Continuous Auditing - The Future of Internal Audit?

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Abstract

Internal audit departments are more than ever before pressured to reduce costs and become more efficient. The use of IT has proven to be a suitable means to achieve this efficiency gain, but also holds limits in the audit area. One approach which tries to overcome these limits and has gained popularity over recent years is the concept of continuous auditing. Continuous auditing deals with the highly frequented or even continuous testing of diverse business activities by means of identifying exceptions or abnormalities, partly with assistance of technology. It may be applied to any kind of data and helps the auditor to focus his manual audit activities on areas with high risk. Despite its potential, we find that companies refrain from using continuous auditing on a large scale which is supported by a range of other studies. This is mostly because of its high implementation efforts and the limited availability of corporate data in digital form. Still, continuous auditing represents a promising supplement to traditional auditing which may more and more enter daily audit practice and change auditors' operational work towards a more automated, risk-oriented approach in near future.

Keywords: continuous auditing, internal audit, internal controls, risk management

Introduction

Although the general focus of internal audit work and its underlying objectives have more or less remained the same, auditing methods used by internal audit departments have advanced over time. Latest developments as the growing digitalization of business operations and the growing extent and diversity of data handled in these operations require from auditors to adjust their audit work and make use of sophisticated methods to handle these challenges. The usage of IT as audit support mechanism has become popular among the audit functions of many companies over the last decades and looks back at a considerable development.

The first steps towards IT usage in internal audit were already made in the 1960s when companies started developing and implementing audit modules which were embedded in legacy systems. As IT was a relatively young topic back then, administration of embedded audit modules was both costly and challenging. Therefore usage was not very wide-spread.

In the 1980s, computer-assisted audit tools and techniques (short: CAATTs) gained in popularity and were used for data analyses and ad hoc investigations. To a large extent, however, the audit profession lacked technical skills, suitable software tools, as well as the organisational will the overcome the challenges coming alongside with this new audit approach.

In the 1990s data analytic solutions were introduced and increasingly used by the internal audit function to verify data and controls. Despite the solutions' potential to analyse data and control on a large scale, auditors refrained from testing whole populations and kept relying of samples (Coderre, 2005).

Nowadays, companies are pressured to reduce costs wherever possible more than ever before. As this development applies to all departments of companies, internal auditors have to find efficient

solutions to reach their audit opinion without a loss in quality. The growing amount of corporate data and its increasing heterogeneity makes this task even more challenging.

One audit methodology which tries to tackle this challenge and increasingly enters businesses' practice is the concept of continuous auditing (short: CA). CA deals with the highly frequented or even ongoing testing of diverse business activities by means of identifying exceptions or abnormalities, partly with assistance of technology. The auditor is thereby directed to areas of increased risk for further (manual) audit activities. Areas without noted exceptions are left out of consideration for further actions. Thereby, it is possible to audit the full extent of a population (instead of only a sample as under the traditional audit approach). By this significant change in the audit approach itself, CA aims at leveraging internal auditing to a higher maturity level.

The academic article at hand focuses on the question in how far CA represents the future way of auditing. It will elaborate on the components of CA, its aims, its subareas, as well as its advantages and disadvantages. Also, it will explore where companies currently stand on their way from traditional auditing to continuous auditing.

Continuous Auditing in detail

Definition

The concept of CA was first introduced by Groomer and Murthy (1989) as well as by Vasarhelyi and Halper (1991) about 25 years ago. According to CIPA/AICPA (1999), this concept covers "a methodology that enables independent auditors to provide written assurance on a subject matter using a series of auditors' reports issued simultaneously with, or a short time after, the occurrence of events underlying the subject matter".

This definition implies several aspects. Using CA in an effective way presumes that the subject matter to be audited has previously been analysed in its design and that appropriate auditors' reports have been identified. Auditors' reports thereby take the form of measuring points (e.g. key performance indicators (short: KPIs), key risk indicators (short: KRIs)) and may focus on a set of selected controls, risks, or on data in general to verify a specific subject area. For each measuring point, target values need to be in place in order to serve as reference values for the factual measurement results at a later point in time. Both measuring points and target values have to be set in a way in that they enable the auditor to make proper conclusions about the subject matter's state. As this preparatory work is rather time- and cost-intense, it is advisable to concentrate on the most critical subject matters only and to choose not more measuring points per subject matter than ultimately necessary. Thereby, the specific amount of measuring points largely depends on the complexity of the subject matter and the degree of assurance to be achieved by the auditor.

The aim of providing written assurance to an addressee (usually top management, the board of directors, or the audit committee as part of the board of directors) as quoted in the definition of CA is the same as under any other audit approach. Also, the definition leaves open the degree of assurance to be provided. In general, assurance provided by continuous auditing may be reasonable or limited. However, due to the high initial input to implement CA, it is advisable to aim for limited assurance only and to complement CA with additional audit activities to achieve a higher level of assurance.

The definition also implies that auditors' reports are issued (i.e. evidence is gathered) simultaneously or shortly after the occurrence of events underlying the subject matter. Therefore, measurement of subject matter may need to take place in a highly frequented, if not continuous manner. CA per definition does not require IT to support the audit process, but computer assistance during the measurement process is highly recommendable to keep the methodology time- and cost-efficient.

In contrast to traditional auditing which features periodic reviews of only a sample of a subject matter, continuous auditing covers an ongoing audit testing of 100 % of all relevant data of a subject

matter. Thus, it provides auditors with an opportunity to go beyond the limits of traditional audit approaches and the limitations of sampling (Chan and Vasarhelyi 2011).

Subareas
According to Vasarhelyi (2011), CA comprises three subareas:

- Continuous Data Assurance
- Continuous Controls Monitoring
- Continuous Risk Management and Assessment

Continuous Controls Monitoring covers the ongoing assessment of internal controls. These controls may originate from different departments as finance, IT, accounting, or personnel and may cover different hierarchy levels. By using Continuous Controls Monitoring, the auditor obtains an early indication about the existence of potential weaknesses in theses departments, as well as in the departments' structures and processes. To identify any weaknesses, KPIs are used to measure whether controls have been executed and whether the execution was performed in line with time targets (Vasarhelyi, 2011).

Continuous Risk Management and Assessment refers to the activities used by auditors to identify and assess the levels of risk or changes to the level of risk. Thereby, KRIs (rather than KPIs) measure abnormalities in departments, processes, or IT systems. Most importantly, these KRIs need to be of forwards-looking character, i.e. they indicate developments which may cause a risk to arise or to change negatively in near future (Vasarhelyi, 2011).

Continuous Data Assurance includes all other activities by auditors to verify data on an ongoing basis. In most cases these analyses feature data at transaction or account level, but may also cover data from more aggregated levels. Thereby, Continuous Data Assurance uses KPIs to identify undesired developments in chosen subject matters which are not primarily considered as control or risk, e.g. continuous scans of master data changes, authorizations and parameters in IT systems, or transaction data (Vasarhelyi, 2011).

Due to the wide range of application areas, also the aims of CA can be manifold. In general, CA can follow the same objects as ordinary audits (e.g. financial audits, operational audits, compliance audits, forensic audits). Thereby, the ability of an internal audit department to rely of CA largely depends on the digital availability of subject matter data as well as of the objectives to be achieved by the audit (Abdolmohammadi and Sharbatouglie, 2005; IIA, 2013).

Procedure
Several approaches have been discussed in literature to introduce and operate CA. These range from high-level phase models to delicate process flows (e.g. Abdolmohammadi and Sharbatouglie, 2005; Mainardi, 2011; IIA, 2015). Few of these approaches also consider CA as some kind of ongoing cycle (e.g. Yeh and Shen, 2010). To work effectively, changes to companies as well as to their internal and external environments need to be accounted for frequently when using CA. Therefore, we agree with Yeh and Shen that CA is an ongoing cycle which constantly identifies potential for its own optimization.

Irrespective of the specific subarea CA is used for or its individual objective, this cycle approach can be broken apart into four phases following the plan-do-check-act cycle.

The *Plan*-phase is of decisive importance, especially during the first-time introduction of CA. During this initial phase, objectives to be achieved as well as the desired level of assurance to be obtained by using CA should be defined. Also, the subject matters to be analysed by CA need to be determined. These can range from specific detail matters to processes, IT systems, or complete departments and corporate functions. Choices made should be based on a medium- to long-term, risk-oriented audit planning. Subject matters which usually require an increased level of manual audit activities may be preferably chosen for CA as these offer an increased potential for efficiency gains.

In accordance to the previously set objectives, measuring points (i.e. KPIs/KRIs) need to be defined for each subject matter. These represent the basis for measurements performed at a later phase. The definition of KPIs/KRIs usually turns out to be a challenging task as their quality directly influences the explanatory power of CA results. As KPIs/KRIs express a specific matter in condensed form, valuable information which would have been gathered during a manual audit, may be lost. Auditors therefore tend to compensate for this risk by defining a considerably high amount of KPIs. Contrarily, the administration (i.e. the actual measurement) of KPIs/KRIs binds financial resources and should therefore be limited to a minimum. Thus, a general amount of measuring points is difficult to state as the extent of KPIs/KRIs depends on the complexity of the subject matter and the desired degree of assurance. To find a suitable solution, it is advisable to analyse the subject matter in its design before designing measuring points.

Moreover, appropriate measurement frequencies for data transmission need to be set. These do not necessarily be perfectly continuous, but should be in line with the CA objectives.

For each KPI/KRI, target values need to be defined which will later be used as reference to measured values. These target values should be set in a way that they allow the auditor to make meaningful conclusion about the audited subject matter. If target values are set too high or too low, exceptions may either me identified in excess (so-called *false positives*) or may not be identified at all.

Follow-up activities which are to be performed upon identification of an exception should be defined in this stage as well. In practice, it turns out useful to document these proceedings and provide them to the employees in charge of carrying out follow-up activities. Optimally, this documentation does not only include activities to be performed, but also points out responsibilities, time lines, etc.

The *Do*-phase includes the actual analysis and evaluation of data. In specific, KPIs/KRIs are determined based on collected data at previously defined points in time. The exact course of action depends on the previously set objectives and the extent of CA activities as well as on the company's technical capacity. It may comprise the following tasks:

- Data selection
- Data extraction
- Data storage
- Data harmonization
- Data preparation
- Data analysis

At first, required data needs to be identified at the place of origin. This identification may turn out to be rather challenging, if relevant data is part of a larger data set and not separated from irrelevant data. In this case, relevant data needs to be marked off before it can be used for further purposes. This delimitation may be based on different parameters (e.g. time, range, content, key words) and should be used to make the data selection as suitable as possible to what is needed for later analyses.

Selected data needs to be extracted and transferred to the entity performing the audit. Hereby, it must be ensured that original data is not changed and that only a duplicate of the original data is transferred. The audit entity may be an auditor (in case CA is performed manually), an audit module which is integrated in the legacy system holding the subject matter, or a separated audit system (Kuhn Jr. and Sutton, 2010). The transferal itself may vary from the auditor transferring data on a storage device to data being transmitted automatically via a technical interface between legacy system and audit module/system. Once transferred, data should be stored and not modelled in any way in the further process. Instead, data analyses should be done with further duplicates of the stored data. Before analyses may actually be performed, data needs to be prepared. This preparation may include steps as grouping, restructuring, or filtering. When data is drawn from different data sources or turns out to be heterogeneous by nature for any other reason, harmonization of data is an essential element

of this stage. Hereby, it is irrelevant whether CA is performed manually or automated (by means of an audit module or an audit system).

These single steps are not necessarily obligatory and may vary in order. If carried out manually, they steps usually turn out to be rather time-consuming. Using IT software to automate proceedings may therefore yield significant benefits.

After measurements have been made for each KPI/KRI, results can be compared to previously defined target values in the *Check*-phase. If tolerance levels were defined, these are to be considered accordingly. Depending on whether CA is performed in a manual or automated manner, results may be presented in various forms. In audit modules/systems, identified derivations between measured values and target values are usually shown as alerts. Some audit modules/systems also make use of traffic light diagrams (red, yellow, green) or two-level scales (pass, fail). Irrespective of the actual form, it is advisable to display results as clearly as possible to simplify identification of areas needing further attention.

Follow-up activities to be performed in the *Act*-phase may vary in form and extent and may range from analytical procedures to case-by-case activities as inspections, inquiries, observations, or reperformances. Findings won by these follow-up activities should be used for verifying previous results from CA activities as well as for reaching (or strengthening) audit opinions. Also, they should be used for optimising KPIs/KRIs, measuring frequencies, target values, and tolerance levels for future CA activities. Follow-up findings may also be useful to reevaluate subject matters' appropriateness for CA purposes. If adjustments are made to the CA methodology, corruption of previous results should be prevented.

CA adoption

Maturity models

In academic literature, some authors assume CA to be the ultimate maturity stage of internal audit (e.g. Chan and Vasarhelyi, 2011; Vasarhelyi, Alles, Kuenkaikaew, Littley, 2012). Thereby, the underlying assumption is that the internal audit function of a company matures over time and becomes more and more sophisticated in its structures and processes. Briefly speaking, maturity models used in literature mostly hold four (in some cases also five) stages, starting with uncoordinated audit activities and ending with strictly structured, automated audit activities (e.g. traditional – emerging – maturing – full continuous). To determine the maturity of an audit function and its belonging to a specific stage, several dimensions are quoted in literature. Among the most frequently mentioned dimensions are the following:

- Objectives
- Extent
- Time frame
- Data access
- Automation
- Audit and management overlap
- Diversity and management of audit subfunctions

The objective and the scope of auditing activities already give an indication about the maturity of an internal audit function. Traditional auditing usually includes a long-term planning which set forth single audits aiming at obtaining assurance about very specific subject matters. CA meanwhile aims at an area-wide coverage of a range of subject matters and only assumes detail testing to happen if exceptions are identified during previous CA analyses. Also, audit activities covering large data volumes may preferable be found in CA.

Traditional auditing is usually centred on drawing meaningful samples from a defined population. Therefore, audit results largely depend on the sample and may be distorted if sampling methods are

applied inappropriately or simply by sampling bias. CA overcomes these shortages by taking into consideration the full population and ensuring a 100% coverage.

The traditional audit approach may include periodic audits as well as irregular audits and ad hoc audits. Due to their nature, audit results are obtained some time after the event has occurred and therefore bear the risk of being obsolescent. Based on this time gap, unfavourable events may already have caused damage to the company without the auditor having the opportunity to counteract. CA, instead, is highly frequented or even follows a real-time frequency. Audit reports are provided to the auditor immediately or shortly after the event's occurrence. The auditor can therefore act on short notice and cure identified exceptions before it causes serious damage to the company.

The reputation of the internal audit function within a company largely determined the power it has over other departments and the extent it can push through its interest. Internal audit functions with limited internal power may face the problem of having only limited access to required data. This may be a result of other functions refusing to provide access or granting access only after formal requests (with upper management involvement) have been posed. Under CA, the audit function comprises of unlimited or almost unlimited access to all corporate data. If necessary, access to data is granted on short notices without much organisational resistance.

Traditional auditing makes only limited use of technology. For the most part, audit planning is done without IT assistance and audit activities are performed manually. Audit reports are typically stored in hard copy. The usage of technology generates large efficiency gains under CA and is therefore highly recommended. This IT usage is not limited to audit activities only, but may also cover audit planning at a previous phase as well as the audit documentation at a later phase.

Let alone any regular (obligatory) reportings of the internal audit function to management, the audit function operates independently from management under traditional auditing. Cooperation between these two parties hardly takes place and coordination of audit scopes or objectives in specific are rare. Under CA, audit activities go hand in hand with management's activities. Planning is largely harmonized, areas which are of less interest for management are preferable covered by the internal audit function. Due to this close integration, one function makes use of the other's results. Also, the audit function may verify management's activities.

Audit activities under tradition auditing are centred on financial aspects. Other aspects, e.g. IT, compliance, data security, are only audited with less priority. Also, if these „minor" areas are subject to an audit, this audit is largely independent from other audits and is seldom interlinked. The situation is the complete opposite under CA. Finance is not necessarily the central subject matter to be audited. Instead, audit activities are well spread over diverse topics and cover a wide range of areas as compliance, security, IT, and operational aspects. Audit activities are interlinked and complement each other in formulating an audit opinion.

Degree of CA adoption in practice

A lot of research has been undertaken to find out in how far companies have adopted CA and where they find themselves in diverse maturity models. As these studies differ considerably from each other in terms of research approach, used data, and timing, results vary significantly as well.

The studies by PricewaterhouseCoopers of 2006 as well as by ACL and the Institute of Internal Auditors (short: IIA) of 2009 indicate that the use of continuous auditing in practice is wide-spread. However, as both studies do not provide a deep insight into the actual intensity of continuous auditing usage, these articles leave some doubt in regard to the representativeness of their findings.

Vasarhelyi, Alles, Kuenkaikaew, Littley (2012) also dealt with this issue and, amongst others, brought forwards the objective to find out about the state of adoption and implementation of continuous auditing systems by internal auditors. On a general level, the authors conclude that companies which had participated in their survey find themselves between stages 1 (traditional) and 2 (emerging) in regard to the level of continuous auditing adoption which clearly contradicts the

findings of the PricewaterhouseCoopers study and the ACL/IIA study. Given this observation, they conclude that perceived usefulness of continuous auditing is rather low.

In their article of 2012, Gonzalez, Sharma, Valletta primarily deal with the antecedents of the use of continuous auditing in the internal audit context, but also analyse the extent of usage of CA. By performing a regression analysis they find that only few companies have continuous auditing fully implemented.

Our experience from the practical field in Germany reflects the rather low implementation rate of CA. Many companies we have worked with over recent years have implemented IT tools to analyse subject matters as part of their audit activities. Mostly we find that these tools are used in irregular intervals based on specific needs as part of scheduled audits (e.g. fraud or authorization scans for specific divisions or departments). However, only in very rare cases companies apply these tools as part of ongoing/continuous audit activities or to provide real-time assurance. Notably, the implementation rate is relatively higher at larger companies than at medium and small companies.

In various talks with members of the internal audit function, we verified the reasons for the low implementation rate and concluded a range of factors hindering the spread of CA. Mostly quoted, the initial implementation of CA requires a high level of cost and time. Before KPIs/KRIs can be defined as basis for measurements, it is recommendable to analyse the subject matter in its design. Otherwise, KPIs/KRIs may lack in precision and may fail the meet CA objectives. Also, target values may not be set appropriately, leading to either exceptions not being identified or to events being identified and labelled as exception while in fact they are unsuspicious. Also, some companies figured that digitalization of their structures and processes had not advanced far enough to enable data to be provided on an ongoing basis. Other companies meanwhile lacked of monetary funds to finance the acquisition or development of an IT system to support CA. In rare cases the audit function saw itself not experienced and knowledgeable enough to tackle the challenges accompanying the implementation and maintenance of CA (e.g. missing experience with specialized IT systems).

Conclusion

Used in an integrated manner, CA enables auditors to identify and remedy weaknesses. Moreover, it turns out to be more time- and cost-efficient than the traditional audit approach. CA features audit coverage of full data populations and therefore overcomes sampling bias of traditional auditing. Before CA is implemented, it is highly recommended to analyse subject matters in their designs in order to ensure a proper definition of measuring points. Among all involved employees, these analyses increase the general understanding of the companies' internal structures and processes as well as their external environments. Also, using KPIs/KRIs allows the auditor to focus on critical areas in a risk-oriented manner which frees resources bound to other areas under the traditional audit approach.

However, these benefits come at a cost. Irrespective of the specific architecture (embedded audit modules, separate audit systems), using IT for CA purposes requires investments for acquisition or development of software as well as for maintaining and updating software in regular intervals. While the IT systems only display auditors' knowledge and experience, the auditor needs to be knowledgeable about subject matters to be audited. This implies that the auditor keeps spending time on analysing subject matters even after the initial CA implementation in order to continuously guarantee a proper definition of measuring points, target values etc. Thereby, the auditor's IT affinity plays a decisive role. During the initial implementation of CA, efforts to be taken may turn out to be higher than under regular usage in later years.

Still, CA includes elements showing promise to make the audit function both more effective and more efficient in future. Given the rather high challenges during its implementation, most companies will refrain from introducing CA for all performed audit activities at once. Correspondingly, benefits generated from the use of CA will not be reached on a short-term basis, but are the result of a

constant step-by-step process towards a higher level of automation and an increased concentration on risk.

Provided that manual audit activities will remain necessary, especially as part of follow up-activities during the *Act*-phase, CA does not represent a completely true alternative of traditional auditing. However, it does represent a valuable complement to traditional auditing which will significantly change the internal audit function. Manual and continuous auditing activities will become more interrelated over time. Manual activities by the auditor will be highly dependent on results of CA and vice versa. This will also impact the auditor in his daily working routines. Focus will shift from highly operational activities as single-case reviews and analyses to more analytical activities as audit planning, managing KPIs/KRIs, and technology handling. Moreover, risk will even more be the leading factor of choosing audit subject matters.

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