impacts.

In this study CA was revealed not as a neutral controlling process but one that actively created the environment that it was supposed to audit. The IA group played a critical role in creating the monitoring system. This, as highlighted by Sutton (2002), impacts upon audit independence. Whilst there is an extensive literature base on audit independence, there is limited research in relation to CA and designs that would accommodate independence requirements requiring further investigation. Further, CA enabled analytics driven audits. This has implications in terms of audit judgement. That is, setting analytical criteria to detect erroneous or fraudulent transactions and the need to manage the volume of information associated with a flood of exception reports. Such matters await further research.

Separate but related to managing information overload was the issue of data quality and access. Accessing quality information and in a suitable format was identified as a key challenge as it needed to be sourced from diverse systems involving different custodians and at times political processes. Further, the ability to produce relevant reports from analytical monitoring requires an understanding about the information needs of multiple stakeholders and the frequency with which they need to receive this information. Methodologies to support CA may be enriched by drawing from the well established field of information management and design.

Brown et al (2007) posited that CA was likely to drive down the costs of auditing procedures. Whilst efficiencies in automating and improving audit procedures were recognised in the case, it was difficult to quantify the benefit. Further research needs to be directed at benefits management, as it is important, as recognised by Brown et al. (2007), in determining the viability of adopting such systems.

The role of the internal auditor was viewed as changing from a focus on static, cyclical and control centric models to more risk centric and agile practices enabled by CA. This requires an understanding of information and audit technologies, client interactions, an increased audit by exception approach and openness to change. Further research is required to examine how internal auditors are interpreting this 'new' role and how these knowledge areas and behaviours are being accommodated in the curriculum of business schools.

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