

The messy matters of continuous assurance

Preliminary findings from six Australian case studies

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Abstract— The potential benefits of and business imperatives for continuous assurance (CA) are now widely acknowledged. However, uncertainty remains about how CA may be effectively implemented at a theoretical and practical level. The aim of this paper is to report on the first stage of a long-term comparative case study research project examining the adoption and implementation of CA in Australian organizations. The research supports three goals, to inform strategies for creating CA capability, increase success of CA initiatives and advance theory. Key preliminary findings emerging from the comparative analysis of six case studies include the: multifaceted and changing nature of CA; the importance of developing and leveraging data analytics capabilities, managing exceptions and multi-stakeholder interactions; the challenges of messy data, complex IT environments and understanding information needs; and the need for senior management support and a strong business case to progress CA initiatives.

Keywords—continuous assurance, continuous auditing, continuous monitoring, audit analytics, adoption, case study

I. Introduction and Motivation

The concept of continuous assurance (CA)¹ broadly and more specifically continuous auditing (CAu) and continuous monitoring (CM) are not new with a history spanning more than three decades [1]. Technological advances and widely acknowledged benefits such as being able to monitor irregularities on a continuous basis, improve reporting and provide more assurance with a greater breadth and depth of coverage in changing governance, risk and compliance (GRC) landscapes has renewed attention in an area that has largely remained, until more recently, a theoretical pursuit [2] [3] [4]. Yet, notwithstanding the growing awareness around the benefits of CA it appears that its adoption has not met initial expectations [4].

Recent surveys have offered reasons as to why there has been limited uptake including: the lack of a strong business case; no clear picture or road map as to how CA could be implemented; limited insight into the availability and functionality of CA technologies; and the need to improve audit capabilities in the design and use of CA techniques, technologies and data analytics [4] [5] [6] [7]. In addition,

while a significant amount has been written about CAu and CM, the concepts remain ambiguous [1] with limited understanding about how the two approaches are used and integrated in practice [8]. Hence uncertainty remains as to how CA may be effectively implemented and the impact on work practices for auditors and business managers [3].

The aim of this paper is to report on the preliminary findings of six case studies being conducted in Australia relating to the adoption and implementation of CA. The motivation for this case study research is twofold. Firstly to develop a deeper understanding of how CA is experienced and constituted in practice. Much of the research to date has been based on large-scale surveys, which are limited in terms of providing insights into organizational contexts [9]. Secondly, there have been limited field studies of CA conducted in Australia [1].

The paper is structured as follows. Section 2 explains the theoretical background of the study. Section 3 provides a discussion of the research project more broadly and the research approach adopted in this study. Section 4 examines the preliminary findings. Section 5 discusses key themes and implications. The final section offers concluding comments and the limitations of the study.

II. Theoretical Background

A. Contested meanings and ambiguities of CA

There are contested meanings and ambiguities in the use of the terms CA, CAu and CM [1]. Different interpretations have been assigned to the term ‘continuous’ such as real time and “near” real time, to differentiate frequencies of audit procedures, represent the interval in issuing a report or as a continuum of activities [1]. Verver [8] refers to the “twin peaks of continuity” as CAu and CM where the distinction is based on the “ownership” of the process. That is, auditing is performed by auditors, providing ongoing assurance and “more timely insight into risk and control issues” [8]. Monitoring of key business processes and controls is the responsibility of management. Others have defined CAu as providing “assurance on real time information within an organization” by internal audit, consisting of continuous controls monitoring (CCM), continuous data assurance (CDA) and continuous risk monitoring and assessment (CRMA)

¹ To avoid confusion the label CA will be used as an overarching term to incorporate both CAu and CM in this paper, unless otherwise specified.

[10]. The Institute of Internal Auditors (IIA) Global Technology Audit Guide (GTAG) 3 [11] refers to CA as a framework representing the “combination” of activities performed by internal auditors to “independently evaluate: the state of controls, risk management within the organization, and assessment of the adequacy of the management monitoring function.” Finally, others have observed that practitioners attach “less significance” to the meaning of CA focusing on the application of techniques and value created [12] suggesting that the roles of auditors and business managers are determined in practice and dependent on the unique circumstances of each organization [1].

Understanding how auditors and business managers make sense of CAu and CM in practice may provide insights into the types of knowledge, assumptions and expectations salient in CA activities and actions relating to its adoption, implementation and use. Such understanding would be particularly useful having regard to the potential transformative effects of CA, requiring a “fundamental rethink of all aspects of auditing” in its development [9]. Currently it is not clear as to what organizations mean when they state they have CAu or CM in place or “the extent to which they have adopted a CAu approach across all of their business processes” [9]. Hence there is a recognized need to undertake in depth “micro-level” studies of the adoption and implementation of CA in organizations [9] and in particular Australia where there is currently limited field studies.

B. Theoretical foundations

There is currently limited theory on the adoption, implementation and use of CA [1] [9] [13]. Theoretical development has focused mainly on the development of prototypes, prescriptive standards, frameworks and techniques [1] [14]. Researchers have also investigated the economic feasibility of CAu, benefits [14] and impacts on managerial behaviors [2]. Whilst these studies present useful findings, the meaning of CA is largely taken for granted, regarded as a neutral link in achieving some benefit and assumes that management recognizes the need for and intrinsic value of CA [1].

Two recent studies into the adoption of CAu [9] and CM technology [13] both draw on the Technology Acceptance Model (TAM) [9] and its successor the Unified Theory of Acceptance and Use of Technology (UTAUT) [13]. Generally in using this perspective CA is viewed in terms of attitudes and intentions based on psychological models. Notwithstanding the important insights that these studies provide, the meaning of CA is assumed to be embedded in psychological elements such as perceptions of its usefulness by auditors and business managers “downplaying the context-specificity of CA and the situated practices involved in constructing and producing particular organizational outcomes”² [1].

The analytical approach adopted in this paper is inspired by the technological frames of reference (TFR) perspective, see for example [15] [16] and actor network theory (ANT), see

for example [17] [18] [19]. These theoretical lenses are used to reveal the local practices and situated accomplishments of CA, to assist in developing guidance that is driven by the needs of particular circumstances regarding CA [1]. Underpinning both of these perspectives is an organizational and socio-technical change view which assists in exploring how auditors and business managers understanding of CA may shift and change over time.

Broadly the TFR perspective focuses attention on how actors come to understand information technologies and how these interpretations act as “attention directing” and “problem solving templates” [14] for their actions related to, in this case, the adoption and implementation of CA. TFR provides a useful way to frame the preliminary findings in terms of providing generic categories relating to: (1) CA features or attributes, such as the nature and understanding of the problem and views of technologies; (2) potential organizational applications of CA and their development, for example, business value, rationale for technologies and images of implementation; and (3) issues around use and work practices.

Generally, the ANT perspective views CA as emergent assemblages of people, processes and technologies involving the translation and alignment of interests of multiple actors through processes of persuasion, incentives and negotiation [17]. Technological capability or social relations do not determine CA outcomes. Rather CA is viewed as a complex yet routine activity, situated in ongoing work practices. Hence the emphasis is on detailing the everyday practices involved in developing and implementing CA. The ANT view complements TFR in that the later is limited in developing understanding of how frames towards CA (in this instance) develop in relation to others, such as executive champions, and where and how these frames came to be, such as institutional and cultural origins [15].

Given this theoretical framing, the overarching research questions are:

How do auditors and business managers frame CA?

How does CA get started, developed and performed in organisations?

III. Research Project Context and Research Approach

This study is the first phase of the second stage of a long-term program of research in the adoption and use of continuous assurance in Australia. The first stage involved an in depth longitudinal case study. The second stage is based on comparative case studies. The research supports three goals: to inform strategies for creating CA capability; increase success of CA initiatives; and advance theory.

Specifically, the aims of the research program are to:

- investigate how CA practices are constructed, implemented and evaluated within complex and changing business, legal and technical environments;

² Although Vasarhelyi, Alles, Kuenkaikaw and Litley [9] state that the TAM model is used mainly to frame their interview guide.

- describe key elements of success in the effective design, implementation and evaluation of CA initiatives;
- identify the factors that constrain or enable organisations to develop an effective CA capability;
- develop a capability and evaluation framework to assist organisations conduct effective CA practices and maximize value from technology solutions.

This paper reports on the preliminary analyses of the first phase of the second stage of this research.

A. Interpretive case study approach

An interpretive case study approach [20] is adopted in this study. That is to provide rich and detailed descriptions of CA so as to draw out contextualized and ambiguous meanings of CA in practice. This incorporates the way CA is used and the techniques, procedures and systems adopted.

B. Case Sites and Research Participants

Six case sites were identified mainly through introductions from a network group and one from a meeting at a conference. As set out in Table 1, two cases were private sector organizations, the remaining government agencies and institutions. Each case site has been given an alias for reasons of anonymity and confidentiality.

TABLE I. DETAILS OF CASE ORGANISATIONS AND PARTICIPANTS

Case	Type of org	Participant	No. of inter-views	Total time of interviews	Interview(s) conducted
1	Wholesaler	Group Business Assurance Manager	2	120 min	Dec 2010- Nov 2012
		Manager Risk Intelligence & CA	2	79 min	Dec 2010 Feb 2012
		GM Merchandise	1	50 min	Jan 2012
		GM Finance	1	26 min	Jan 2012
		A/C Payable Mgr	1	28 min	Jan 2012
		Credit Mgr	1	51 min	Jan 2012
		Comm Mgr	1	45 min	Feb 2012
		Payroll Mgr	1	20 min	Feb 2012
2	Education	Internal Audit Mgr	1	52 min	June 2012
3	Local govt	Information Assurance Mgr	1	60 min	Oct 2012
		Assurance Mgr	1		
4	Govt Agency - A	IT audit manager	1	58 min	Feb 2012
5	Govt Agency - B	Snr Director	1	65 min	Sep 2012
6	R & D	Risk & Compliance Director	1	75 min	July 2012
		Total	16	12.15 hr	

C. Data Collection and Analysis

Primary data was collected from interviews over a period between December 2010 and October 2012. All participants were senior level internal auditors and senior business managers. A semi-structured interview design was used covering four main areas: (1) events and activities surrounding CA and its implementation; (2) CA technologies and architectures; (3) evaluating CA; (4) impact of CA on Audit/Business Manager work practices and decision making processes. Lead questions were supported by subsidiary questions to probe further into the participants' responses. The less structured style of interviewing was used to generate ideas and assist in delivering more novel responses. In addition, secondary data comprising reports and presentations as well as informal conversations, which were recorded in field notes, formed part of the data collection and analysis.

The digitally recorded interviews were transcribed, approximately twelve hours in total. Content analysis and descriptive coding [21] were used to identify key events, issues, challenges, practices and meanings of CA arising from the interview transcripts and secondary data. Participants were provided with a copy of the transcript to ensure its authenticity and provide an opportunity for further comments.

IV. Preliminary Findings

The purpose of this section is to report on the preliminary analysis. The findings are set out below and have been framed into three generic categories:

- **The nature of continuous assurance (CA):** Refers to people's images of CA (incorporating continuous auditing and continuous monitoring) and their understanding of its capability and functionality.
- **The CA strategy:** Refers to views and understandings about the motivation behind why CA has been adopted, its implementation and value to the organisation.
- **Uses of CA:** Refers to people's understandings about how CA is used in their routine work and the issues and consequences associated with such use.

Whilst reported separately these three areas are interrelated.

Table 2 provides an overview of the people directly involved in the adoption and implementation of CA, the approximate year in which the CA initiative commenced, the technologies used and a maturity view. The number of people reported as being directly involved in CA nor the technologies used have remained the same over time. In some cases, for example Case 1, the number of people directly involved has increased, whilst in others such as Case 5, the numbers are changing due to a government restructure.

A. Nature of continuous assurance: images, capability and functionality

Whilst there were variations in terms of how CA was described, common elements identified are set out below.

TABLE II. SUMMARY OF CASES

Case	People directly involved with CA	Year CA originated (approx)	CA Technologies	Audit Maturity ³
1	3 plus Group Assurance Mgr	2003	ACL for data analysis ACL Direct Link™ for SAP to extract data from tables CaseWare for exception workflow mgt Windows Scheduler	Full CA >90 ACL scripts performed daily plus continuous monitoring of high risk exception resolution Predictive analytics on high risk areas
2	Internal audit manager plus contractor	2010	Oracle BI IDEA for smaller ad hoc items	Emerging to maturing Getting business line mgrs (HR & Finance) to use the reports and follow up on exceptions
3	3, two at mgt level	2010	Oracle BI and Database for Audit Data Warehouse IDEA for smaller ad hoc items	Emerging to maturing Run 80 routines every quarter
4	1	Using CAATS for approximately 5 – 10 years	ACL (for global CAATS) ACL Direct Link™ for SAP IDEA and ACL WizRule – data auditing & cleansing tool to reviews rules and patterns in data.	Emerging to maturing Extract the entire general ledger and analyse at least once a year. Planning to extract the ledger every fortnight or month.
5	2 plus, two directors and senior director	2009	ACL for data analysis CaseWare – exception workflow mgt	Emerging to maturing More than 20 scripts run “regularly”
6	1	2011	ACL for data analysis CaseWare – exception workflow mgt	Emerging Payroll – fortnightly

1) Multifaceted and changing: A business, audit and technical issue requiring a multi-stakeholder effort

CA was revealed as multifaceted and changing in nature over time. It was an assemblage of a variety and suite of software applications, such as ACL, IDEA, CaseWare, ACL Direct Link™ for SAP, Oracle BI and Excel spreadsheets, cast against the backdrop of legacy mainframe systems and ‘new’ implementations in the form of enterprise systems such as SAP. It involved multiple stakeholders consisting of internal auditors, IT and business unit managers, technology vendors

and actuarial consultants, representing multiple skill sets and business interests.

As a technology and an “inferential” process, it enabled the analysis of a complete set of data rather than a smaller sample size on a ‘continuous’ basis providing more timely and “tailored” information. However,

“... when we say continuous assurance even now we’re really talking about periodic assurance ... we drag this data once a quarter or in a couple of instances once a month and we are reliant on fitting into the operating schedules ... so in a lot of instances we have to wait for a month or two months after the end of the quarter to even get hold of that data” [Case 3 Assurance Mgr]

The data analysis served different purposes for different business process owners involving different scripts and tests that were negotiated and refined between internal audit and business managers over time,

“When we started off putting the continuous monitoring in place it was only going to be something that internal audit was going to use. As we had discussions with HR, IT and finance, it became pretty obvious pretty quickly that they were interested in it as well and that they could find a great deal of use out of it.” [Case 2 Internal Audit Manager]

The nature of CA is gradually shifting from a view of audit and automation to a business tool for constructing risk intelligence and developing agility in audit and business practices,

“I think we should really be using a broader term of data analytics in a sense because the data analytics is the thing that brings out trend analysis. Continuous controls monitoring, I think, is a very narrow focus because what that’s saying is that you’re putting parameters and processes in place in your system to identify when something happens outside of a control. That’s only part of this overall better use of technology and capability in the analytics processes.” [Case 5 Snr Director]

2) Ownership and independence: frames of continuous auditing and continuous monitoring

CA initiatives originated in the internal audit department. The same technologies and scripts are used by business process owners to test transactions against business rules on a ‘semi continuous’ basis. Distinctions are made by internal auditors on the basis of who owns the process with the labels ‘continuous auditing’ and ‘continuous monitoring’ being used to distinguish between audit and business process owner responsibilities respectively,

“...it’s something that’s put in place to aid management, to give them assurance that their controls are working, to monitor, review exceptions and for internal audit to come along and make sure that they’re doing that monitoring.” [Case 2 Internal Audit Manager]

³ Based on The Audit Maturity Model designed by Vasarhelyi, Alles, Kuenkaikaew, Littley [9]

These distinctions were arrived at over time rather than being understood by some of the business process owners in the earlier stages of the implementation. For example, in Case 1 business managers initially saw it as a reporting and audit activity,

“So all this assistance from audit in terms of continuous monitoring reports for things like say stock adjustments and the like, it's been a big help.” [Case 1 Comm Mgr]

Educational efforts were required by the internal audit group to show how the two approaches were different but complemented each other.

Over time, the emphasis on monitoring shifted to the business manager being able to manage exceptions more efficiently and referred to in terms of the workflow application used,

“We will host 1000 products a week. So we check every one... Caseware... took away a lot of the manual process and had it automated. So now it generates reports for us to tell us potentially we've got a problem...” [Case 1 GM Merchandise]

Internal auditors are mindful of the potential to compromise independence in the development of CA initiatives. However, for some it was viewed as a service built upon their expertise in risk, control and audit analytics and in the earlier phases as a “catalyst” for gaining “buy-in” from business managers. Once the tests are designed and tested the responsibility is handed over to the business process owners with the understanding and agreement that internal audit will be assessing the effectiveness of management's procedures and making recommendations for improvement where required. Further, the tests and scripts were either designed or reviewed by third parties with expertise in using the technologies.

The risk of not embarking upon this journey because of concerns relating to audit independence were considered far greater than not engaging in a CA program due to lost opportunities for audit and business improvement, discussed further below.

3) Data analytic capabilities: CA as “a tool of the imagination”

Data analytics capabilities was viewed as critical to support a detailed risk assessment process, assist in identifying critical risk points and developing more agile responses to areas that warrant investigation,

“... any of the audits that we do must have some sort of data analytics at the front end. That's why I'm saying there's a combination of usage. It's not just about the continuous monitoring. It's also about the trend analysis, the data analytics. If you're really going to be in that space, we should be covering the field. We've got the team using analytics with [expert assistance] ... in terms of identifying - well, where are the areas that we must audit and where are the areas that we don't need to audit? What's in control? What's out of control?” [Case 5 Snr Director]

More recently in Case 1 a predictive analytics capability has been developed to expand approaches used in fraud detection and monitoring of inventory. This has shifted the focus from what is happening/has happened to what is likely to happen and optimizing what should happen. In this way, attention is being directed at opportunities for operational improvements casting CA as described by the Group Assurance Manager as a “tool of the imagination” and methodology for building risk, audit and operational intelligence.

4) Managing exceptions and expectations: Taking actions and making decisions

A common theme across cases and within Case 1 (where business managers were also interviewed) was the issue of “false positives” and managing the volume of exceptions particularly in the earlier phases of implementation,

“It can be a pain in the butt ... initially because [this] ... report came and there was about 3,000 entries on it...” [Case 1 A/C Payable Mgr]

Refining the scripts and managing expectations required significant effort and negotiations between internal audit and business managers,

“... it has been hard to try and get them to use the reports. They all agree the reports are fantastic. They really like the report but actually using them has been a different matter.” [Case 2 Internal Audit Manager]

The way in which exceptions were managed varied across the cases, revealing different stages of maturity. Enabling technologies of CA, such as CaseWare, was viewed as an efficient and effective way to respond to compliance and risk issues identified by the automated tests. In Case 1 the CaseWare software supports an escalation process that specifies who needs to be notified when an exception arises, actions that need to be taken, an acceptable time frame and confirmation when the exception has been resolved. This technology assisted and enabled business process owners to take actions and make decisions about these exceptions on a timely basis and provided greater visibility into the resolution process. In doing so, internal audit are able to focus their attention on providing higher-level oversight and guidance to business process owners,

“... continuous control monitoring has brought us closer together with the business ... because they see it as a genuine value add...” [Case 1 Group Business Assurance Mgr]

However, developing the process was not without challenges, as discussed further in the next section relating to CA strategy.

B. *Continuous Assurance Strategy: motivations, implementation and business value*

1) *Motivations: How CA became noticeable*

a) *The believers, the experts and “the low-hanging fruit”*

The CA initiative did not arise from some predetermined ‘grand’ objective or ‘overarching’ strategy. Rather it grew organically from a business problem and/or long term interest in the area,

“...it’s a combination between myself and the associate director in the finance branch ... he’s been interested in implementing it for quite some time ...and as far back as 2007 ... the external quality assessment validation that we had done recommended that we consider implementing some continuous monitoring tools” [Case 2 Internal Audit Mgr]

The initiative was driven by internal audit. Justification for expanding the CA program and gaining ‘buy in’ came about through “small wins” gained from

“the low hanging fruit ready for the picking such as duplicate payments” [Case 1 Group Business Assurance Mgr]

and through enrolling experts

“... [the expert] actually came to Australia to do a conference ... We paid for him to come and spend two weeks with the team teaching the team all about the practical aspects just of doing trend analysis through Excel. As part of that, at the end of that two weeks, we actually had a special meeting of the audit committee and the team presented their data analytics to the audit committee. The audit committee then reported to the director-general. I, then, got my approval to get all of the ACL licenses to create the data analytics manager position...” [Case 5 Snr Director]

b) *Expanding analytics capability: From data analytics to predictive analytics*

As understanding about the capabilities and functionalities of CA develops and its use matures, its ongoing development is being framed more strategically building upon the risk and audit intelligence that is being constructed. For example, Case 1 has moved to a more advanced use of predictive risk analytics in relation to their stock shrinkage problem. The emphasis has shifted from what is happening and why, to a more predictive view focusing attention on the degree of acceptable risk in daily stock movements based on past trends and what is considered to be an optimal view. Reaching an understanding about what purpose the predictive analytics would serve, who would be using it, the types of information to be analyzed and the frequency and design of reports (eg. graphics and visualization) was a multi-stakeholder effort involving internal audit, the commercial manager and an actuarial consultant. The stock adjustment model project built upon the earlier work in using CA for monitoring stock shrinkage.

“So we went from starting to monitor them on a weekly basis to then internal audit saying look, we’ve got a way

...[the internal audit team] retrospectively ran some reports on stock adjustments you could see the trend. That’s when we started to talk and say look, this is nice in hindsight. We can’t see that when we’re running reports and seeing them on a weekly basis. We just see if it’s high for that week and query it ... It’s hard to remember adjustments for three, four weeks ago, let alone a year ago with the volumes and the number of warehouses – with all the best intentions. So that’s where this whole idea came about for us, to explore a way that we could get this information, make it more valuable to us. So they [IA] engaged [actuaries] ...” [Case 1 Comm Mgr]

2) *Implementation of CA: the enablers*

a) *An iterative and incremental process: enrolling users and translating needs*

Internal audit led the implementation of CA. It was a multi-stage, bottom up and iterative process. The auditors worked with the business process owners, translating their needs and expectations and utilizing different features and functionalities of technologies, to develop a continuous monitoring capability.

“We’ve automated a number of general ledger reconciliations ... [One person] is as keen as all mustard to use our reconciliations ... [another] is not so keen. I think it’s just a change. [The third party] spent a lot of time with them trying to understand the reconciliations, where they kept the data, what spreadsheets they used – what scripts they run. He spent a lot of time with them trying to explain how it would work... There’s still some resistance there to using it... I think it’s just more of a change issue...” [Case 2 Internal Audit manager]

“It was probably twelve months before we really started getting worthwhile reports that we could meaningfully put out to line managers ... we also went around and spoke to senior managers” [Case 3 Assurance Manager]

In addition, ongoing negotiations with the IT department were required, particularly in the earlier implementation phases of CA, to access the required data,

“It’s taken quite a while to get engagement from particularly IT and perhaps the business owners as well to be honest.” [Case 6 Risk & Compliance Mgr]

These interactions were not without challenges as discussed further below.

Internal audit’s dependency on the IT department has lessened to some degree over time with auditors being able to directly access data from new enterprise system implementations, such as SAP and Oracle,

“... If we can’t get the reports to run then we have to go down to the IT people and ask them to assist us. That can sometimes take weeks and weeks. So for us to have access to the HR and the finance data and just go in and pull it down at any time we need it has been really valuable. It also means that you can do it – if you’re doing an investigation or

something you can do it a little bit more privately than having to go and ask IT for help.” [Case 2 Internal Audit Mgr]

As CA initiatives mature, they are being more strategically framed.

“It’s kind of developed ... we’ve got a strategic plan for analytics, but what we need to be doing is bedding down a timed plan of how we continue to build the process and tie in more of the controls monitoring. Just this year, we’ve put in CaseWare Monitor to sit with ACL, so that’s now doing a lot of the continuous monitoring ... If we’d just laid down a timetable of what we were going to do with the dates et cetera, we wouldn’t have the success that we have today.” [Case 5 Snr Director]

b) The CA champion: the need for “a continuous voice”

Leadership was identified as a significant factor in integrating a sustainable and consistent approach to CA. This sustainable integration required a “continuous voice,”

“In relation to selling it to the business, [the Group Assurance Mgr] is there. He’s really good at selling it” [Case 1 Risk Intelligence Mgr]

“Myself and the chief internal auditors recognized that continuous assurance was happening and was an ideal sort of future for internal audit ... you know the chief internal auditor is pretty good at running things on a shoe string and getting things happening.” [Case 3 Assurance Mgr]

c) The importance of management support

Support from senior management was identified as a critical factor in gaining acceptance of CA from business process owners,

“The challenge there was to convince business to accept it ... For us, there was support from senior management in relation to continuous monitoring.” [Case 1 Risk Intelligence Mgr]

“The chair of our audit committee ... also recognized the future of continuous assurance ... the CEO at the time recognized the potential both in terms of assurance about looking for exceptions and trends [as well as] ... improved management information” [Case 3 Assurance Manager]

“... absolutely. That was the essential part. That was the bitter lesson of my past in that, while I had this vision in other government departments, the thing that always stopped us from getting there was management’s lack of understanding of what I was trying to sell and their reluctance to spend additional money ...the biggest problem I had was getting the management buy-in. That was why, when I came [here] ... I had three team members who were really keen to explore this area, we said, okay, we’ve got the passion to do this, now we have to sell the vision. We realized though that we had a very active audit committee that was interested in making sure that we were a professional audit team.” [Case 5 Snr Director]

d) Understanding the socio-technical context: organisational culture, diverse systems and change

Understanding the impact of new initiatives on roles and work practices was recognized as a key issue particularly having regard to the change experienced in most cases over the past decade through organizational restructuring. Managing change effectively required an understanding about the importance of organizational culture and traditions.

“We’re quite a diverse organization, and I suppose one of the challenges for internal audit and the organization is that we’re usually the ones that every time there is an election we change. Like we’ve had 32 machinery government changes at least in the last five years where they keep bringing in different services. So as an audit unit we need to be able to adapt quickly” [Case 4 IT Audit Mgr]

In addition, an understanding of the complex technical environment was identified as a critical factor in decisions relating to the types of CA technologies acquired, their implementation and their use. Technical complexity was represented in different ways, for example, volume of transactions, variety of business rules, diverse legacy systems and enterprise system implementations.

“Our general ledger is on Oracle. Not every entity in the company worldwide is on Oracle. So we do have some Legacy applications as well. I think one is Sage Accpac that we use for some of the smaller entities. We have another one in our motor technology division in the United States - it’s called Vantage. Our French manufacturing business in Paris has a local French ERP. Pretty much everything else is Oracle now. We have moved quite a few subsidiaries from Legacy systems to Oracle.” [Case 6 Risk & Compliance Mgr]

In addition, there were multiple laws and regulations that needed to be considered with respect to protecting information.

“You do have to be very mindful about confidentiality and privacy. There are some countries where we will have to be very mindful about that, particularly some of the European countries, Data Protection Acts and the European privacy laws. We may have to do that locally rather than exporting it [personally identifiable information]. Australia is not part of the Safe Harbor provisions, for example, so having copies of data from Europe sitting in Australia is not permitted. You can do it in the United States or it’s probably more preferable to do it within Europe ... We may have to keep it either physically in Germany or post it out of the US because the US does have Safe Harbor provisions that meet all the European requirements” [Case 6 Risk & Compliance Mgr]

3) Implementation of CA: the challenges

a) “It’s about the data”: multiple data formats, disparate systems and gaining access

A significant issue for internal audit in developing CA was dealing with multiple data formats and gaining access to the data, as it was located in disparate information systems.

"We currently have three SAP companies which makes our life really, really difficult ... It gets more difficult from the fact that we've changed so much ... We struggle getting data access for these particular applications ... Unfortunately we can't get direct access to the payroll system because that data is shared with other entities and the way the tools work don't actually allow you to have record level security. So if I download data I see everybody's data. Put it this way - they merged with us two years ago and I still don't have access to that system. I'm still having to actually go and request information from their service provider who manages that system." [Case 4 IT Audit Mgr]

In addition, inconsistent data quality presented significant challenges,

"So I think one of the biggest issues for this organization is integration of that information, but also data quality. You've got so many different architectural models in play it's very difficult to get a single view of who clients are." [Case 4 IT Audit Mgr]

Further, with new system implementations there were issues with re-designing scripts and converting data from one system to the other,

"... most of our financials were in PeopleSoft. I had to move a lot of scripts from - PeopleSoft data - to convert into SAP." [Case 1 Risk Intelligence Mgr]

"So we're actually having to change the way that we are doing some of our testing. We effectively have to create two different models; one for the old system and one for the new system and we're having to do data discovery at the same time because we haven't got access to the system to figure out how the hell the thing is working .." [Case 4 IT Audit Mgr]

b) Dealing with the 'false positives,' exceptions and expectations

Common across most case sites, was the issue of dealing with 'false positives' and managing the volume of exceptions that were generated. Time and patience was required from internal audit and business process owners to understand critical risk points and areas of concern for determining the frequency of testing and information requirements that would be manageable and assist in making informed decisions,

"On some of the tests we had probably too much erroneous data so we had to refine the scripts and tighten down the business rules around that. Some of that comes back to the business perhaps not understanding what they really want to see as well - except when they get the report and it's a very big report and they said it's too much to look at. I agree, yeah. A control is not a control if it can't be performed reasonably efficiently. So you don't want an exception report to have 10 per cent of real possible exceptions and 90 per cent

of noise. So it's around managing that and getting it reasonably right." [Case 6 Risk & Compliance Mgr]

Internal audit were also mindful of how pre-written (or "potted") scripts from technology vendors were problematic given the variety of business rules. A failure to properly implement local business rules tended to result in "telephone book" exception listings most of which were "false positives". Internal Audit focuses on ensuring that scripts are written so as to ensure that the reports contain "high probability exceptions". Therefore, scripts needed to be designed by internal audit in consultation with different business process owners. In the earlier phases of implementation this was largely a learning process as internal audit skills and capabilities grew alongside the development of CA.

c) Traversing the IT department and building a sustainable technological architecture

Selecting the most effective technology is critical. Decisions relating to CA technologies were made by internal audit as the IT department viewed CA as an "end user" responsibility. Therefore, internal audit were responsible for acquiring and maintaining software and hardware for performing the data analysis, workflow and reporting of exceptions. In addition, a secure and controlled audit repository that houses the data, analytical procedures and results needed to be created,

"We had to firstly arrange to have the appropriate size server, have that put into place and have a maintenance agreement on it. So that was one part of IT we had to deal with. The other part of IT that we had to deal with were people who administer the PeopleSoft system themselves and make sure that they were very comfortable with what we were doing, that we weren't going to be playing in the production data. We would have a copy of it and negotiate how often they would push the data out onto my server so that we had the up to date information, for them to also write the scripts for that and how they would support that in the future." [Case 2 Internal Audit Mgr]

"So we actually have spent two years trying to, or at least two years trying to get this hardware in place to support this and, unfortunately, that has been one of our biggest challenges; is not only getting the data but getting the IT areas to put in the infrastructure to support us ..." [Case 4 IT Audit Mgr]

4) Demonstrating the business value

Key benefits identified included reductions in error rates, for example duplicate payments, more timely notifications of anomalies, targeted reporting, greater efficiencies and visibility in the resolution of exceptions, as well as developing better risk and control intelligence through analytics. For internal audit specifically, the automation of audit tests has

enabled them to identify and develop more agile responses to critical risk areas.

Yet to continue developing CA there was a recognized need for a more “formalized” approach to assist with evaluating the benefits and value arising from CA initiatives, particularly in terms of building a strong business case,

“We know that the audit committee responds well to it. We’ve shown routines [such as] potential exceptions or unusual transactions through credit cards ... to the divisional managers, the executive level managers and they’ve indicated in those discussions that they know about continuous assurance ... and they see value in it ... having said that we’ve got so many routines that I think the value or the risk that’s being addressed is variable across those routines ... it’s probably timely to take stock and think about where is the best focus...we sometimes don’t have a very convincing answer about what the value is to them and reasons for expecting them to put resources into it [Case 3 Assurance Manager]

C. Uses of CA in routine work practices, issues and consequences

1) The types of CA tests in routine work practices

A summary of the types of tests identified in each case is set out in Table 3. They include both financial and non financial based testing.

2) (Re)formulating audit strategies

CA was identified as being useful in assisting auditors to be better able to plan their audits in terms of having a better understanding of the corporate data,

“When I started doing continuous monitoring reports, I knew where the data was, how much data I had and where the other possibilities of getting the data were.” [Case 1 Risk Intelligence Mgr],

and in terms of building better audit intelligence

“It is useful information for our strategic planning ... The information that we’ve generated ... has fed into the evaluations we’re using to develop our strategic plans” [Case 3 Assurance Manager]

3) Reporting and data visualisation

With the frequency and volume of information being created, minds had turned to how this information can best be reported to management, risk and audit committees,

“I produce more or less a compendium report of everything that comes out of our continuous assurance every quarter and provide that to the chief executive and the audit

committee. At the moment it’s a pretty thick tome and I’m trying to continuously refine that to focus on what are the real lessons that are being learnt from all this data.” [Case 3 Assurance Manager]

Data visualization techniques and technologies, such as dashboards, were being explored as a way forward to communicate information more effectively.

TABLE III. TYPES OF TESTS PERFORMED

Type of test	Cases	Brief description
Accounts payable	1, 2,3	Duplicate invoicing
Vendor reports	1,2,5	Duplicate vendors – match bank accounts and BSB. In addition, match vendor bank accounts with employee bank accounts.
Payroll tests	1,2,3, 4,5,6	Validity of tax file numbers, missing tax file numbers, duplicate allowances, duplicate payments to employees and duplicate deductions, overtime and contractor payments.
Delegations report	2	Various delegations for people, such as financial delegations
Contractors	2	Identify contracts with corresponding purchase orders and an amount based on a regulatory reporting requirement.
Telephone usage	3	Report on transactions in terms of dollars, usage and compliance with policies.
Payroll summary reports	3	Approval of payroll summary reports.
Credit card transactions	3	Exceptions and unusual transactions
Rates revenue	3	Examine rates payments
Development assessments and infringement notices	3	Review of development assessments and infringement notices
GPS positioning of vehicles	3	GPS positioning of council vehicles within various areas of council.
Car parking	3	Revenue stream from car and on street parking
Building security	3	Access to building tied to payroll personnel information.
Totes management	1	Monitor which customer has returned totes and those pending.
Costing exceptions (merchandise)	1	Hard copy reports (approximately 90) for costing exceptions have been replaced with “soft copies” that have been uploaded into the CaseWare application providing greater visibility in terms of when and how the exception has been actioned.
System privilege management	1	Monitoring who has super privileges in SAP and logs of activity
ABN checks	1	ABN checks for vendor and customer master files
Stock adjustments	1	Use of predictive analytics to determine whether stock adjustments are within an acceptable range. Adjustments outside of the acceptable range are flagged to the commercial manager.
GST	4	Reasonableness test of GST to ensure paying the right amount because of complex reciprocal tax arrangements with other government agencies.

4) *Changing working relationships: from audit to business improvement*

A change in working relationships between internal audit and business process owners was identified as a consequence and benefit of adopting CA in Case 1. Internal audit were cast in a new light in terms of assisting management identify operational benefits that could accrue from having more timely information about the effectiveness of controls and through predictive analytics. This changed perception was in contrast to the more 'traditional' view of internal audit "identifying errors."

"So all this assistance from audit in terms of continuous monitoring reports..., it's been a big help... I think this is probably more of what we've wanted from our audit teams... [Case 1 Comm Mgr]

v. Themes, implications and future research directions

Whilst the findings are preliminary, four key themes were identified.

A. *The multiplicity and messy nature of CA*

A common theme was the multiplicity of CA and the messy, iterative nature of its adoption and implementation. The way in which CA was framed and the labels used to describe it varied according to: who the users were, its purpose, technologies utilized, information types (eg. financial transactions, operational information), frequency and level of integration into audit and business routines. This has implications in terms of current guidance that commonly presents the process in a linear fashion that begins with developing a strategic plan and vision. No 'grand' visions or objectives for CA were present in the cases. Rather the nature of CA shifted and was negotiated through its use. These encounters presented new possibilities for CA and gave rise to 'new' and different assurance processes and practices where auditors played a central role as a translator and strategist.

B. *Developing and leveraging a data analytics capability, managing exceptions and multi-stakeholder interactions*

The importance of developing a data analytics capability was highlighted coupled with the challenge of managing the 'flood' of exceptions. A range of CA technologies and possibilities were presented that were simultaneously adapted and refined over time. One participant referring to them as "tools of the imagination." This has implications in terms of understanding the strategies, methods and technologies required to identify, design and build appropriate analytics and the necessary judgments required in determining what is a 'false positive' and 'false negative' and evaluating exceptions.

This also points towards the evolving role of the internal auditor from a focus on cyclical and control centric models to more risk centric and agile approaches requiring capabilities in IT, statistical analysis, multi-stakeholder interactions (business and IT), audit and change management. How are internal

auditors interpreting this 'new' role? How are these knowledge areas being accommodated in the curriculum of business schools and professional education? Such matters await further investigation.

C. *That information thing: Messy data, complex IT environments and information needs*

Data quality and availability was a common challenge. Accessing data sets that were complete and in a suitable format was challenging as data needed to be sourced from a variety of disparate legacy systems involving different custodians and at times political processes in traversing the IT obligatory passage point. In some cases large enterprise system implementations were also being undertaken at the same time.

In addition, matters relating to data privacy and security issues needed to be navigated in terms of organizing access to data as well as in terms of protecting data stored by auditors on servers that were not supported by their IT department. In one case further complexity arose because of laws restricting the storage of personally identifiable information, such as payroll, outside of Europe. This has implications in terms of developing appropriate information governance arrangements for audit 'data warehouses.'

The benefit of being able to provide more timely information to audit committees was cast against the challenge of what and how best to present the information. Dashboards and visualization techniques, such as charts, were highlighted as a suitable way forward. This has implications in terms of understanding the types of visualization technologies that will best assist in this process as well as the information needs of audit and risk committees. Such matters await further investigation.

D. *Senior management support and developing a strong business case*

Senior management support was identified across all the cases as critical in progressing CA initiatives requiring a strong business case. However, whilst efficiencies in automating and improving audit processes were recognized, it was difficult to quantify costs and benefits. There is currently limited guidance available to assist organisations evaluate their CA initiatives. Further research is required to develop an evaluation framework that will assist organisations in adopting and maintaining a sustainable CA program and assess related benefits and performance.

VI. Limitations and Conclusions

This paper set out to report on the preliminary findings of how CA is framed and how this influences actions around its adoption and implementation across six case studies. It is suggested that by improving our understanding of how organisations make sense of the messy and complex nature of CA, this will assist in understanding the challenges faced by auditors and business managers in developing and improving outcomes of CA initiatives.

The findings reported in this paper are not without limitations. Firstly, it represents a preliminary analysis of the first stage of coding. Secondly, of the six cases, only one (Case 1) represented the views of internal auditors and business managers as well as provided a longitudinal investigation. This to some degree reflects the more advanced stage of CA implementation at this case site compared with the others. Further research is required at each case site to examine how CA has evolved and the views of other stakeholders. Finally, the CA initiatives for each case site originated in the internal audit department. Additional case sites need to be identified where CA has originated in a business line area to examine more specifically CM and similarities and differences in its adoption and implementation.

It is hoped that this research, through its focus on how CA is experienced and constituted in practice, will enrich our theoretical understanding of CA in organisations and increase our appreciation of the challenges that practitioners face in this complex undertaking.

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