GLOBAL PERSPECTIVES & INSIGHTS

Data Analytics

PART 1: Literacy, Governance, and Management

PART 2: Gathering, Analyzing, and Visualizing Data

PART 3: Developing a Resilient Data Analytics Strategy

The Institute of Internal Auditors

PART 1

Literacy, Governance, and Management

About the Experts

Steve Mar

Steve Mar has had a long career in auditing technology (IT audit) and information security. He specializes in assessing information security, new systems development, and technology infrastructure risks and controls. He led and developed IT audit teams for Nordstrom, Resources Global, Microsoft, Deloitte, KPMG, and Bank of America, as well as written books and given presentations on technical auditing. Today, he works as the director for Intraprise TechKnowlogies, LLC while also teaching as an adjunct professor at Seattle University.

Trent Russell

Trent Russell is the Founder of Greenskies Analytics and the host of The Audit Podcast. He graduated from the University of Alabama with an MIS degree before joining Ernst & Young's (EY's) IT risk assurance practice, where he served multiple industries. He later joined the financial service office at EY and facilitated the development of data analytics procedures.

Introduction

Adapting to a new data frontier

Since the days before computers, even as far back as when businesses could be run out of horse buggies, people have relied on data to make strategic decisions about their companies. The difference between then and now is the sheer volume of detailed, extraordinarily complex data that modern technology can collect for us. According to a recent study from SeedScientific, it is estimated that there is currently approximately 44 zettabytes of data in the world. For a bit of perspective, one zettabyte equals enough storage to download about 500 billion full-length movies.

By 2025, SeedScientific estimates that the world's data output will reach 175 zettabytes. Although not all of this data is relevant for any significant purpose, let alone relevant to a particular organization or industry, it does speak to the wealth of information available for people and entities to analyze — should they so choose.

Today, data analytics — the formal term for examining data sets to find trends and draw conclusions — is a key component of virtually all business strategies impacting all levels, from executive management decisions down to frontline workers. This means it must be a fundamental part of the internal audit universe as well, both as a tool and as a focus (directly or indirectly) of audits. In this Global Knowledge Brief, the first in a three-part series on data analytics, we will provide an overview of the forms data takes in today's business landscape, as well as how this data must be accounted for in an effective data governance and management strategy. Without a foundational understanding of these topics, internal audit will find providing independent assurance over this critical area next to impossible.

What Is Data?

Know your risk

The forms of data

When people hear the term "data," they likely envision strings of numbers scrolling down a computer screen, perhaps in an extensive spreadsheet or table. That is certainly one form, but the term data goes far, far beyond that image. Indeed, data is any kind of information that can be collected and analyzed.

"To understate all it can encompass, data can come in the form of a tweet or a social media feed, which would be a form of what some people would call public data," said Trent Russell, founder of Greenskies Analytics and host of The Audit Podcast. "It could be on a cloud system, or it could be in paper form. It could be customer trend reports; it could be revenue reports; it could be time data collected and stored by machines on a factory floor. It's a nearly endless list, generally speaking."

There are a few basic data categorizations that can help narrow the list. In 2018, Forbes published a list of 13 data categories, among them:

1. **Big Data**. Refers to the incredible amount of data that will not practically fit into a standard (relational) database for analysis and processing caused by the huge volumes of information created by human and machine-generated processes.
2. **Structured, unstructured, and semi-structured data.** Some data have a level of pre-defined composition and are stored somewhere in some kind of format. Other data, however, such as an organization's social media feed, does not have a composition that fits neatly into such paradigms.
3. **Time-stamped data.** Some data have a concept of time ordering defining the sequence that each data point was either captured (event time) or collected (processed time).
4. **Open data.** Data freely available to anyone in terms of its use (the chance to apply analytics to it) and rights to republish without restrictions from copyright, patents, or other mechanisms of control.
5. **Machine data.** This refers to the digital exhaust created by the technologies and infrastructure powering modern business. Some examples include application programming interfaces (APIs), security endpoints, message queues, change events, cloud applications, call detail records, and sensor data from industrial systems.
6. **Real-time data.** A term to refer to data collected by the instantaneous computing that happens about as fast as a human can perceive.
7. **Dark data.** Digital information that is not being used and lies dormant in some form.[1]

[1]. Adrian Bridgewater, "The 13 Types of Data," Forbes, July 5, 2018, https://www.forbes.com/sites/adrianbridgwater/2018/07/05/the-13-types-of-data/?sh=779ec9723362,

Data Governance and Management

What a sound data strategy looks like

Know your business

Luckily, organizations do not have to have a firm grasp on all possible kinds of available data — a task that in the modern world borders on the impossible. Instead, the more important task for organizations looking to invest in data analytics is to identify the data most relevant to them. The larger the pool of available data and data sources, the more challenging such a task becomes. However, working to overcome this challenge lays the foundations for an organization's data governance and management strategy.

According to Steve Mar, a director at Intraprise TechKnowlogies, LLC and adjunct professor at Seattle University, gaining an understanding of what data is most relevant to an organization begins with a vision for how the data will be used. "If you don't have a vision and plan; if you are not aligned with a corporate strategy; if you don't know what you are capable of doing in your department; you will not succeed," he said.

Critical to the development of such a plan is a keen understanding of the company's business processes. "Try to determine what makes your organization successful and where it is getting the largest return on investment — that will define what data will be most relevant to a data analytics strategy and where," said Mar.

"Some organizations, for example, don't realize they are basically an inventory place," he continued. "What matters the most to them is their supply chain, getting accurate data, inventory management, etc. In this case, you might not have to worry about access to a general ledger account tracking parking fees. You have to worry about your machinery, inventory levels, how part numbers and SKUs are managed, and things like that. And if you don't have that kind of information and understanding of your process, you will quickly get into trouble."

Data storage and protection

A complex regulatory environment

An understanding of how and where an organization's data is stored is vital not just from a data governance standpoint but to comply with an increasingly rigorous regulatory environment, as well.

Although some industry-specific data protection-related regulations existed before, such as the U.S. Health Insurance Portability and Accountability Act of 1996 (HIPAA), the pioneering legislation regarding data governance is the European Union's General Data Protection Regulation (GDPR). Implemented in 2018, it sparked a global movement to hold private entities accountable for protecting personal data, while enhancing individuals' control and rights over their data. This fundamentally altered business strategy, personnel needs, and the risk landscape.

In the four years since GDPR's implementation, the data protection environment has only grown more complex. As of 2022, more than 120 countries have enacted some form of international data privacy laws.[2] Complicating the picture further, the U.S. has taken action to address data protection at a state level, with five — California, Colorado, Connecticut, Utah, and

2. "Data Privacy Laws by Country 2022," World Population Review, 2022, https://worldpopulationreview.com/country-rankings/data-privacy-laws-by-country.

Virginia — currently having comprehensive consumer data privacy laws on the books.[3] According to Gartner, by 2024, 75% of the global population will have its personal data covered under privacy regulations.[4]

To avoid costly penalties, it is imperative that organizations dedicate resources to identifying the regulations applicable to them, keep current on additions or changes to data regulations, and provide appropriate assurance over compliance. Such tasks can be distilled down to asking and answering three basic questions:

1. Where are our customers?
2. What are the corresponding notification requirements?
3. Have any of the areas in which we operate enacted their own data privacy regulations?

Data ownership and access

While not saying that data storage in previous technology generations was simple, it was at least more tangible. Data could be on print documents or in databases, data lakes, or other various digitized architectures, and it could be secure if basic data governance practices such as restrictive access were maintained. With the widespread adoption of Big Data, however, data management became much more nuanced and abstract.

In response, organizations with sound data governance policies and practices have embraced an entire data security ecosystem that includes detailed Big Data governance frameworks; data governance committees; Big Data architects, data engineers, and IT teams; and, in some cases, third-party cybersecurity providers. Together, these entities foster a data security environment founded on collaboration, enterprisewide data education, and clearly defined roles and responsibilities.

Discussion of these roles inevitably includes who has access to the data in question. Accessibility expectations can be established within organizations through updated codes of conduct and policies that contain data governance-related requirements, including:

- An inventory of data covered by the organization's data governance policies.
- A list of security best practices to ensure employees safeguard company equipment and mobile devices.
- Access restrictions tied to job roles and responsibilities.
- A list of prohibited actions that could negatively impact data governance and corresponding penalties.[5]

When considering such requirements, it is important to establish who should have primary responsibility over the organization's data. Typically, said Russell, this should fall to an appointed chief data officer (CDO), who establishes policies and standards for data governance, provides oversight of the implementation of data governance controls, and leads the data governance committee.

"This chief should be keen enough on the strategy of the organization, know how to rank data by priority, and be able to see opportunity within the data," he said.

Internal audit has a vital part to play alongside the CDO. "Even if the auditor at the table isn't necessarily a data expert, their broad view of both the organization and the risk environment has significant value," said Russell. Not only can they provide assurance for the organization's data governance strategy through the testing of controls, he said, but they also can provide insights on how new data trends, such as machine learning analytics, Internet of Things (IoT), and the increasing adoption of 5G, could fit or not fit into the current governance model.

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3. "State Laws Related to Digital Privacy," National Conference of State Legislatures, Jule 7, 2022, https://www.ncsl.org/research/telecommunications-and-information-technology/state-laws-related-to-internet-privacy.aspx#:~:text=Five%20states%E2%80%94California%2C%20Colorado%2C,of%20personal%20information%2C%20among%20others.
4. Gartner Identifies Top Five Trends in Privacy Through 2024," Press Release, Gartner, May 31, 2022, https://www.gartner.com/en/newsroom/press-releases/2022-05-31-gartner-identifies-top-five-trends-in-privacy-through-2024#:~:text=By%202024%2C%2075%25%20of%20the,Data%20Covered%20Under%20Privacy%20Regulations.
5. "Data Governance," The IIA, 2020, https://www.theiia.org/en/content/articles/industry-knowledge-brief/2020/data-governance/.

Conclusion

The importance of buy-in

All these aspects of data governance and management are for naught without enterprisewide buy-in starting with the board. This is true not just for designing and implementing a successful data governance strategy, but also to unlock the potential for greater use of data analytics within the organization.

“You could love data analytics, but without support from the board and executive leaders, you are going to be quite lonely in your data analytics dreams,” said Mar. “They may know it’s a great thing to do, maybe even necessary, but lots of people say they love to diet and exercise and don’t do it behind the scenes.”

The secret, said Mar, is to present, or at least play a part in supporting, a powerful data analytics vision. This requires not just restating the benefits of data analytics, but also understanding how to do data analytics enough to show the benefits. “If you don’t know what you’re doing, you will not succeed. I don’t know how to emphasize that more,” he said.

With proper understanding of the organization’s data needs and strategies, internal audit can present a data analytics audit plan that is detailed, clear, and illustrates to the board a tangible return on investment. Part 2 of this series will highlight what such data analytics plans can look like for internal audit, and how auditors can further adopt data analytics into their audit role in new and exciting ways.

PART 2

Gathering, Understanding, and Visualizing Data

About the Experts

Alicja Foksinska Arnold, CISA, CFE

Alicja Foksinska Arnold is a lead IT auditor at Protective Life Corporation. She spearheaded the creation of data analytics, visualization, and storytelling efforts in the organization's internal audit department, becoming the data specialist of the team. She is currently managing and maturing the newly created Data Analytics shop. Alicja is also an instructor at The University of Alabama at Birmingham (UAB), where she teaches accounting information systems and data visualization for business.

Bryant Richards, CIA, CRMA

Bryant Richards is the director of the center of intelligent process automation at Nichols College, where he is teaching and building programs to reduce the industry gap between business and technology skills. Prior to joining Nichols College, Bryant spent 20+ years in industry, mostly in internal audit and compliance. He is currently pursuing his PhD in accounting with a focus on leveraging emerging technology in internal audit.

Introduction

Data is the foundation on which every internal audit is built. As organizations increase their reliance on data to enhance products and services, internal auditors are positioned to leverage this ever-growing resource. Data analytics, robotic process automation (RPA), artificial intelligence (AI), and other tools provide practitioners accessible and valuable avenues to improve efficiency and effectiveness in assurance services and increase internal audit's value to the organization. Areas where data analytics can improve internal audit services include performance reporting, fraud prevention and detection, continuous monitoring, and risk assessment.

This Global Knowledge Brief, the second of three that focus on data analytics, explores data in its various forms, data gathering techniques, the importance of data validation, data analysis, and keys to effective storytelling with data.

Starting the Data Analytics Journey

Forms of data and new technologies

Gathering data

Internal audit provides assurance that existing internal controls are adequate to mitigate existing or unidentified risks, that governance processes are effective and efficient, and that organizational goals and objectives are met. Identifying and harnessing meaningful data is critical throughout an organization, particularly in internal auditing. The methods that the internal audit team uses may vary depending on the situation, but employing a variety of sources of information can provide better perspective and context. Approaches may include:

- Interviewing people or conducting focus groups within or outside of the areas being audited.
- Using questionnaires or checklists to collect information, including observations and opinions from people who work in or deal with the business area being audited.
- Observing the workings within a business area over a period of time to spot issues or inconsistencies.
- Vertical auditing, in which the auditor monitors one process from beginning to end to identify any issues.
- Documenting formal practices and procedures within a business area.
- Accessing informal documentation that may provide insights into ad hoc processes and procedures.

Supplemental guidance from The Institute of Internal Auditors (IIA), including Integrated Approaches to Internal Auditing, provide additional insights into how to leverage data and resources to support engagements.

"While intuitively, an integrated approach to an engagement begins with setting objectives and scope, the execution of the engagement will likely require integrated audit techniques and optimizing tools, resources, and knowledge sharing. Internal auditors should use all available tools to improve the efficiency and effectiveness of their engagements," according to the practice guide.

While approaches may vary, the underlying goal remains consistent: to gain an in-depth understanding of the culture, systems, and processes of the business area being audited.

Technology enhancements

Many new technologies are enhancing the quality and efficiency of data collection, validation, and reporting, They include:

- **Data analytics**. While this is not a new tool, improved technology has made it easier to identify, understand, and predict trends, as well as create metrics that can help optimize performance.
- **Artificial intelligence (AI)**. AI can take unstructured data — information that is not neatly categorized into conventional rows and columns — and use machine learning and other tools to complete tasks that people would otherwise perform, such as problem-solving. Today, companies often handle large amounts of unstructured data in the form of information from outside sources, emails, social media posts, and more.

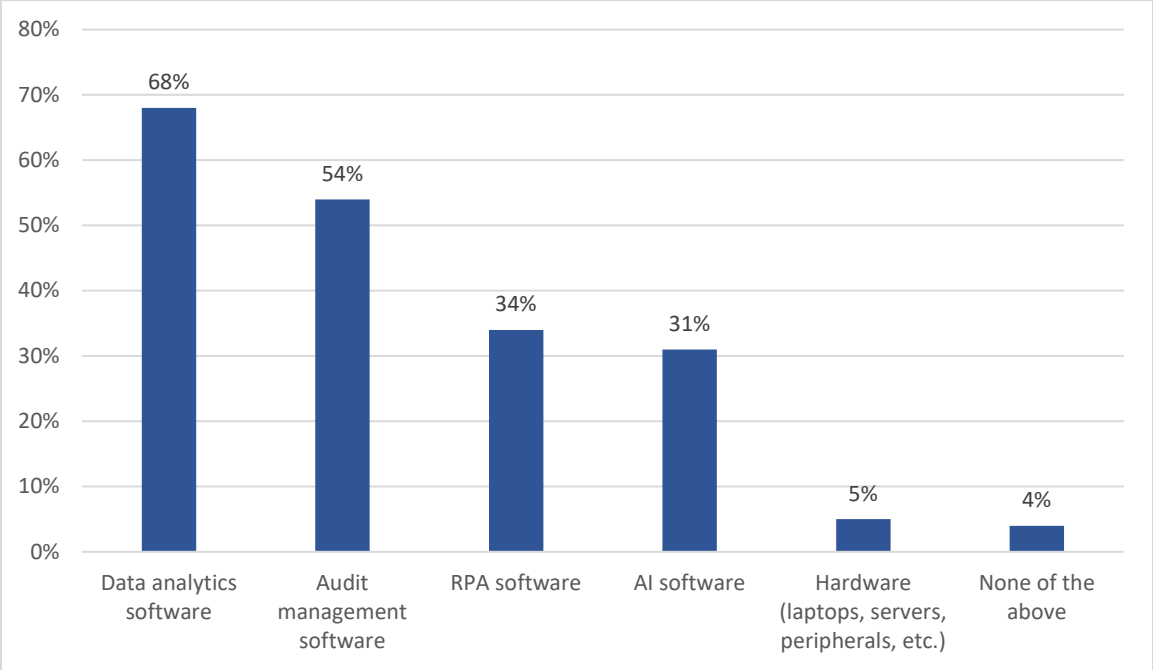
- **Robotic process automation (RPA)**. RPA automates repetitive low-level tasks, freeing people to take on more demanding responsibilities. To accomplish these tasks, RPA uses structured data — information that can be easily processed by people or machines and used in conventional relational database systems.

While data may sometimes still take the same forms as it has in the past, technologies like these make it possible to enhance data validation and, ultimately, enable better decision-making.

If internal audit takes full advantage of the opportunities presented by AI and data analytics, the resulting benefits could include improved performance reporting, fraud prevention, risk-based internal audits, and continuous monitoring, said Grant Thorton UAE, Dubai Senior Consultant Muhammad Hassan Rizvi in "Data-enabled Internal Auditing," a 2022 article published in *Internal Auditor*. "With the continuous expansion of technologies such as artificial intelligence (AI), cloud computing, and big data, organizations can now store and process more data than ever, making it easier for them to drive business strategies and decisions based on data analysis insights," according to the article.[6]

The benefits of data analytics are no secret among internal auditors. The IIA's 2022 "North American Pulse of Internal Audit Survey" found data analytics software to be the most desired technology upgrade among CAEs (Figure 1).[7]

Figure 1: Focus Areas for Technology Increase



Note: The IIA's North American Pulse of Internal Audit Survey, Oct. 5 to Nov. 9, 2021. Q22: If your internal audit function were to receive an unexpected budget increase, in which area would you primarily spend it? n = 505.

[6] "Data-enabled Internal Auditing," Muhammad Hassan Rizvi, *Internal Auditor*, February 21, 2022.
[7] "2022 North American Pulse of Internal Audit: Benchmarks for Internal Audit Leaders," The IIA, March 10, 2022, https://www.theiia.org/en/content/research/pulse-of-internal-audit/2022/2022-north-american-pulse-of-internal-audit/?gclid=CjwKCAjwzNOaBhAcEiwAD7Tb6IcbLu44qaLU8lHJSD-kDbe5nhqtORum-O4Qiba9MVM5VdNu6n81GBoC5qoQAvD_BwE.

Questions to Consider

Internal audit typically gathers information from other sources, both within and outside the organization or the business area being audited. Two important questions for auditors to consider in the data-gathering stage are:

1. What is the best way to access information from the data source?

It is critical for internal auditors to understand the business process being audited and what kind of data it uses and/or creates. That includes having a sense of the inputs that the data might have been subject to. For example, if there have been manual inputs to some or all of the data, it is possible for mistakes or other intentional or unintentional changes to occur. Because internal audit's conclusions and reports can only be as good as the information on which they are based, it's important to recognize such risks to data integrity.

45%

Percentage of workforce tasks that can be automated. "RPA can help internal audit increase productivity, expand its risk coverage and help address the ongoing compliance burden by doing more with less."

- PwC[8]

In many cases, internal auditors request data from the business area and then audit the report they receive. However, it is preferable to secure a direct connection to data sources, such as a server database, or an application, according to Alicja Foksinska Arnold, lead IT auditor, Protective Life Corporation. This is a recommended practice because:

- On a practical level, it can minimize the time necessary to submit follow-up questions on the data to the business area that created the report.
- Having direct access to data also enhances the independence of internal audit, because it guarantees the information has not been filtered before getting to the auditors. While more internal audit functions are following this approach, it is not yet universal.

To maintain independence, internal auditors should have read-only access to the data. This allows for data to be examined without altering or editing any of the underlying numbers while allaying auditee fears relating to maintaining database integrity.

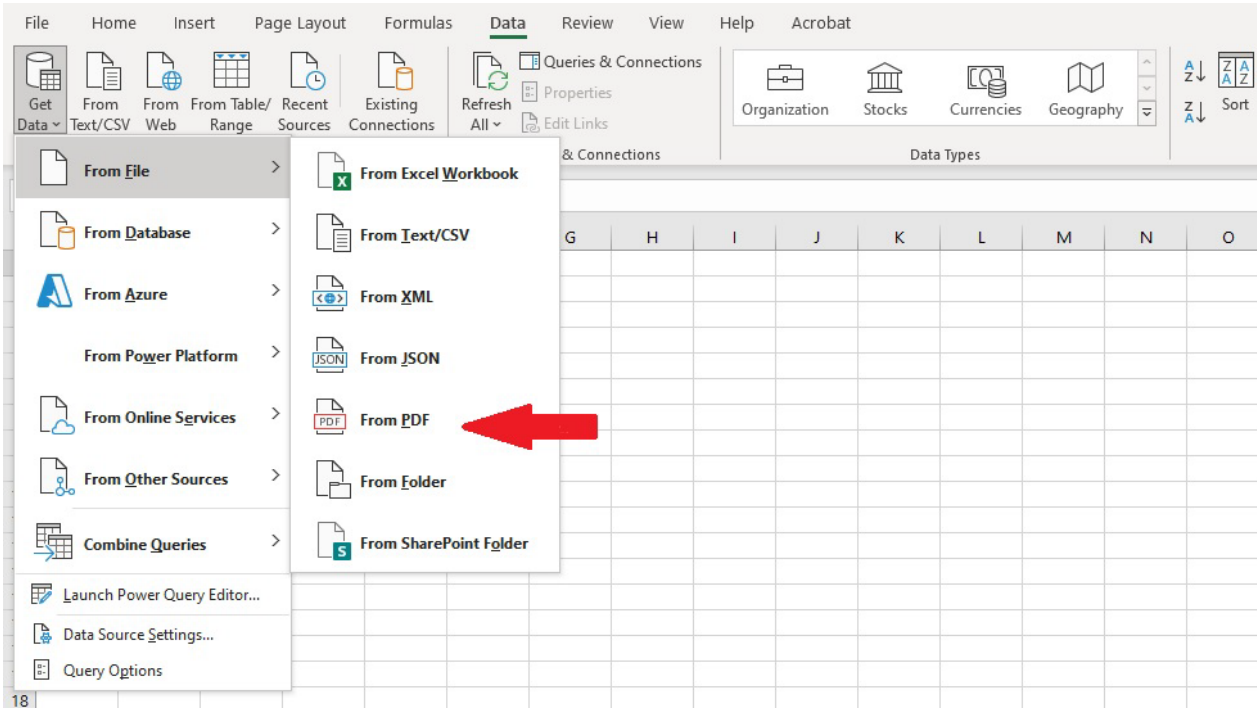
2. How can internal auditors use technology tools to streamline tasks?

Using RPA, internal auditors can automate frequently used and repetitive manual tasks. This makes it possible to use their output across a variety of applications. Improvements to readily available software are making it easier to import data from a variety of sources with ease. For example, while it was once necessary to load data from a PDF into an Excel file manually, it can now be done in many cases with the push of a button (Figure 2), noted Bryant Richards, CIA, director of the center for intelligent process automation at Nichols College.

In particular, he advised internal auditors to explore options for converting information into structured data, making it easier to use in a variety of applications, including visualizations. Simple automation tools need not be complex or expensive, Richards said. They include those from NICE Automation Studio, UiPath, and Automation Anywhere. It can also be possible for a standard PDF with Excel.

[8] "Seth Rosensweig, "Robotic Process Automation: A Primer for Internal Audit Professionals," Accessed November 11, 2022, PwC.

Figure 2: Importing PDF Data Into Excel



The Importance of Data Validation

Accuracy is critical

Data flow diagrams

Accuracy and completeness are key considerations in any audit. Data validation tests the quality of information meant for use in decision-making. Data quality failures may result from duplication of records; mistakes in data collection or calculation; misuse or improper categorization of data; information tampering due to security breaches; or obsolete data, among other problems.

Steps that auditors may take in validating data include:

- Evaluating whether the data has come from a reliable source and makes sense in context with the auditors' overall understanding of the business area.
- Considering how many sources the data are derived from, as well as how long they took to obtain, to determine if these factors raise risks to data integrity.

Proper validation requires beginning each audit without preconceived notions. One potential mistake may occur when internal auditors approach an audit engagement assuming the data will show the same situations as occurred in the past. This can influence their perceptions of the data and lead to incorrect conclusions. To prevent this outcome, data should be used to perform an analysis and develop a unique story, rather than to confirm or debunk an assumption.

Validation is an important consideration at many points in the data's lifecycle. For example, Foksinska Arnold's organization frequently performs system conversions when it is scaling up its technology. In the process, data is moved from one system to another. Internal auditors should be aware that during that transfer, an accidental shift of data by one decimal point can have a significant impact on data validity and on decisions made using incorrect information, she said. Auditors should remain attuned to events that could increase risks to data integrity and the impact they could have.

To that end, data flow diagrams are critical to data validation. Those in charge of the business area being audited may not always understand how data has moved from stage to stage. A data flow diagram that maps out the data's journey can help internal auditors understand and make sense of the data gathering process, Richards said. This can identify points where there were higher-risk manual inputs, for example, or where data might have been accidentally transformed into a different format, such as when a date comes up as a text string. It can also show the origin of different types of data and which systems and applications it has moved through, alerting the auditor to potential problems. Creating the diagram is only one part of the data validation process, but neglecting this step potentially means losing perspective on the best ways to validate a data set and assess the risk associated with certain fields. "You can't assume that data is correct just because it came from a system," said Richards.

In a time when the volume of data often seems overwhelming, data flow diagrams also offer a perspective on what data is most important or relevant to a particular audience. The diagram also helps pinpoint what information may be important to various stakeholders and whether the data answers their most important questions, Richards said.

Dashboards and other data visualization techniques can also help auditors pinpoint risk factors. “By displaying data points and combining the analytics with key performance indicators, auditors have the ability to drill down, looking both vertically and horizontally across risk areas to identify individual audits, scope, and key testing procedures.”[9]

[9] “Data-enabled Internal Auditing,” Muhammad Hassan Rizvi, Internal Auditor, February 21, 2022.

The Value of Storytelling

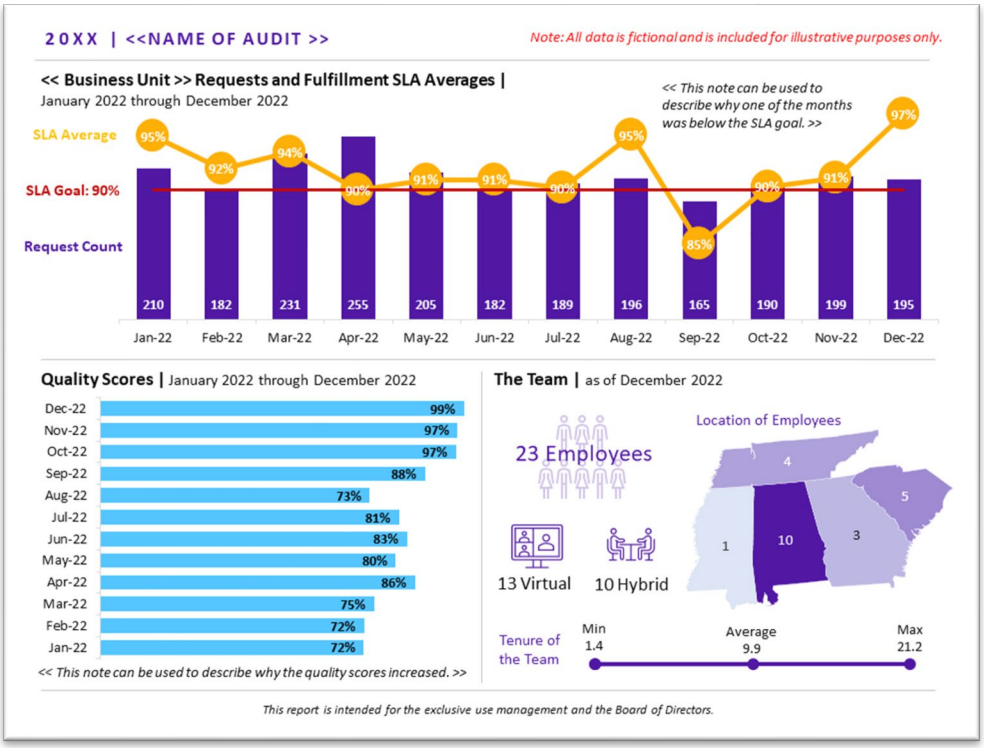
Turning data into action

Data visualization

Data storytelling takes information and turns it into easily understandable graphics that present a clear narrative. These visualizations can offer an audience a new and easily understandable perspective. A business area that is focused on its own responsibilities may be surprised to learn the results of control testing, for example, or other considerations outside of its realm of expertise. In addition, because of internal audit's deep understanding of the organization and of the business area under audit, the auditors can create their own key performance indicators (KPIs) based on data sets that they have recognized as important. Internal audit's metrics or KPIs may integrate data of different types or from other sources within or outside the area, providing the business area's management with a fresh perspective. Internal audit can also use dashboards to assess risk at regular intervals or in real time. Foksinska Arnold's organization, for example, uses Power BI or Tableau to create visuals and dashboards that walk management through the data sets and bring them to life (Figure 3).

In creating their visualizations, auditors should tailor them to each audience, whether that means the business area being audited, senior management and the board, or other stakeholders. When developing visualizations, it is important to follow the rules of any good story by including an introduction, a discussion of the setting, the different scenes that build the story, a climax, and a conclusion. "Don't jump to the punchlines," Richards advised, but tell a story that each specific audience can follow to gain a better level of understanding and a complete picture. Tell the story from beginning to end and attempt to simplify it as appropriate. The number of charts used should depend on the complexity of the information being conveyed.

Figure 3: KPI Presentation Example



Courtesy of Alicja Foksinska Arnold

For example, Foksinska Arnold's team presents a report to the group being audited at the end of every engagement. For this audience, the internal audit team offers a wide range of details because the group is seeking a full understanding of the health of their area. The internal audit report walks the group through every finding, how each one was identified, what testing was done, and the end results. Each detail-rich presentation requires an exit meeting of roughly an hour, she said.

This conversation is a learning experience for both the business area and internal audit, according to Foksinska Arnold. The business area is able to see the story of their department that internal audit has created and the unique approaches internal audit has used. "We're not there to tell them how to do their jobs, but to share our expertise," she said

When findings are problematic, visuals can clearly illustrate the issues and make them less difficult to present. They can demonstrate that the internal audit team's conclusions are not a judgment, but just the facts. Graphics can track the origins of the data behind a finding, the analysis involved, and the insights gained. They can also show how the internal auditors may have married different types of data — from within or outside the department audited — to develop their analyses and conclusions.

Internal auditors should keep in mind that data can also be used to illustrate a clean report. It can confirm what the audited group is doing right and enable it to identify best practices, she said.

The groups being audited appreciate the visualizations and the access to fresh research on their performance and risks. "They often call us back to do special advisory projects," Foksinska Arnold said. "When the information you offer is that transparent and you give them so much value, they see us in more of a partnership role."

56%

Making the leap to more advanced analytics applications was the second greatest challenge for audit leaders at 56%, according to a Gartner survey. A total of 53% worried about IT auditing practices, and 44% also pointed to ineffective investment in audit analytics as a key concern.

- Gartner[10]

Unlike a report to the audited business area, reports to the audit committee might last only five minutes. In this case, the focus of the presentation is a short but information-packed, three-page written report. It is written to be understood by directors and senior management who generally do not have extensive familiarity with each business area. While the auditee's information must cover numerous key points, Foksinska Arnold said, "Management doesn't want to read a 20-page report."

Her audit team's three-page report follows the story's narrative arc:

- **Page 1** covers background details, hitting the high points that the audit committee and management really need to know. Such points include issues such as which group is being audited, the purpose of the business area and the audit, the testing that was performed, and the risks in this area.
- **Page 2** uses visualizations to delve deeper into the situation in the department introduced on Page 1, using numerous separate visualizations. If the business area being audited is a call center, for example, charts can track the number of calls handled per month or average number of calls per employee per day to highlight daily details. Graphics can make data findings easier to understand and contextualize, showing how the data was identified and its impact. Graphics can also give an overview of all findings identified and offer the users further information on each one as needed.
- **Page 3** delivers the story's resolution, with the internal audit team's recommendations.

After internal audit has presented its findings, the business group comes back with a timeline for addressing any related problems. Internal audit can then schedule a follow up to make sure that issues have been addressed.

[10] "Gartner Survey Reveals the Top Challenges for Internal Audit in 2022," Gartner, March 17, 2022, https://www.gartner.com/en/newsroom/press-releases/2022-03-17-gartner-survey-reveals-the-top-challenges-for-internal-audit-in-2022.

Conclusion

Internal auditors can bring a unique level of understanding and objectivity to each of the steps addressed in this brief. In the data gathering process, their focus on data integrity ensures the quality of information used for decision making. In validating data, they confirm its accuracy and completeness. And in their role as storytellers, they break down volumes of often complex data to present narratives that are most relevant and meaningful to each audience. By taking these steps, they confirm and clarify the value internal audit can add to data gathering, validation, and visualization.

The final installment in this series will examine developing a resilient data analytics strategy. An effective data analytics strategy enhances the internal audit function's capability and capacity, jibes with the organization's overall data strategy, and is critical to providing assurance on key areas of data protection, regulatory compliance, and overall effective data governance.

PART 3

Developing a Resilient Data Analytics Strategy

About the Experts

Emmanuel Manalo, CIA, CPA

Emmanuel is the Head of Internal Audit at Lemonade. His long career in internal audit started in public practice with PricewaterhouseCoopers - Philippines and Ernst & Young - Singapore. His pivot to data analytics strategy and execution allowed him to build internal audit analytics functions at Tyco International and Estee Lauder Companies. He also held internal audit leadership roles at Johnson Controls and Visa as Head of Internal Audit - Americas and Operational Audit, respectively.

Yusuf Moolla, CIA

Yusuf has more than 20 years of data and assurance experience. He previously worked for Deloitte and KPMG in several countries, leading audits and data projects. Yusuf helps performance auditors and internal auditors confidently use data for more effective, better-quality audits. He works closely with clients — supporting them through data-focused consulting, advice, delivery, and coaching. Yusuf is a principal consultant with Risk Insights and co-author of *The Data-Confident Internal Auditor*.

Introduction

Data analytics involves reviewing raw data to identify trends and anomalies and to mine meaningful information from a large pool of data. “Data analytics” is not a technology program, but technology does enable more effective and efficient use of data analytics. Data analytics can be used in tandem with tools such as artificial intelligence (AI), machine learning and robotic process automation (RPA).

Types of analytics include:

- Descriptive analytics, which covers the details of past performance and may include year-over-year or month-over-month changes in sales, revenue, pricing, inventory, customers, or visitors, or other trends or changes that have already occurred.
- Diagnostic analytics, which examines the *factors behind a trend or result*.
- Predictive analytics, which uses predictive modeling to discern *what might happen in the future*.
- Prescriptive analytics, which *assesses potential outcomes and identifies the next best actions* based on analysis of existing data.

Due to a complicated global business and political environment, as well as stakeholder expectations, business leaders are increasingly focusing attention on the last two types of analytics above — predictive and prescriptive. Internal audit certainly already adds value by offering perspective and insights that can help organizations develop forward-looking strategies. An appropriate and resilient data strategy can support and augment that effort.

This Global Knowledge Brief examines how chief audit executives (CAEs) and their teams can craft data analytics strategies that:

- Enhance internal audit capabilities.
- Determine what technologies best suit their needs
- Enhance assurance on key areas of data protection, regulatory compliance, and effective overall data governance.

Enhancing Capabilities

Overcoming barriers

Managing you team's mindsets

Data analytics and advanced data technologies can make significant changes in the way that internal audit teams function. Their use can result in additional capacity for audits and enable and support higher-level work and analysis.

The mindset of the internal audit leaders and team members is one of the most important factors in successful implementation of data analytics and advanced technologies. Sticking to the way things have always been done or questioning the need for change can hinder any effort at transformation.

"If the whole audit team is resistant to new approaches or questions the value, it is very difficult to change," said Yusuf Moolla, principal consultant at Risk Insights and co-author of *The Data-Confident Internal Auditor*.

While training on new techniques and technologies is key, it may not have a meaningful impact or may not even occur if the organization is not open to setting aside current methods and trying new ones. Moolla said closed minds or failures of imagination can lead to team leaders or members not understanding "the worth of an additional evidence source."

One way to alter mindsets is to consider and communicate the benefits of data analytics and advanced technologies. A few worth noting include:

- They can enable internal audit to more easily find fraud, duplications, exceptions, conflicts of interest, and other risks, errors, or concerns throughout the system.
- They do the tedious, repetitive, manual tasks, providing team members with accurate reliable information. Practitioners can concentrate instead on a greater number of audits, more complex assignments, or higher-value advisory work. The result is higher productivity and more value to management and the board.
- Many newer professionals are excited about advanced tools such as automation and artificial intelligence and want to put them to work in their new careers. That can be a powerful recruiting advantage during a time of staff shortages.
- Data visualization can take complex and data-heavy topics and turn them into easily understandable graphics tailored to each audience's level of knowledge. (For more information, see the IIA Global Knowledge Brief, Data Analytics Part 2: Gathering, Understanding, and Visualizing Data.)

In Moolla's mind, data visualization is "where internal audit, management and the audit committee meet," because it allows for better understanding among them. "It's critical that people at every level understand that data is a new form of evidence and a really effective way to communicate overall," he said. If it can add more value and the team has made a commitment to give the effort a chance, it's well worth trying."

It is true that newer team members with skills in data analytics techniques may be able to drive change. However, because there is often an unconscious bias toward hiring people who have characteristics or attitudes, professionals with knowledge and passion for digital transformation may not be chosen for the team, Moolla said.

Even if internal audit does attempt to hire these people, they may choose to work for more forward-looking organizations instead. Indeed, it is possible to spot problems in mindset by considering how long people with new ideas or capabilities

stick with the organization. If they don't last long, the organization's reluctance to embrace new ideas may be a contributing factor.

At the same time, it is true that even younger team members may have some discomfort in accepting advanced technologies. The pace of change is so rapid that those technologies may have moved well beyond even what recent grads studied in school only a few years earlier. Team members of any age may also not welcome advanced data technologies because they assume that this area is the province of an information technology or data science team. Internal audit leaders should be sensitive to these potential problems and reassure and educate their team members.

Addressing other barriers

There are a number of additional hurdles that may make it difficult for internal audit to enhance its data analytics capabilities and capacity, noted Emmanuel Manalo, head of internal audit at insurance provider, Lemonade.

- **Lack of an organizational strategy on data.** Even if one exists, it may not take into account the specific needs of internal audit. If the strategies, structure, and framework are focused on business issues, such as customer transactions, for example, it will not lend itself well to internal audit uses.
- **Little or no understanding of data structures.** It's harder to appreciate or accept new approaches or technologies if their purpose, use, and value aren't clear. As part of their training, team members will have to understand data and why it is a priority.
- **Lack of the skills used in processing data.** For example, team members may need graphic design skills for dashboards or the ability to use intuitive machine learning analytics. Without them, internal audit teams may not be able to create the kinds of dashboards or visualizations that can highlight and communicate valuable findings. They also may not be able to manipulate the data to achieve useful insights. Not all team members need such skills, but the overall function should have such resources available to it. That may mean that internal audit may become the customer of other departments that have these skills, such as graphics or data science. However, a dedicated data team within internal audit is preferable — one in which data professionals are trained to audit, according to Manalo. These professionals can then share their knowledge and learn from existing internal audit team members.
- **Failure to collaborate.** The head of audit or the head of analytics within internal audit should have a good relationship with the chief data officer. Such relationships provide internal audit leaders with ongoing information and insights on overall organizational data strategy. Collaboration and visibility can also give internal audit a seat at the table when limited resources are distributed.

Technology Determinations

Data strategy, tools, and capabilities

Key questions to ponder

In choosing an advanced technology there are several factors to consider:

What is the organization's overall data strategy? It's important to determine what data framework the company is using, and if this is suitable for internal audit. Internal audit should be involved in or at least have reviewed the organizational data strategies to spot gaps, and then understand whether they need to be adapted to or address internal audit needs, according to Moolla.

What separate data tools and approaches does internal audit need? Internal audit should use as much of the organizational data governance framework, data strategies and technologies as feasible, while keeping in mind that this function may need to do some tweaking to meet its own unique requirements. As an example, internal audit adds value by analyzing and combining data from a range of different sources to provide perspective and insights that management and the board would not otherwise have. It may as a result need specific additional data safeguards.

It's important to consider, as well, whether internal audit has its own short-, medium-, and long-term data strategy. Compared to the overall organization, internal audit could have separate security and other requirements.

If internal audit is investing in its own data system, it is likely because the company does not already have one overall enterprise system. If one does exist, it's critical that internal audit's system can connect to multiple data sources and systems. Internal audit should be able to access the organization's overall data storage and to use organizational templates and styles to facilitate stakeholder use and for reporting.

How is the team using current tools? It's possible that existing software has capabilities that are not being put to full use. For teams making their first forays into data analytics, it may be best to begin with a small use case, perhaps for audits where a simple tool like Excel is already in use. The team can then build from there as its comfort with data analytics tools grows. Even if there are no underused systems, a system review can help the team consider what types of analyses the team might need now or in the future for more advanced use cases.

What are the data capabilities of the internal audit team? Pick tools that suit the team's current abilities. The team may only need a simple rules-based tool or it might be able to benefit from advanced data modeling capabilities. As the group grows in size and/or knowledge, it's possible to add data models and perform predictive analytics. If pricing is a consideration, keep in mind that it's relatively easy to get started with a basic programs without having to pay a consultant for a complicated installation, Manalo noted.

Will team members be coding? While the ability to code is valuable, code-based tools are no longer necessarily the best solutions, according to Moolla. "No-code or low-code tech is now mainstream," he said. Most systems are quite extensible, or possible to modify, so they can be adapted for use beyond their initial need.

When considering a tool, what basic data system needs does it address? Moolla recommended that, at a minimum, tools should be able to handle cleansing, or the ability to weed out errors; analysis, to put the data to work; and visualization,

to explore and present results. It is not necessary that all capabilities exist in one piece of software; it's even possible to use a different software for each step.

What type of vendor is best? While new and up-and-coming vendors can be very innovative, don't overlook the benefits of working with an established vendor, Manalo said. One advantage is that they already have internal audit use cases that organizations can leverage. In addition, it can be easier to recruit new people or replace departing professionals and get them up to speed if the company is using a widely used system that more people are familiar with. Established vendors may be more likely to continuously improve their tools, as well.

How do licensing fees work? Manalo noted that some vendors charge a license fee when a user simply views a report. As a result, it's wise to determine in advance if there will be a fee every time members of management or the board view a dashboard.

As a general rule, the value of planning can't be overemphasized, Manalo noted. The most significant consideration during the process should be understanding which questions the audit team is trying to answer with data analytics and advanced technologies. When management understands those questions, and the potential value of the answers, it will be easier to engage them in the effort and to align with organizational goals and strategies without replicating information that is already available.

The validation process is also critical. Data analysis is a trial-and-error process. Adjustments to results may be needed if there are considerations or parameters that were not included in the initial results. Multiple validations can improve and enrich the analysis process.

Comprehensive Approach

Protection, compliance, and effective governance

Accessing and managing the data

Given the team's deep understanding of requirements in a wide range of areas, internal audit should have a key role in the ongoing dialog on data protection, regulatory compliance, and overall data governance.

Addressing these considerations requires the right tools as well as people who are knowledgeable in each area. They are all so wide and multifaceted that it would be challenging to conduct proper oversight with manual data tools, Manalo said. Instead, systems and tools should be able to address key questions such as those on:

- Where specific data is located.
- What information is accessible to third parties.
- What risks data may be exposed to, such as unauthorized access or use.

Effective data use "is a very broad problem, and it needs to be solved in a very structured way," Manalo said. That means that internal audit must be collaborating with the right gatekeepers and stakeholders. They include the chief information security officer, chief compliance officer, and the data privacy officer. Internal audit should work together with such stakeholders to address data policies and risks.

Deleting or purging data is also an important consideration. Given the large and expanding volume of data available, companies may struggle with how and when to cull data from their systems. They may inadvertently be making the mistake of keeping data longer than is prudent. In addition to managing and protecting the data the company needs, data tools can also seamlessly delete data based on policies set by the organization to minimize exposure and prevent an unnecessary build-up of stored but unneeded information.

Internal audit may need to drive this process, but it should not own it, Manalo said. Instead, internal audit should remain a key player in a team effort. The organization's overall risk management framework and policy set by the governing body will define its risk appetite and help identify which data needs protecting. Armed with a strong understanding of data analytics, internal audit can help organizations put analytics tools to work.

Conclusion

Data analytics combined with advanced data technologies are powerful tools that can enhance every internal audit function. They are flexible enough to suit the different levels and the needs of a variety of organizations. Internal audit leaders should prepare and position their teams to leverage data analytics as parts of a robust data strategy. The advantages are so numerous and easy to illustrate that building a case for them with key stakeholders should be relatively straightforward.

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