![KPMG logo — cutting through complexity]

ADVISORY SERVICES

Transforming Internal Audit:
A Maturity Model from
Data Analytics to
Continuous Assurance

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Executive summary

If you're traveling down a path that never reaches its destination, would you stay on the same path or would you try a different approach? It's a question worth asking, especially when it comes to data analytics-enabled auditing.

Although the benefits of data analytics-enabled auditing are well known, many organizations have been unable to realize them. The primary reasons may lie in their approach. Most organizations take a *tactical and technical'* approach toward leveraging data analytics in planning and executing audits. This includes buying sophisticated software tools and hiring specialists to run analytics and expecting that to be sufficient to achieve data analytics-enabled auditing across their audit universe. But to be truly effective and sustainable, data analytics-enabled auditing requires more than proceeding with business-as-usual and adding some tactical and technical data analytic capabilities.

While technical skills and tools are surely important to the process, organizations need to take a more *strategic* approach to implement, sustain, and expand data analytics-enabled auditing. This may require transforming the way you plan, execute, and report audits, including your relationships with business stakeholders. The key is to focus on your audit methodology, or approach, not just your technical capabilities.

This paper provides a multi-dimensional reference model to illustrate how to take a transformative approach toward audit planning and execution in order to implement sustainable data analytics-enabled auditing. In the examples provided, we've modified a traditional internal audit methodology by integrating analytics and highlighting characteristics throughout each phase. This can help serve as a reference on how and where you can modify your internal audit methodology. We've then taken it a step further by applying a maturity model as an overlay to the methodology.

The maturity model, seen through the lens of an internal audit methodology, is designed to illustrate that there are many data analytics-enabled auditing characteristics across our five phases of an audit methodology at each of the five proposed maturity levels. As you will see in the following pages, the maturity model serves as a reference to highlight specific data analytics-enabled auditing characteristics from a very basic level of maturity through a very mature level for each phase of the audit methodology. Knowing these characteristics may assist you on your journey to transform your audit methodology, or approach, to include data analytics in order to reach your desired ultimate internal audit destination.
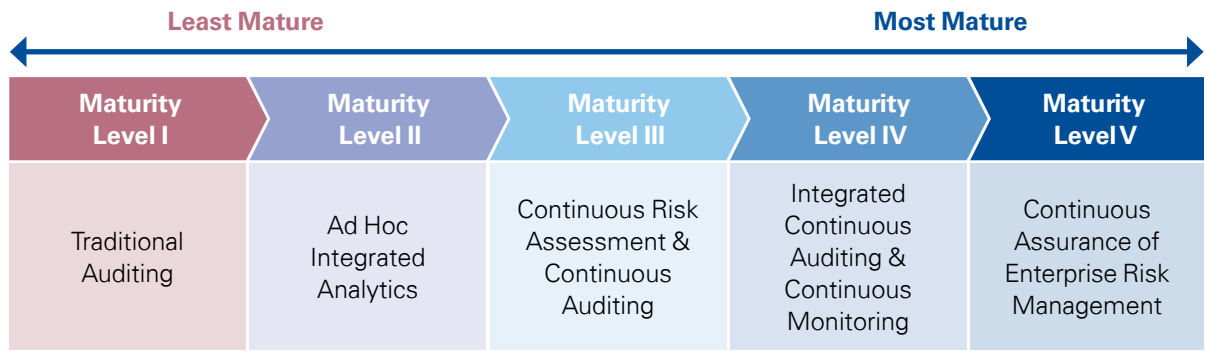
Making the journey

Does your internal audit approach add value to senior management's view of business risk and strategic goals? What role does internal audit play in the assessment of risks that directly impact your organization's ability to achieve its strategic goals? Is the internal audit department a partner in developing the strategic priorities and vision of the company? Does internal audit's methodology effectively leverage data analytics in order to continually assess the risks that would inhibit the achievement of the organization's strategic goals? Regarding the risks identified, how does your approach determine how audits are identified, planned and executed? If the answers to these questions are unclear within your internal audit department, you're certainly not alone.

The continuous assurance of enterprise risk management[1] (as noted in Maturity Level V in the chart below) is an ambitious goal for internal audit departments, many of which are still seeking to achieve a state of integrated or sustained data analytics, continuous risk assessment and continuous auditing processes. Truth be told, repeatable and sustainable data analytics and continuous auditing processes remain a top goal for many internal audit departments and senior management, but most organizations are still in their infancy or planning stages when it comes to actual execution.

As internal audit departments seek to advance their approach, the use of a maturity model can help benchmark the department, using a few basic characteristics (an example of which can be found on page 6), to provide a clear path toward achieving data analytics-enabled internal auditing, continuous auditing, and beyond. Rooted in an internal audit methodology, the maturity model serves as a guide along the journey from traditional internal audit models toward more mature levels of continuous auditing, and through to the continuous assurance of enterprise risk management – an ultimate goal of internal audit, as well as, most enterprises and their executive management. A key first step within the maturity model is the successful integration of data analytics.

An overview of maturity levels
The maturity model below represents the stages of maturity from the least mature state of traditional auditing through to the most mature state of continuous assurance of enterprise risk management.

Least Mature   **Most Mature**

Maturity Level I	Maturity Level II	Maturity Level III	Maturity Level IV	Maturity Level V
Traditional Auditing	Ad Hoc Integrated Analytics	Continuous Risk Assessment & Continuous Auditing	Integrated Continuous Auditing & Continuous Monitoring	Continuous Assurance of Enterprise Risk Management

Continuous Assurance is a progressive shift in audit practices towards the maximum possible degree of audit automation as a way of taking advantage of the technological basis of the modern entity in order to reduce audit costs and increase audit automation. Given the emphasis on the transformation of the entire system of auditing, the development of Continuous Assurance requires a fundamental rethink of all aspects of auditing, from the way in which data is made available to the auditor, to the kinds of tests the auditor conducts, how abnormalities are dealt with, what kinds of reports are issued, how often and to whom they are issued, and many other factors, the importance of some of which will only become apparent as Continuous Assurance is implemented. "Continuous Assurance for the Now Economy", Rutgers Business School, February 2010.

While many internal audit departments may have already added the use of data analytics in the planning, scoping, and execution of audits, many have done so in an *ad hoc* fashion – using one or two technical resources for one or more isolated areas of audit focus. As a result, these internal audit departments are just skimming the surface and are underutilizing the full potential of data analytics by failing to radiate this powerful capability across their departments and their audit universe.

Here lies the fundamental problem. Most organizations have not considered the use of data analytics or continuous auditing in relation to the department's internal audit methodology, including a transformation of how audits are planned, executed, and reported. For example, most internal audit methodologies do not connect or integrate the use of data analytics or continuous auditing throughout the various phases of an audit cycle. Hence, data analytics becomes more of a bolt-on activity, which departments try to sustain by building a "technical" capability, rather than a strategic enabler integrated into the fabric of the audit process.

By not integrating data analytics within the internal audit process to guide the department in planning and executing audits, internal audit departments struggle with implementing the use of data analytics. Even if they have implemented its use, those same departments have struggled with expanding its use beyond one or two resources, beyond one or two audit areas, or beyond use on an infrequent basis. Further, when its use is concentrated with one or two key resources, and those resources leave the department, use of data analytics frequently stops. Consequently, the results generated from traditional *ad hoc* analytics ultimately do not have a significant impact on the departments' audit approach because of this lack of integration into the overall audit process.

As a result, there continues to be a barrier in the way that internal audit departments are leveraging data analytics, which can be overcome by fundamentally transforming the audit process via a new audit approach, or methodology. A maturity path may help to effectively initiate and advance the use of data analytics and continuous auditing.

By starting with the phases of a common internal audit methodology and identifying the characteristics at different levels of maturity, an organization can identify logical integration points for repeatable and sustainable data analytics, continuous auditing, and other related initiatives. The result is a new internal audit methodology adapted to represent data analytics-enabled internal auditing at each phase of the audit process.

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The value of identifying maturity levels

The first step on your transformation journey toward achieving data analytics-enabled auditing involves *identifying your current level of maturity*. Knowing your current maturity level is necessary to determine gaps within the approach that need to be addressed in order to reach the desired future state. Not every organization requires the same level of maturity in their data analytics or continuous auditing processes. It depends on a number of factors including, for example, the needs and goals of the enterprise, the ambitions and permissions of the chief audit executive, the nature of the enterprise's business, and the regulatory environment in which the enterprise operates now and in the future.

Establishing where your internal audit organization stands requires comparison with a reference maturity model, which includes clear levels of maturity, for each phase of the audit process, with consideration of a variety of people, process, and technology factors. The purpose of such a comparison, or gap assessment, is to help identify the desired future state maturity level that is right for your internal audit organization, the gaps between the current and future states, and to enable building a strategy to achieve the desired future maturity state. Moreover, the model serves as a mechanism to measure progress along the way.

KPMG has developed the following reference maturity model to illustrate the application of data analytics and their related characteristics for each phase of the audit methodology and how they may vary at different maturity levels.

Defining analytic capabilities

Analytical capabilities can be defined and organized into the following four categories of capability: Descriptive, Diagnostic, Predictive and Prescriptive. You will need to manage the capabilities as a portfolio. See "Advanced Analytics: Predictive, Collaborative and Pervasive."

Descriptive analytical capabilities: Descriptive analysis/models provide information about the state of events, trends, patterns and relationships in the existing data and provide the basis for models which may be used to find variance to patterns in new data. (Note: With descriptive models, there is no response [dependent] variable that you are trying to predict the value of.) The typical kind of analytic question answered is "What happened or what is happening right now and how does it relate to historical patterns?"

Diagnostic analytical capabilities: These types of analysis are developed to understand the causes of an outcome, often in the context of a process or related events. Various techniques and models can be used to abstract and account for dependencies among causal factors. Typical kinds of insight provide by this sort of analysis include answers to the business question "Why did it happen?"

Predictive analytical capabilities: These types of analysis are developed for predicting the values of one or more response (dependent) variables from the values of predictor (independent) variables in the dataset. Predictive models use historical data with known responses to develop (or estimate) a model that can be used to predict values for new data. These sorts of capability are needed to support leading performance measures: e.g., "What will happen?" and "What is likely to happen?"

Prescriptive analytical capabilities: Prescriptive models and analysis are used to develop a course of action (adaptation) in response to an event or series of events. A prescriptive model can be used to define and articulate the ideal process to follow to address or respond to an event. Given that a certain action or event has taken place, the prescriptive model can be used to find the best response. This kind of analysis can answer business questions such as "What is the recommended next action?"

Source: Best Practices in Analytics: Integrating Analytical Capabilities and Process Flows, Gartner, March 2012

Internal audit data analytics and continuous auditing maturity model

Audit Methodology-based Maturity Model

Maturity Levels	Level I	Level II	Level III	Level IV	Level V
IA Methodology	Traditional Auditing	Ad Hoc Integrated Analytics	Continuous Risk Assessment & Continuous Auditing	Integrated Continuous Auditing & Continuous Monitoring	Continuous Assurance of Enterprise Risk Management
Strategic Analysis	○	○	◑	◑	●
Enterprise Risk Assessment	○	○	◑	◑	●
Internal Audit Plan Development	○	◑	◑	●	●
Execution and Reporting	◑	◑	●	●	●
Continuous Improvement	○	○	○	◑	●
Types of Data Analytics Applicable	Descriptive	Descriptive, Diagnostic	Descriptive, Diagnostic, Predictive	Descriptive, Diagnostic, Predictive, Prescriptive	Descriptive, Diagnostic, Predictive, Prescriptive

○ Data Analytics are generally not used   ◑ Data Analytics are partially used but are sub-optimized   ● Data Analytics are effectively and consistently used (optimized)

Many organizations have an interest in expanding data analytics and moving beyond the traditional auditing process toward repeatable and sustainable data analytics-enabled auditing, quantitative-based continuous risk assessment for dynamic audit planning and continuous auditing. Others may seek additional value through the integration of continuous auditing and continuous monitoring functions. And the truly ambitious will go further and seek to achieve full maturity to achieve the continuous assurance of enterprise risk management.

The authors do not mean to suggest that CA needs to be in place before or in order for CM to be in place. CM can be implemented by management independent of internal audit. However, if both CA and CM are in place, they should be integrated – which is the focus of Maturity Level IV.

Using the maturity model to lay the groundwork, an internal audit organization will need to evaluate its current internal audit methodology for audit planning, execution, and reporting. The early phases of a typical internal audit methodology should include strategic analysis and enterprise risk assessment. Strategic analysis provides an initial understanding of an organization's business from a top-down perspective and offers a framework to help identify organizational and industry issues, strategic objectives and challenges. Next, an enterprise risk assessment is necessary to gain insight into the risks that may threaten a company's achievement of business and strategic objectives.

For illustrative purposes, we are focusing the following pages on two select phases of the internal audit methodology – *internal audit plan development and execution and reporting* – to highlight the application of, and characteristics relating to the integration of, data analytics within the reference maturity model.

Internal audit plan development at various maturity levels

Internal audit plan development should be based on the prioritization of the risks identified during the enterprise risk assessment phase of an audit methodology. Internal audit plan development involves defining the operational, financial and strategic risks that need to be addressed through the execution of the internal audit plan, including the approximate resources necessary to accomplish the scope, and provides a basis for an organization to monitor progress and performance. The use of analytics-enabled auditing characteristics at this phase increases as you move from a very basic level of maturity (Maturity Level I) through to a very mature level (Maturity Level V) as represented in the chart below.

Internal Audit Data Analytics and Continuous Auditing Maturity Model	Maturity Level I Traditional Auditing	Maturity Level II Ad Hoc Integrated Analytics	Maturity Level III Continuous Risk Assessment & Continuous Auditing	Maturity Level IV Integrated Continuous Auditing & Continuous Monitoring	Maturity Level V Continuous Assurance of Enterprise Risk Management
Internal Audit Plan Development	• Limited use of descriptive data analytics	• Use of management reporting underlying data to perform broad descriptive data analytics (i.e. benchmarking) • Use of analytics may include descriptive and some diagnostic	• A predefined set of analytics is established to identify and prioritize risk • Automated extract, transform, and load (ETL), analytics and reporting • Use of analytics may include prescriptive, diagnostic, and some predictive	• Management systems are leveraged to enable continuous assessment and prioritization of business risks • System generated analytics and dashboards are monitored by the business against specified risk criteria • Predictive and prescriptive analytics may be added to the descriptive and diagnostic	• The Enterprises strategic goal and objectives are aligned with risk management practices • Strategic objectives and risks to those objectives are monitored and prioritized on a continuous basis • IA Plan is dynamic and able to react to changes in the business • Consistent use of analytics including descriptive, diagnostic, predictive and prescriptive

Internal Audit Plan Development at Maturity Levels **I** *and* **II**

In traditional internal audit methodologies (*Maturity Level I*), data analytics are not typically utilized to develop the audit plan. At the next maturity level of ad hoc analytics *(Maturity Level II)*, internal audit may use some high level quantitative measures, such as financial statement trends and industry benchmarking, in conjunction with the traditional qualitative approach. The quantitative measures are utilized to confirm and validate the risks and areas of focus identified during the qualitative/traditional planning process. This type of identification and prioritization typically occurs on an annual basis.

Internal Audit Plan Development at Maturity Level **III**

During the third maturity level of continuous risk assessment and continuous auditing *(Maturity Level III)*, internal audit monitors a number of quantitative measures that provide insights to changes in the business, control weaknesses and business performance. The quantitative and qualitative measures are aligned with priority business risks and internal audit evaluates these quantitative and qualitative measures regularly throughout the year on a quarterly or monthly basis. Business risks and audit areas are re-prioritized in accordance with the business risk profile. In addition, the assurance of risk appetite[1] and coverage is further refined and enhanced using data analytics. The types of analytics used may include descriptive, diagnostic and even some predictive. The analytics utilized identify risks that are outside of established risk appetite parameters and the analysis is performed more frequently at determined time intervals. At this third maturity level, evolving events in the regulatory and risk environment are considered near real time for impact to the business and for business response to the change in the environment.

Internal Audit Plan Development at Maturity Level **IV**

The next maturity level to consider is continuous auditing and continuous monitoring *(Maturity Level IV)*. At this fourth maturity level, project planning during internal plan development involves many key business processes that leverage business intelligence and continuous monitoring techniques to evaluate business risk and financial and operational results. Analytics include both internal and external data and results are benchmarked against leading practices. Internal audit leverages the business' continuous monitoring process and output to identify audit trigger events and re-prioritize risks at appropriate intervals (e.g., monthly, quarterly, etc.). The assurance of risk appetite and coverage is further refined and enhanced using data analytics. Predictive analytics may be used more extensively and prescriptive analytics may be introduced. Data analytics are system generated from within the business units to enable audits to be added, accelerated, dropped, or deferred (i.e., dynamic audit planning). Audit plans are dynamically created using a number of variables, including key performance indicators (KPIs), key risk indicators (KRIs), and historical results prior audits.

Internal Audit Plan Development at Maturity Level **V**

In the ultimate maturity level of continuous assurance of enterprise risk management (*Maturity Level V*), internal audit plan development would involve the monitoring of an enterprise's strategic and business process risks using business intelligence and continuous monitoring techniques. The risks and performance indicators are continuously reconciled to an enterprise's strategic business objectives. The strategic risk factors include both internal and external factors that may inhibit the achievement of the strategy and the analysis of the changes in risk drives the prioritization of audit areas on a continuous basis at predetermined intervals (e.g., daily, weekly, monthly, etc.). This level of maturity is characterized by a more expansive and consistent use of advanced analytics including predictive and prescriptive analytics.

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[1] Risk appetite is generally regarded as the amount of risk that a company is willing to assume over a period of time and in the pursuit of its mission, *Turning Risk into Advantage: A Case Study*, KPMG LLP (2011)

Execution and reporting at various maturity levels

Within an internal audit methodology, execution and reporting involves the scoping of each audit, creating and executing the audit steps, conducting the business process analysis, identification of control gaps to be considered or evaluated, and the documentation of audit evidence and reporting of any findings. The use of analytics-enabled auditing characteristics at this phase increases as you move up from each of the five maturity levels as shown in the chart below.

Internal Audit Data Analytics and Continuous Auditing Maturity Model	Maturity Level I Traditional Auditing	Maturity Level II Ad Hoc Integrated Analytics	Maturity Level III Continuous Risk Assessment & Continuous Auditing	Maturity Level IV Integrated Continuous Auditing & Continuous Monitoring	Maturity Level V Continuous Assurance of Enterprise Risk Management
Execution and Reporting	• Data Analytics are not utilized to drive the execution of the audit plan in traditional auditing	• Ad hoc data analytics are utilized to identify outlying transactions or to assist in scoping the audit. • Use of analytics may include descriptive and some diagnostic	• Key business processes have automated analytics ready for the auditor during planning to scope and focus audit efforts. • Data analytic enabled audit programs • Use of analytics may include prescriptive, diagnostic, and some predictive	• Automated Auditing techniques achieve several audit objectives based on "exception" auditing. • Internal Audit is connected to the same data and reporting as management and assesses the quality of the data and the analytics monitored by the business. • Predictive and prescriptive analytics may be added to the descriptive and diagnostic	• Audit procedures are designed to verify the underlying data analysis and reporting of risk at the business level to ensure that they are aligned with the Enterprise strategic goals and objectives. • Automated auditing is focused on root cause analysis and management's responses to risks including business anomalies and trigger events. • Consistent use of analytics including descriptive, diagnostic, predictive and prescriptive

Execution and Reporting at Maturity Levels I *and* II

This phase of an internal audit methodology is focused on the identification and communication of findings and performance improvement opportunities using formal documentation and meetings with various constituent groups such as the audit committee, senior management, process owners, and other stakeholders to communicate the results of the internal audit work. This drives change that contribute to the achievement of the enterprise's strategic and business objectives. During the execution and reporting phase, auditors typically review financial statements, management reporting, prior audit reports, performance and risk indicators affected by the process to gain an understanding of the business process. In traditional auditing (*Maturity Level I*), data analytics are generally not utilized to drive the execution of the audit plan. In *Maturity Level II*, ad hoc data analytics help to identify outlier transactions and focus audit scope. The analytics are descriptive in nature and their results guide the walkthrough procedures focusing on identified gaps, and the prioritization of the measure and analyze procedures.

Execution and Reporting at Maturity Level III

Execution and reporting at the continuous risk assessment and continuous auditing maturity level (*Maturity Level III*) would include key business processes with automated analytics generated for the auditor during planning in order to scope and focus audit efforts.

As part of the execution and reporting methodology phase, internal audit actively reviews performance and risk indicators, benchmark comparisons and external information. Data is readily available, analytics are descriptive, diagnostic, and even some predictive with some analytics being pre-packaged. The analytic results focus the walkthrough procedures and the prioritization of measure and analyze procedures. Internal audit utilizes data analytics-enabled audit programs to expand audit coverage and improve auditing efficiency and effectiveness. Most data is readily available to the auditor and is validated during audit execution. Root cause is investigated through the data and verified by inquiry. The data and results are available and verified by the business process owners.

Execution and Reporting at Maturity Level IV

In *Maturity Level IV* (integrated continuous auditing and continuous monitoring), the business process owners monitor performance and risk indicators for the business processes during project planning. The audit team leverages the business' monitoring and performs independent analyses on the monitoring output to identify trends and prioritize areas to focus audit efforts.

Internal audit is now connected to the same data and reporting as management. Internal audit assesses the data quality and the analytics monitored by the business. Continuing with the process analysis area of the execution and reporting phase as an example, internal audit performs analyses of the results from management's monitoring process to gain an understanding of how well risks are monitored and controlled. System event logs and process sequencing are analyzed. In addition to descriptive and diagnostic analytics, predictive analytics may be used more extensively, prescriptive analytics may be introduced, and the analytics may be programmed or even automated. The analytic results guide walkthrough procedures and the prioritization of the measure and analyze procedures.

Internal audit can then leverage the analytics and monitoring performed by the business and data quality is regularly validated. Automated auditing techniques achieve several audit objectives based on "exception" auditing. This type of auditing is performed on a continuous basis rather than only when an audit is scheduled. These audit programs allow internal audit to gain increasing efficiencies and to expand audit coverage. The audit team interprets, analyzes, and challenges the results of the analytics. The root cause is investigated through the data and verified by management through inquiry and the exceptions and results are verified by the business process owners.

Execution and Reporting at Maturity Level V

The next maturity level, which can be viewed as the ultimate objective of internal audit organizations, is the continuous assurance of enterprise risk management (*Maturity Level V*). The execution and reporting methodology phase at this level includes project planning in which business monitoring and audit's procedures rely on the same processes, technology, data and information. The auditor performs procedures verifying the underlying data analytics and reporting are aligned with the strategic objectives. The audit scope is fluid, focusing on root cause analysis and management's effectiveness at monitoring and responding to risks.

Continuing to look at process analysis as an example, at this maturity level, process analysis involves data analytics that are executed by the enterprise's systems to continuously verify that certain risk tolerances are not exceeded. This level of maturity is characterized by a more expansive and consistent use of advanced analytics including predictive and prescriptive analytics. The business risks are reconciled to the entity level key strategic risks on a continuous basis. A technology-enabled process analyzes internal and external quantitative and qualitative data such as competitive landscape information, new regulations, economic trends, etc., and detects any risks that may impede the achievement of the organization's strategic goals. Data trending information for certain key processes and controls are available to senior level management and enhanced and dynamic reporting of results are available for management's and internal audit's review and response.

At this final maturity level, automated auditing is used and is focused on management's responses to business anomalies and trigger events. Internal audit verifies the reconciliation of the business' monitoring of process risks and controls with the entity's strategic level risks on a continuous basis. Senior Management provides insights to organizational and people management by interpreting and analyzing the results. Root cause investigations and recommendations focus on management process improvements and exceptions and results are discussed and verified by the business process owners.

Challenges

Each level of maturity contains its own set of challenges. Some may be more predictable than others, but it's critical to recognize the difficulties experienced by others to appropriately prepare and avoid them. Some typical pitfalls that may derail data analytics-enabled auditing and continuous auditing initiatives include the following:

General
- Determining and establishing consensus on objectives and success criteria.
- Measuring and demonstrating success.
- Limited resources (technology and human know how).

Data Availability and Quality
- Lack of access to data
- Disparate information systems with different data formats.
- Incomplete data sets, inconsistent data quality.
- Data privacy/security issues to navigate.

Data Analytics
- Inability to effectively leverage data analytics to achieve audit objectives.
- Definition of "exception;" addressing "false positives" and "false negatives".
- Workflow around exception resolution; managing volumes of exceptions.

Change Management
- Managing impact of data analytics, continuous auditing, and continuous monitoring processes on auditors and business process owners.

Conclusion

Many internal audit departments are thinking about data analytics-enabled auditing and continuous auditing processes strictly from a tactical approach while not considering the advantages created through the integration of data analytics and continuous auditing throughout an internal audit methodology. However, there are tremendous benefits to be realized by thinking more strategically and transforming how internal audit departments plan and execute audits through the use of repeatable and sustainable data analytics-enabled auditing; quantitative-based continuous risk assessment for dynamic audit planning; and continuous auditing. This transformation requires more than just developing technical capabilities to perform data analytics. It involves reevaluating and, where necessary, modifying the internal audit methodology being used by the entire internal audit department to create a *strategic* approach to implement, sustain, and expand data analytics-enabled auditing and other related initiatives such as continuous auditing, continuous monitoring, and even continuous assurance. Finally, acceptance and support from management and key business stakeholders is critical to ensuring that internal audit's transformation efforts remain relevant and valuable to the business.
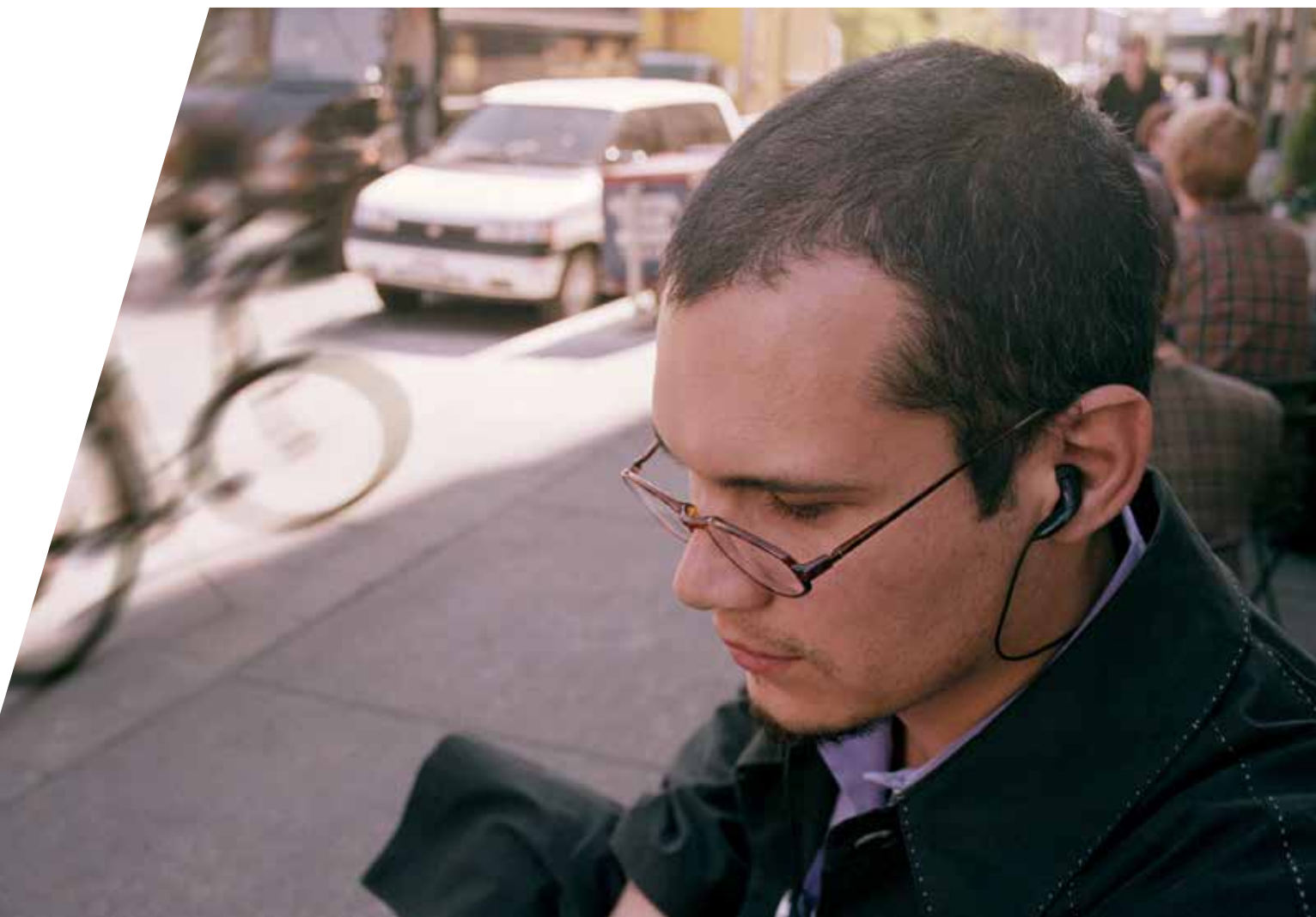
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