

Internal Auditors' Response to Disruptive Innovation

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Executive Summary

Organizations are embracing innovation and disruptive technology at breakneck speed. While these changes have many positive effects—often improving the efficiency and effectiveness of operations, increasing responsiveness to customer needs, or enhancing a competitive advantage—they are also associated with new and sometimes unknown risks. As trusted advisors and competent assurance providers, internal auditors can provide meaningful input to the innovation decision and should be relied upon to ensure emerging risks are effectively mitigated. But, fulfilling these responsibilities can be challenging for the internal audit function if it is not adequately informed about or prepared for changes.

This report explores the innovations and disruptions that organizations are currently facing and how internal audit is evolving to react to these changes. Through interviews and surveys, the following questions are examined:

- What innovations and disruptions are organizations currently implementing?
- To what extent is internal audit involved in the innovation decision?
- To what extent is the internal audit department prepared for any challenges stemming from the innovation and how effective is it in addressing these changes?
- How has internal audit changed to respond to organizational innovation and disruption?
- What best practices could internal audit adopt to effectively address organizational innovation and disruption?

Ten innovations and disruptions that internal auditors should be prepared to incorporate into the audit plan are identified and discussed: data analytics, cloud computing, agile processes, mobile technology, robotic process automation (RPA), continuous auditing, new organizational strategies, artificial intelligence (AI), regulatory changes, and digitalization. Respondents provide a variety of specific recommendations for best approaching each unique innovation and disruption.

In general, internal auditors who responded to the survey felt neutral about their level of preparation and the effectiveness of their response to most innovations—not completely prepared but not unprepared either. Internal audit largely relies on existing personnel to address the innovations, but increases training and adds new audit areas to the audit universe to respond. However, when new personnel are required, new skills, such as IT expertise, and an innovation mindset are preferred over traditional audit expertise.

When examining all innovations together, the following best practices for internal audit departments dealing with innovation and disruption are identified (these are fully discussed in chapter 5):

1. Have a seat at the table.
2. Communicate effectively.
3. Build strong governance.
4. Have a role in enterprise risk management (ERM).
5. Innovate in internal audit itself.
6. Cultivate the right skillset.

By following these best practices, internal auditors can be more prepared and effective for the innovations and disruptions that they will increasingly face in their organizations.

Acknowledgments

We are grateful for the financial and research support provided by the Internal Audit Foundation. We are also grateful to the 11 chief audit executives (CAEs) and internal audit directors who generously shared their time and expertise as interviewees. Additionally, we are grateful to the CAEs and internal auditors from Atlanta, Georgia (USA), Germany, and Austria who were instrumental in defining the research questions examined in this study, and in particular, Bill Mulcahy of IIA–Atlanta for his gracious support of this research.

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Chapter 1

Introduction

The business world is facing unprecedented change and innovation. As explained by American business writer Bruce Tulgan, “We are living through the most profound changes in the economy since the Industrial Revolution. Technology, globalization, and the accelerating pace of change have yielded chaotic markets, fierce competition, and unpredictable staff requirements.” For business professionals, managing all of this change—and especially the break-neck pace of change—has become the equivalent of trying to sprint a marathon.

As organizations try to innovate, it is important to note that many innovations also serve as significant disruptors to traditional processes. Thus, along the proliferation of innovative technologies and practices that organizations are adopting comes an evolving set of risks that must be assessed and managed. Internal audit, as the third line of defense, has the opportunity to play a critical role in maintaining effective control and mitigating these emerging risks. To this end, it is critical for internal auditors to have what former Hewlett-Packard (HP) CEO Carly Fiorina described as strategic and peripheral vision:

“The pace of change is so great, there is always something else going on. What that says to me is that you have to have strategic vision and peripheral vision. Strategic vision is the ability to look ahead and peripheral vision is the ability to look around, and both are important.”

To help internal auditors keep pace and develop both strategic and peripheral vision, two primary questions are addressed in this report:

1. What innovations and disruptions have affected organizations and their internal auditors?
2. How has internal audit responded (or struggled to respond) to these innovations?

Key innovation trends facing organizations and their internal audit functions are identified through in-depth interviews and surveys of practicing internal auditors. Further, internal audit functions’ responses to these innovations and helpful insights and best practices for internal auditors facing these changes are documented.

Throughout this report, innovations as well as disruptions that organizations are facing are addressed. While these terms have nuanced differences, each will be used interchangeably, suggesting that organizations are facing significant change as a new innovation is implemented or a disruption arises. Additionally, innovations/disruptions that effect the organization as a whole, as well as those that are transformative within the internal audit function, are considered. It is important to recognize that as organizations adopt innovations, it forces change within the internal audit function and must be addressed. Similarly, when internal audit implements an innovative change (e.g., emphasis on data analytics or continuous auditing), it can influence the organization as well.

Chapter 2

Research Method

We investigated internal audit functions' responses to innovation and disruption using a two-stage research design. In the first stage, we performed 11 semi-structured interviews with CAEs (or equivalents) from organizations of varied sizes, industries, and type. In the second stage, we surveyed internal auditors who also represent organizations of varied size, industry, and type. Most participants were located in North America. By interviewing and surveying a diverse set of internal auditors, we were able to identify a wide variety of innovations and disruptions internal audit functions are currently facing and gain a wide range of perspectives on their ability to respond effectively to these changes. Copies of the interview and survey questions are available from the authors upon request.

Interviews

Chief audit executive (CAE) interviewees were identified using personal contacts established through our relationship with The IIA. Each interview lasted approximately one hour. We used a standard set of interview questions to guide the interview but allowed for considerable variation in follow-up questions as needed based on the interviewee's experiences and expertise. Interviews were recorded and transcribed. We used the insights gained from these interviews to inform and motivate our survey, which was administered during the second stage of the study (described below).

Surveys

In October 2018, the Internal Audit Foundation sent an email to approximately 5,000 members that briefly introduced our study and invited them to participate. The email included a hyperlink that interested participants could use to access an online survey. The survey included three sections: 1) questions about the participants and their organizations (i.e., demographic variables), 2) questions about current organizational innovations the internal auditors are facing, and 3) questions about future organizational innovations internal auditors are likely to face within the next three to five years.

The survey was open for approximately one month and we received 162 responses. Each provided their complete demographic information along with information about at least one innovation to be included in the study. This represents a slightly lower response rate than for similar studies conducted using

surveys administered by The IIA (see Anderson et al., 2012 and 2014, and Christ and Ricci, 2015, for examples). However, given that the aim of this study is to provide descriptive information about organizations facing innovation and their internal audit functions, as well as best practices and suggestions, it is reasonable to believe that many internal auditors who received the initial invitation did not feel they had relevant insights to share (i.e., may not believe they had innovative practices to discuss). Thus, this sample is sufficient for the purposes of this study.

In total, the sample obtained provides a diverse view of internal audit functions across North America and thus is suitable for a detailed study of how they respond to innovations in their organizations. For a detailed description of study participants, please see the appendix.

Chapter 3

Current Innovations

In stage one of our study, we interviewed 11 CAEs (or equivalent) from a variety of organizations. Each interviewee was asked to identify any disruptions or innovations that their organization is currently facing (or has recently faced). Interviewees identified a diverse set of innovations, ranging from the very technical (e.g., robotic process automation or digitalization) to more broad organizational changes (e.g., shifts in corporate strategy). **Table 3-1** reports the frequency of reported innovations.

Table 3-1: Innovations Identified Through Interviews

Current Innovations ^a	Percent Reporting
Corporate Strategy Changes	64%
Robotic Process Automation	55%
Data Analytics	45%
Cloud Computing	36%
Mobile Tech	27%
Digitalization	27%
Artificial Intelligence/Machine Learning	18%
Drones	18%
Regulatory Changes	18%

^aOther current disruptions/innovations described by at least one interviewee included agile processes, the internet of things, and the gig economy.

The innovations identified by the interviewees formed the basis of the list of innovations provided to survey participants. The list was then supplemented with other innovations identified in popular and business press, resulting in a list of 23 potential innovations provided to survey participants. Some of

the items on the list may not seem like innovations or disruptions to all organizations, especially to early adopters; however, the definition of innovation in this research is intentionally broad, because what is considered innovative can differ greatly from organization to organization. We chose to allow survey participants to describe activities that have been most innovative for *their* organization without further categorizing innovations as “new” or “old.” As a result, the study is informative to other practitioners who may fall anywhere along the spectrum of innovative organizations.

Using this list, survey respondents provided information about 331 total innovations that their organizations or internal audit functions are currently facing (or have recently faced). The survey then asked participants to select (up to) three of the most innovative and/or disruptive changes their organization has implemented or is in the process of implementing. (Not all participants provided three responses to this question.) Respondents could also add additional innovations/disruptions in a free-response field.

Based on the responses to the survey, 10 innovations were identified, each of which received 10 or more survey responses. Innovations with less than 10 responses were put into a category titled “other.” The number of responses and rank of the 10 most frequently described innovations appear in **table 3-2**.

Table 3-2: Most Frequently Identified Innovations from the Survey

Innovation	Definition	Number of Responses	Rank
Data Analytics	IT-enabled data analysis techniques used to draw insights from raw information sources.	54	1
Cloud Computing	Using remote servers hosted on the internet to store, manage, and process data.	48	2
Agile Processes	Approach to project management involving short “sprints” to produce multiple iterations of the product.	38	3
Mobile Technology	Using cellular technology to connect phones, tablets, or laptops to communicate.	35	4
Robotic Process Automation	Automation that allows the user to design a “bot” that performs routine, systematic tasks.	33	5
Continuous Auditing	Using automated methods to perform audit activities on an ongoing basis.	28	6

New Organizational Strategies	A wide range of organizational strategies were described by survey respondents (e.g., changing distribution channels).	16	7
Artificial Intelligence	Processes that use intelligent machines to work and react similarly to humans. Characterized by machine learning.	14	8
Regulatory Changes	A wide range of regulatory changes were described by survey respondents.	11	9
Digitalization	Conversion of text, pictures, sound, etc., into a digital form that can be processed by a computer.	10	10
Other Innovations	Various, including drones, blockchain, driverless cars, smart cities, internet of things, etc.	44	No Rank

Internal Audit's Response to Innovation in General

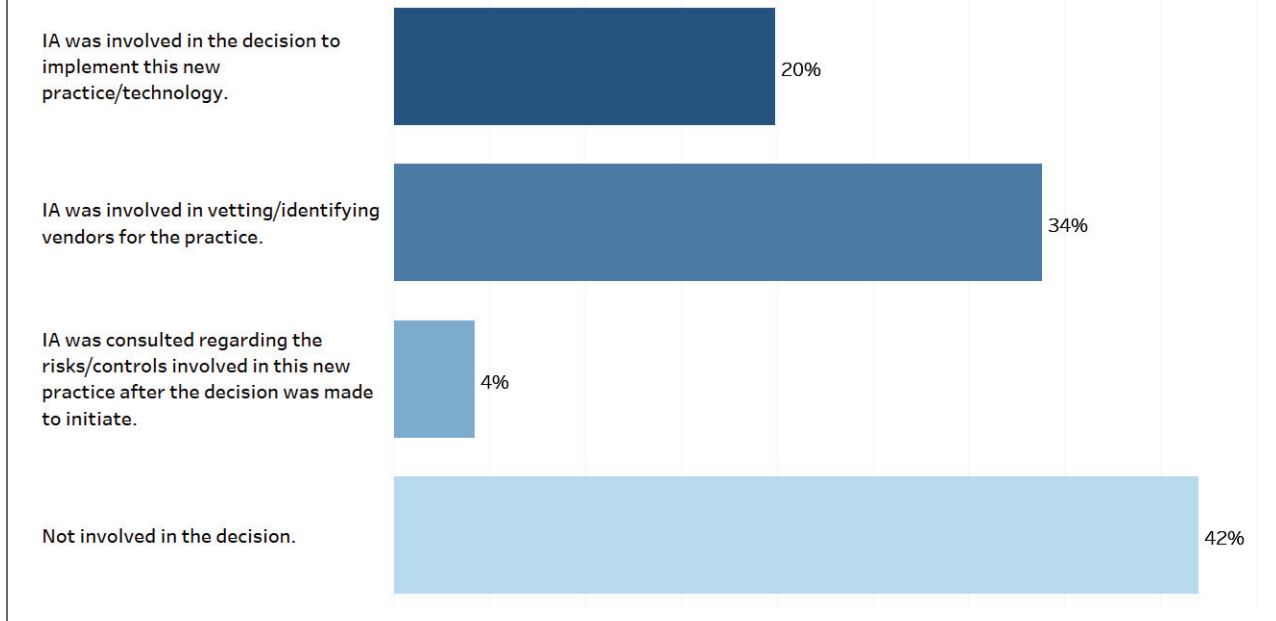
In addition to identifying innovations that are currently relevant, it is also important to analyze how internal audit responds to organizational innovation in general. This was done at a macro level by grouping survey responses related to all innovations together and focuses on internal audit's response to organizational innovation in three primary areas: 1) involvement of internal audit in the decision to innovate, 2) changes internal audit has made in response to the innovation, and 3) evaluations of internal audit's preparedness and effectiveness related to the innovation. The analysis of each innovation is detailed in chapter 4.

Internal Audit's Involvement in the Decision to Innovate

The impetus to innovate can vary significantly from organization to organization or from innovation to innovation. For example, an organization might innovate in response to customer needs, in an attempt to keep up with or differentiate from a competitor, or to adopt an emerging technology. Organizations also differ in how they execute an innovation decision. Of particular interest for this study, not all organizations include the internal audit function in the discussions surrounding the decision to innovate.

Respondents were asked to what extent internal audit was involved in the organizational decision to implement an innovation. As shown in **figure 3-1**, 42% of respondents indicated that internal audit had no involvement in the innovation decision. That is, the decision to implement an innovative or disruptive change was made without any input from internal audit.

Figure 3-1: Involvement in the Decision to Implement an Innovation



While it is important for the internal audit function to maintain independence and objectivity so that it can effectively provide assurance over such innovations in the future, it is potentially problematic to keep internal audit out of the innovation discussions completely. Internal audit can provide important insights into any new risks posed by the innovation, address whether existing controls are in place to potentially mitigate new risks, and help vet potential suppliers or external partners that will be involved in the implementation of the innovation. Each of these activities can be performed without a loss of independence and objectivity, if executed appropriately. In addition, and critically important, if the internal audit function is not involved in or at least informed about innovation decisions early in the process, they may be unprepared to provide assurance or consulting services regarding the changes. This can diminish internal audit’s ability to handle emerging risks resulting from the innovation, thus putting the organization at risk.

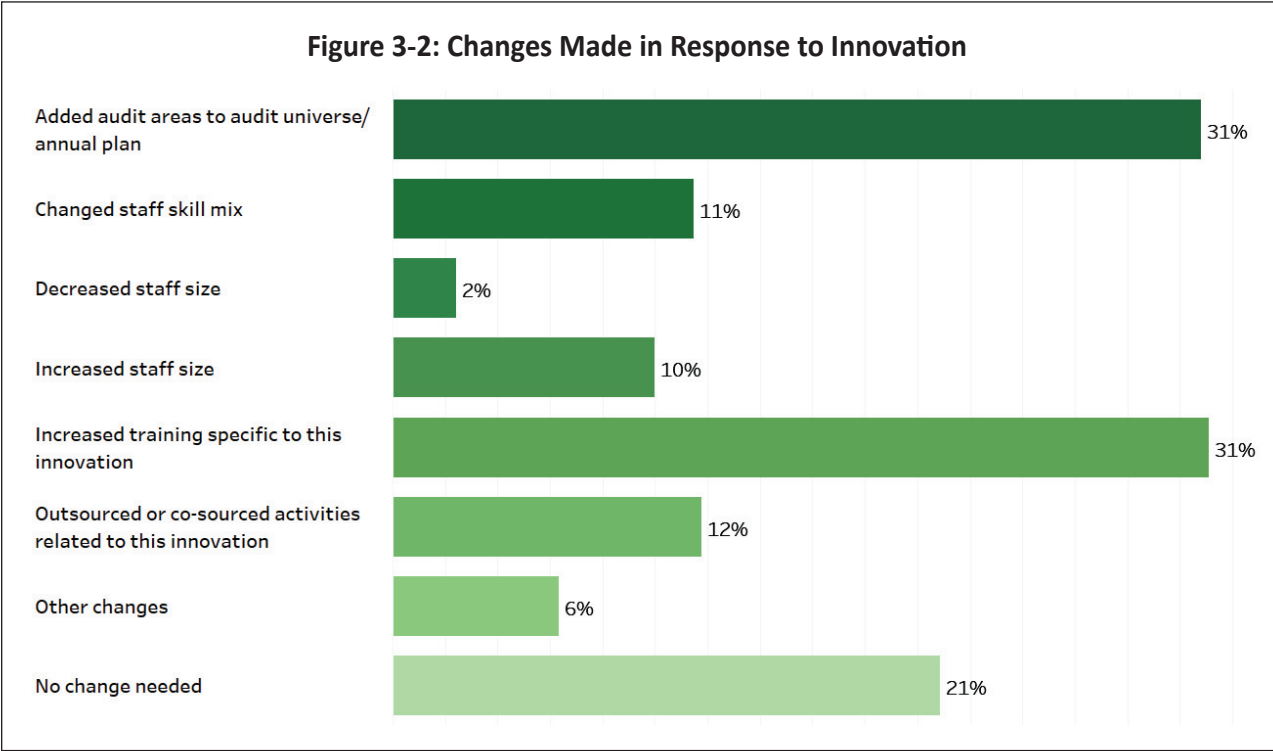
Returning to figure 3-1, when internal audit was involved in the innovation decision, most frequently (34% of the time) respondents indicated they were involved in the process of identifying and vetting the vendors or products that would be involved in the implementation. This support in the initial phase of an innovation project or process helps to proactively reduce the potential risk and identify potential room for improvement.

Respondents indicated 20% of the time that they were involved in the initial decision to implement an innovation. While we cannot tell from the survey the extent of internal audit involvement in the decision, insights from our interviews suggest that the involvement is often described as a position on a steering or risk committee. In this regard, the internal audit function can provide input without becoming consultative or violating the three lines of defense.

Finally, only 4% of the time internal audit consulted about the risks involved in the innovation and the controls necessary to mitigate those risks after the innovation decision. Again, this input could be provided without violating independence and objectivity standards. Further, this allows internal auditors to have early insight into the risks that they should be considering once the innovation is implemented and what new audit activities should be added to the audit plan. This lack of involvement in identification of risks and controls after innovations have been adopted represents a significant opportunity where internal audit can add value moving forward. Internal auditors should advocate for a seat at the table at this key decision point in the innovation process.

Internal Audit’s Response to Innovation and Disruptions

Many of the innovations and disruptions described by interviewees and survey respondents represent considerable changes in the technology or processes used to meet organizational objectives. As such, it is likely that the internal audit function may need to change its audit activities, personnel, or skillsets so that it can continue to add value and provide effective assurance in the face of these changes. Survey respondents were asked whether and how their internal audit function has changed in response to the innovations implemented at their organizations. **Figure 3-2** shows their responses. The most common changes described by survey respondents were increased training specific to the innovation (31%) and revisions to the audit universe and/or annual plan to focus on the new (risk) areas (31%).¹



¹ For this question, participants were allowed to select all responses that applied for each innovation; therefore, responses are not mutually exclusive, so the total adds up to more than 100%.

Response data suggests that internal auditors largely believe their existing internal audit personnel can effectively provide assurance regarding the new innovations. In particular, survey respondents were approximately three times more likely to indicate that they increased training rather than changed their staffing mix via outsourcing or co-sourcing the activities related to the innovation, or hiring new auditors with a different set of skills. Relatedly, 21% of respondents indicated that no changes were needed at this time.

Some anecdotal evidence from the interviews also supports the notion that, in general, internal audit functions may not be making major staffing changes to respond to organizational innovation. For example, in response to a question about factors necessary for the internal audit function to be prepared for technological innovation, a CAE from a global financial firm stated:

“I don’t think internal audit needs to have technology-specific expertise. I think we need general technology expertise. We need to have advisors that can help us, from a co-sourcing perspective, think through things that maybe we’re not considering and not thinking through. But most of this stuff follows principles that can be handled through [what we know and do] already. We have very capable audit staff.” (C11)

This CAE reiterated that the key to successfully responding to organizational innovation is to remain well versed in audit methodology, risk, and control. These same principles that have always been central to effective internal audit work continue to be critical in an evolving workplace. He did specify, however, that as he hires new internal auditors into the business, he focuses on “just getting smarter thinkers into this business. Fewer people who want to be told what to do and more auditors who are interested in generating ideas and innovative ways to attack risks and problems.”

Data also indicated that only 2% of the time internal audit functions have responded to innovation by decreasing staff size. Instead, when staffing changes are made, innovations are much more likely to increase staff size, as 10% of respondents indicated hiring additional staff because of an innovation.

Several of the innovations described by respondents could have direct staffing implications for internal audit. For example, innovative practices such as data analytics, robotics, and artificial intelligence were also described as new practices used within internal audit to facilitate and improve audit activities.

When fully implemented, each of these innovations has the potential to reduce the number of internal audit staff required (Cooper, Holderness, Sorensen, and Wood, 2019). Indeed, efficiency is one of the primary benefits of using data analytics in an audit process (Austin, Carpenter, Christ, and Nielson, 2019). However, current results suggest that respondents have not yet experienced the “doomsday” outcomes predicted by the popular press and some academic publications, suggesting a significant drop-off in the need for auditors and accountants (Frey and Osborne, 2013).

Internal Audit's Preparedness to Respond to Organizational Innovation

Finally, internal auditors were asked to identify how prepared they were to respond to each innovation and how effective they believed they were in response to the innovation. Both questions were rated on a seven-point scale, with 1 indicating being completely unprepared/ineffective and 7 indicating being completely prepared/effective. Across all innovations, on average, respondents were slightly below the midpoint of the scale, indicating they believed that they were neither prepared nor unprepared (score of 3.8). Similarly, on average, respondents indicated they believed they were neither effective nor ineffective (3.9) in responding to the innovation.

These middling scores seem to support the findings from the 2018 Global Chief Audit Executive Survey conducted by Deloitte. As discussed by IIA President and CEO Richard Chambers in the December 12, 2018 edition of *Internal Auditor* online:

"If you occasionally have doubts about the impact of internal audit on your organization, you are not alone. According to Deloitte's 2018 Global Chief Audit Executive Survey, a staggering 60% of chief audit executives (CAEs) believe the internal audit function does not have a strong impact and influence within their organization. And, while that's obviously bad news for internal auditors, it was actually an improvement from 72% in Deloitte's 2016 survey."

Thus, it appears that the profession of internal auditing faces a challenge as it prepares for and addresses innovation. Results suggest high variability in how each individual internal audit function is preparing for and effectively responding to innovation in their organizations, and even within their own internal audit groups.

General Response to Innovation

Analysis of the survey data yielded three important insights. Each is described below and includes support from our interviews, where relevant. First, the results indicate that in many organizations, internal audit does not have a seat at the table when innovation and organizational change is discussed. This represents the single most important finding of this study. To add value to the organization, internal audit must work to have a seat at the table and overcome the traditional perception of being a "watchdog." Without being part of the conversation, internal auditors will constantly be in reactionary mode and may be unprepared to address the changes facing the organization, thereby putting them further at a disadvantage for adding value to the organization.

The most obvious way internal auditors can add value regarding organizational innovation, while still maintaining independence and objectivity, is to leverage their strength of risk identification and control evaluation/design by helping the organization more fully understand the implications of innovation early

in the process. That only 4% of organizations are availing themselves of internal audit expertise in this area suggests a tremendous opportunity for internal auditors to play a more significant role.

As with the survey responses, interviewees reported that internal audit did not necessarily play an active role in the *decision* to innovate. However, those interviewees that described the most successful implementation of innovations indicated that internal audit was brought into the process at a fairly early point. For example, a CAE from a company in the financial industry described his involvement in the company's strategy governance committees: "The best practice I can think of is to be in an advisory capacity early on... Stay in touch with what is actually happening [in the organization]." (C11)

This sentiment was echoed by the CAE from a company from the automotive industry (C1) who further described how important it is to have a trusting relationship with senior management and operations because, "They need to keep us in the loop [about new innovations]. It works out better for everyone when we can really partner with them."

Similarly, a CAE from a financial organization attributed its internal audit function's preparedness to address organizational innovations to its involvement in the innovation decision. In particular:

"Here at [Financial], we have a seat at the table and have built trust with the business and the board. I think because [management] wanted us to be there at the forefront, it has opened the doors for us to get the right level of resources and training and backgrounds that we need [to be successful]." (C7)

A second, and nearly as critical finding as the previous finding, is the relatively lukewarm ratings internal auditors give to themselves for being prepared for innovation and being effective with innovation. These ratings could be interpreted in two very different ways. An optimistic interpretation suggests that given the significant and continual change that business and internal audit is facing, internal auditors are right where they are supposed to be. Using a river-rafting analogy, the internal auditors are squarely in the boat, not capsized or drowning from the rapid pace of change. A more pessimistic interpretation, again using the river-rafting analogy, is that although internal auditors appear to be in the boat, they are white-knuckle-clinging-to-the-sides not thriving on this trip and may be in for a rough future as the river speeds up and gets more complicated. Specific internal audit functions likely span the range of almost drowning to expert river guides. The key to moving forward is to get ready quickly as an even more thrilling pace of innovation with many potentially disruptive rapids is expected.

If these first two insights are considered collectively, it reveals an important insight for internal auditors. In particular, there is likely a reciprocal relationship between being part of the innovation conversation and the level of internal audit's preparedness and effectiveness with innovative changes. When internal auditors have a seat at the table during the innovation decision, even just as observers, they can better prepare and be more effective in response to the next change. Success with an innovation then increases

the likelihood that internal audit is involved in the future, creating a positive cycle of having a voice and being effective.

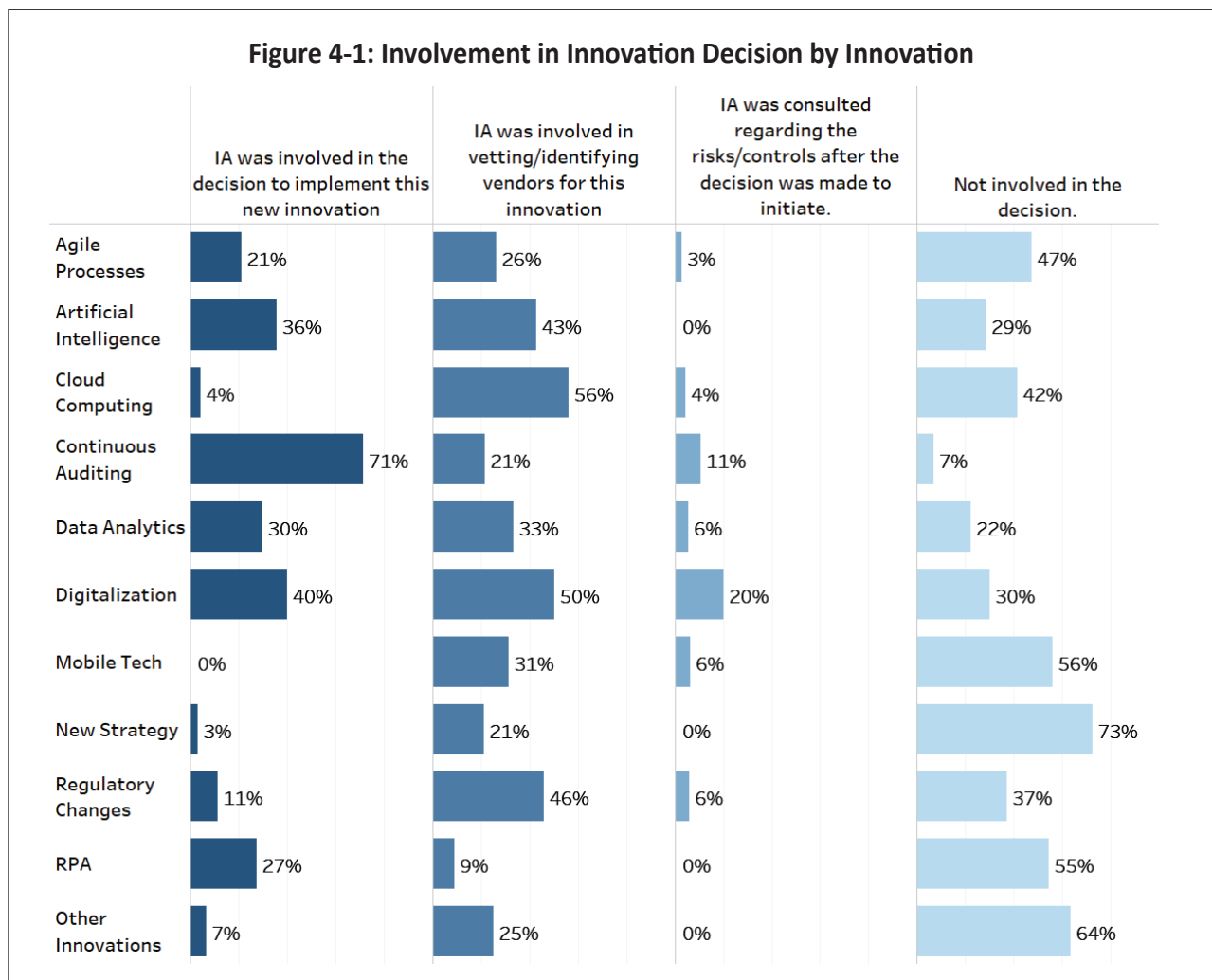
However, the opposite is true as well. When internal auditors are not involved in the innovation discussion early on, they may be surprised by and ill-prepared for innovation, diminishing their ability to add value to the organization and provide effective assurance. This cycle then is likely to continue with the internal audit function being less likely to be involved in the next conversation. This negative cycle threatens internal audit to be perpetually ineffective and marginalized as a voice in the organization. Getting on the positive path is critical for internal audit's future. In subsequent sections, we provide additional details and suggestions for how internal audit can be more prepared and effective for future innovations.

Finally, it has been consistently observed that innovation stretches and requires internal auditors to change. This change is generally required of the current staff as internal auditors are more likely to retrain their staff than increase staff size or hire specialists. This has critical implications for the internal audit group: hiring decisions need to consider the ability of candidates to adapt and learn, budgeting and time allocation decisions need to plan for significant training outlays of time and money, and individual internal auditors need to embrace continuous improvement and education. This latter point may be challenging because 21% of respondents do not think change is necessary to respond to innovation. This group of respondents may not yet fully understand the implications of the innovations being implemented by organizations today or in the near future.

Chapter 4

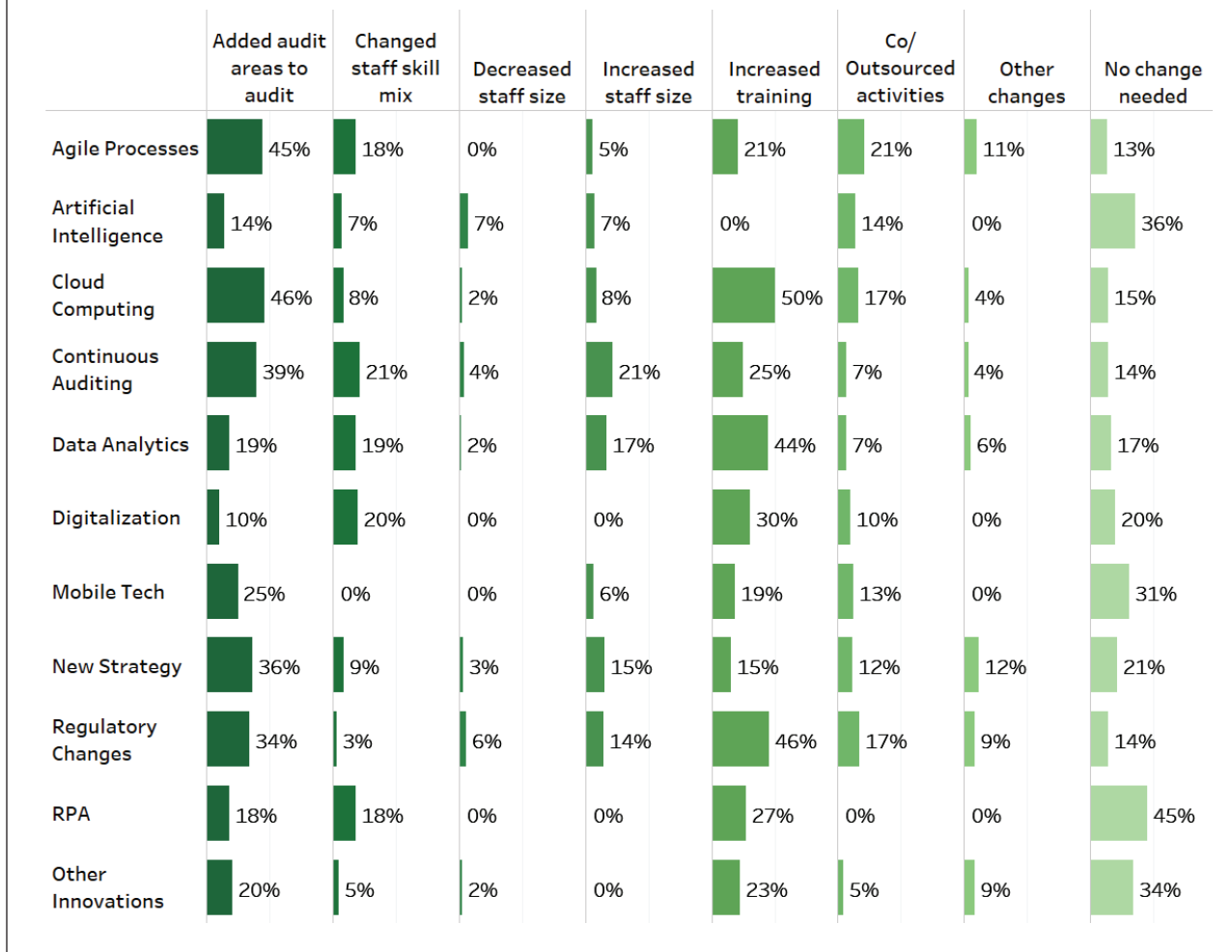
Innovation-Specific Responses

This chapter offers a more detailed examination of each type of innovation identified by respondents. To aid in comparison across innovations, **figure 4-1** and **figure 4-2** break the results down by specific innovation. In addition, **figure 4-3** shows a summary of the preparedness and effectiveness ratings for each innovation. In each of these figures, the innovations are presented alphabetically.



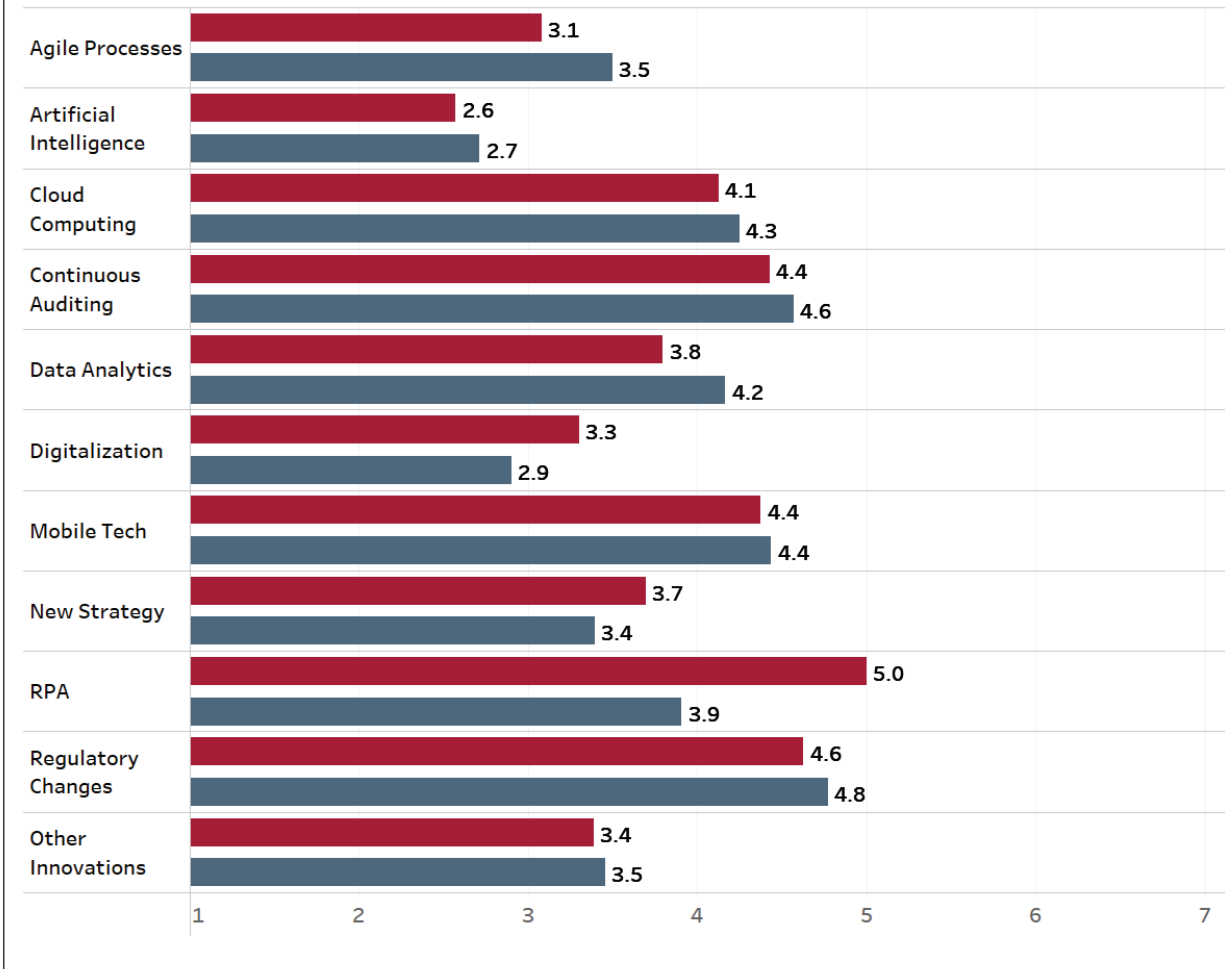
For each innovation, each bar indicates the percentage of respondents who indicated a specific type of involvement in the innovation decision process.

Figure 4-2: Internal Audit's Response to Innovation by Innovation



For each innovation, each bar indicates the percentage of respondents who indicated a specific type of internal audit function response to the innovation implementation.

Figure 4-3: Internal Audit’s Preparedness and Effectiveness by Innovation



For each innovation, the red (blue) bar represents the extent of internal audit function preparedness (effectiveness) in responding to that particular innovation using a seven-point scale, where 1 = completely unprepared/ineffective and 7 = completely prepared/effective.

Data Analytics

Definition

Data analytics is a broad term that encompasses IT-enabled techniques used to draw insights from raw information sources (i.e., data sources). In an auditing context, the American Institute of Certified Public Accountants (AICPA) defines data analytics as the “science and art of discovering and analyzing patterns, identifying anomalies and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling and visualization for the purpose of planning or performing the audit” (AICPA, 2017). Although data analytics is not necessarily new to all of the organizations interviewed or surveyed, participants agree that it has been transformative for their organizations, and the extent of its use continues to increase and evolve.

Data analytics can be implemented broadly throughout the organization to facilitate decision-making in all facets of the business. In these cases, internal audit functions must understand this new approach for decision-making and gain comfort with the processes management undertakes to develop its analytics. Additionally, data analytics can be and often is implemented internally within the internal audit function to improve the effectiveness of the audit. Indeed, internal auditors describe marked improvement in the efficiency and effectiveness of audits that use data analytics.

Effects on the Organization/Risks

When asked about the new risks their organizations face due to the implementation of data analytics, the most frequent response was risks related to data integrity. In particular, when organizations implement data analytics, individuals are likely to have access to various systems from which they pull and combine data for analysis. There is increased risk that analytics will be performed and subsequently relied upon for decision-making using incomplete or flawed data sets. Thus, effective governance processes need to be in place that identify who has access to data, how it will be used, and how it will be protected.

Respondents also described concerns about transparency in that more transparency means management and internal audit cannot “control” “bad” news as more people have access to the raw data. Also, transparency can be problematic as staff leave—they take more insights with them, potentially to competitors.

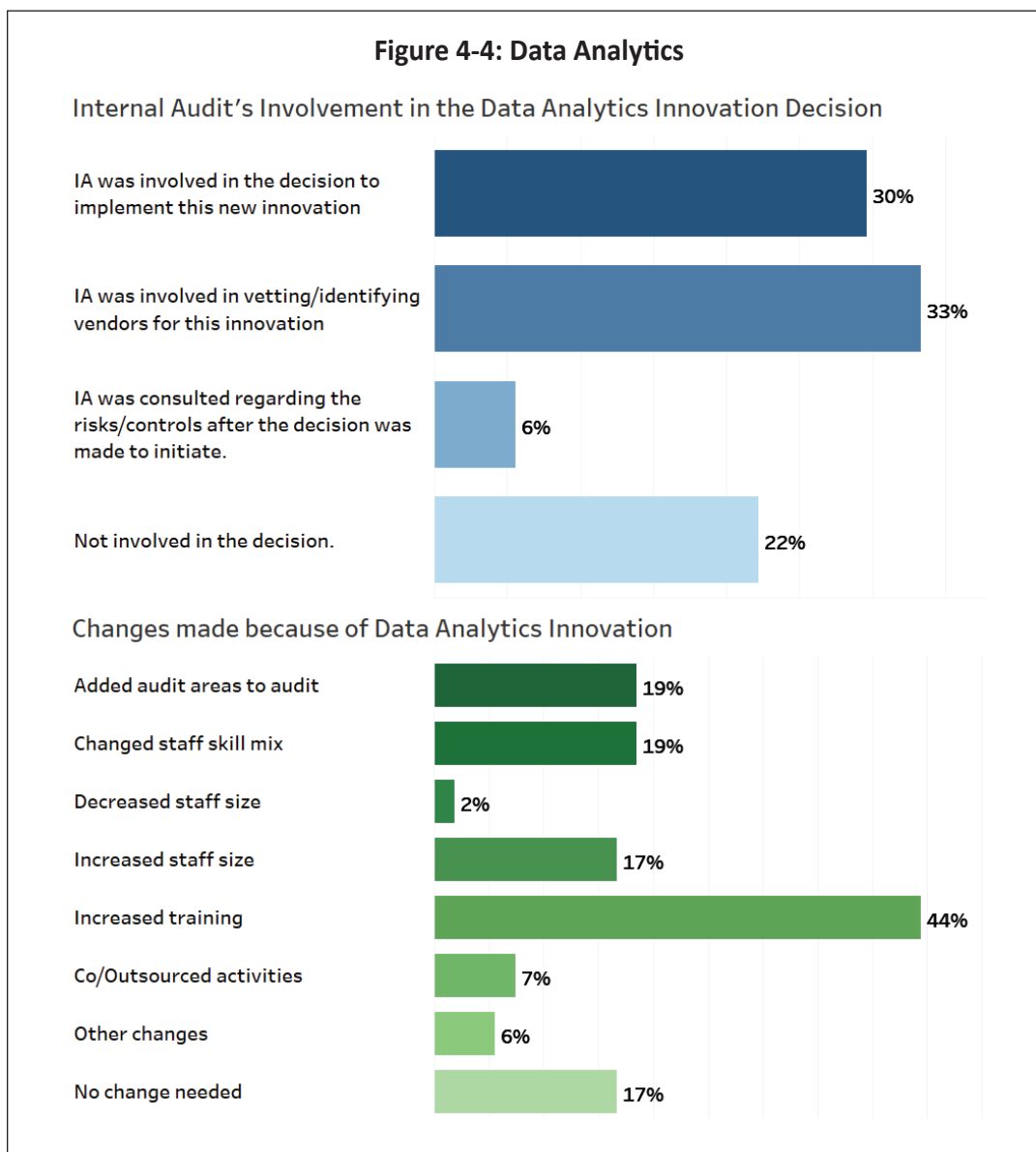
Organizations’ reliance on data analytics can cause challenges for internal auditors. For example, one CAE of a company in the financial industry (C11) indicated that data in his/her organization tends to be spread out and disparate, making effective use of data analytics challenging. Further, the organization did not apply a consistent methodology or discipline to analytics when first implemented, so it can be particularly challenging for the organization (and subsequently internal audit) to bring it all together and use it effectively.

Relatedly, a CAE from a utilities company (C4) described how each business unit in his/her company implemented its own version of data analytics to meet individual needs. Thus, there was no consistency across the organization, making it difficult to harness the power of analytics. Moreover, it was quite difficult for internal audit to provide assurance because of the disparate nature of the analysis.

When data analytics is used within the internal audit function as an internal audit tool, it can also create some challenges. For example, survey respondents warned that focus on data analytics can detract audit staff from having sufficient time to perform other types of audits, leaving stakeholders frustrated. Additionally, several respondents noted that having their staff perform data analytics increased turnover, as more of their staff were poached internally for management positions or by other companies. Having the resources to hire and retain skilled data analysts is difficult.

Survey Results

In our survey, 54 respondents selected data analytics as a major current innovation in their organization, more than any other innovation. Despite being the most common innovation, internal audit was not more or less involved in the implementation decision than for other innovations. Nor did respondents feel that their internal audit functions were more (or less) prepared to respond or effective in response to this innovation. Results can be seen in **figure 4-4**.



Insights

Survey respondents cited a wide variety of analyses performed with data analytics. More interesting than the diversity of analyses is the many tools that were reportedly used. As one respondent

stated, “[internal auditors should] avoid reliance on Excel just because Excel is easy to use.” Also, one respondent warned “be wary of free tools.” The most frequent tools cited were Tableau and ACL. R, Python, and SQL were the next most recommended tools.

Best Practices

- **Training:** Survey respondents described a new (internal) requirement to learn and improve data analytics as part of the audit scope and the audit team’s performance goals. By formalizing the training process and including it in the annual plan, the internal audit function was better able to improve performance using data analytics.
- **Maintain strong data governance:** Organizations should require and strictly enforce the documentation of data libraries, which helps significantly when staff leave their positions. Also, spend significant upfront time to have and keep data access and to structure the data in a controlled, meaningful way.
- **Control proliferations of analyses:** A common problem with data analytics is that there is no control over what analyses are done, saved, shared, and relied upon. Thus, duplication is possible and, worse, duplicitous analyses that have different results are possible (potentially due to error or misapplication of analytics techniques). Providing control over who can perform analyses and how these analyses are reviewed and stored is critical.

Cloud Computing

Definition

Cloud computing is the practice of using a network of remote servers to store, manage, and process data rather than a local server or personal computer.

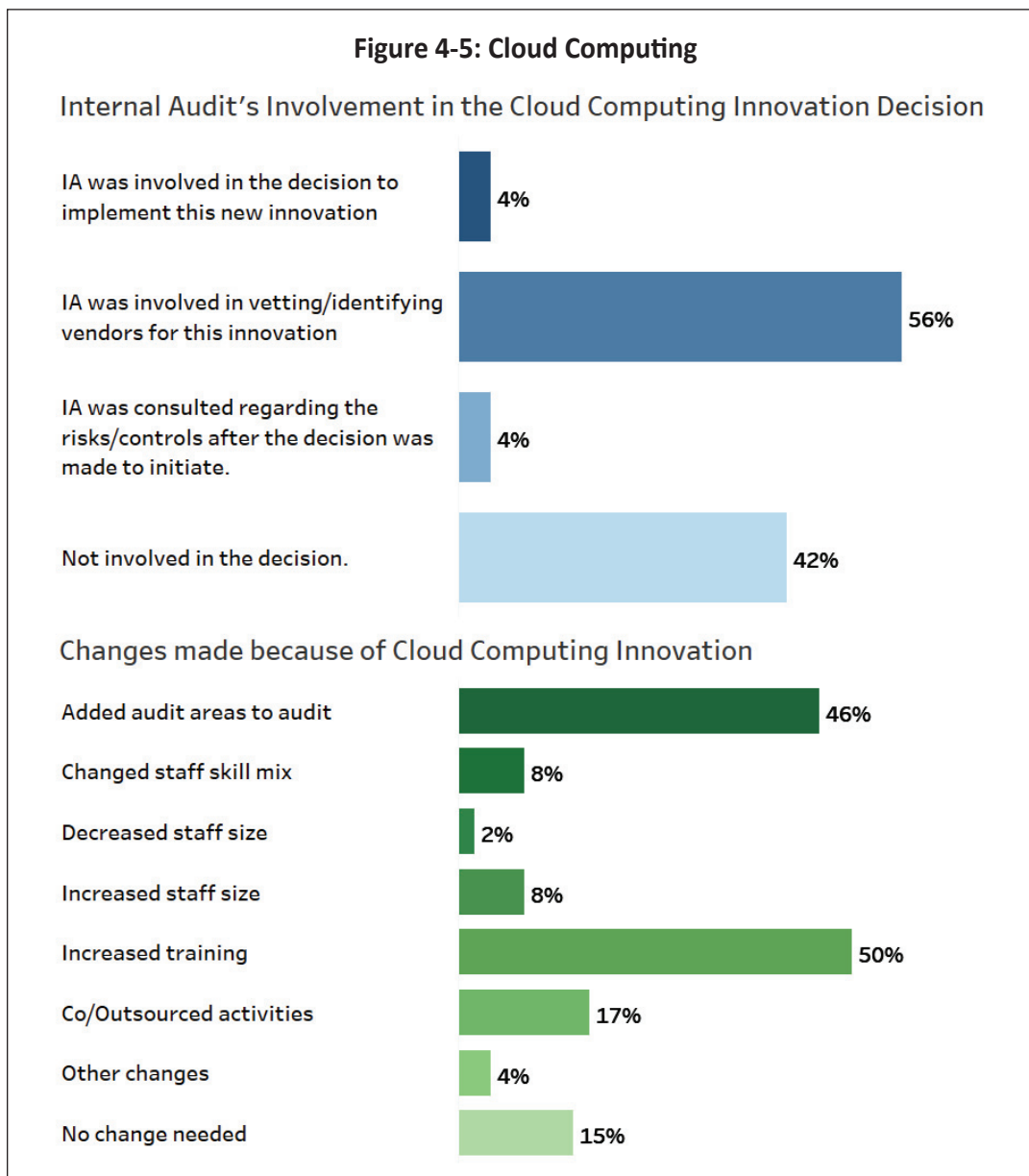
Effects on the Organization/Risks

As described by survey respondents, cloud computing introduces a host of risks to the organization, including those related to privacy, security, data breaches, data sensitivity, reputation, and regulation. Additionally, a shift to the cloud fundamentally changes the organization’s approach to data storage, use, and management.

As described in an interview by the CAE of a company from the food and beverage industry, “Our IT strategy is to move out of our own data centers and utilize the cloud. These cloud providers can do it for less money and more effectively and they have higher levels of security. It has changed the IT department quite substantially and it has changed how much talent [is] needed in the organization. The IT staff is about 1/3 less than it was a year ago.” (C5)

Survey Results

Cloud computing was the second most frequently reported innovation, with 48 survey responses. Survey respondents indicate internal auditors are more involved in vetting/identifying a vendor for this innovation than for all other innovations (36%). Cloud computing also scored the highest of all innovations for requiring auditors to add more areas to their audit plan and necessitating training in response to this innovation. In terms of preparation and effectiveness, cloud computing scored right in the middle with internal auditors neither agreeing nor disagreeing they are prepared and effective in this domain. These results can be seen in **figure 4-5**.



Insights

Given the prevalence of new risks elicited by a transition to the cloud, it is not surprising that many survey respondents strongly recommended evaluating controls surrounding cloud computing as a best practice. Further, they recommended hiring individuals with IT skills to facilitate the evaluation of cloud computing controls. Thus, as companies innovate using cloud computing, it is likely to shift internal audit hiring practices. Multiple individuals recommended hiring outside experts to conduct penetration tests and bringing in personnel with specialized IT skills. Finally, a consistent theme emerged that to be successful, respondents suggested building a very strong relationship with IT before moving to the cloud.

Best Practices

Survey respondents provided several specific recommendations that are worth noting, including:

- **Evaluate controls:** In addition to the standard evaluation of internal controls surrounding data security, privacy, etc., several respondents indicated the importance of evaluating “soft controls.” The move to cloud changed the culture of several companies and it also caused several companies to downsize IT employees—which often resulted in IT knowing significantly less about the organization. These respondents indicated that paying attention to things like culture and knowledge of the organization was important.
- **Increased IT expertise in the internal audit function:** The internal audit function will need to employ individuals with IT skills to facilitate the evaluation of cloud computing controls. As one respondent described: “[Our] recruiting focus has moved away from accountants towards people trained in coding, cybersecurity, informatics, and data analytics.”
- **Closely monitor your cloud co-sourcing partner:** Make sure to include as much detail as required to clearly communicate the results of testing. Assign staff to “shadow” your co-sourcing partner as much as possible to gain subject matter insights.
- **Be aware of costs:** Internal audit should help organizational leadership be prepared for cloud vendors who will not disclose the true cost of an implementation up front. There may be significant costs associated with maintenance that are not apparent during the negotiation phase.

Agile Processes

Definition

Agile processes (or the agile method) is an approach to project management with the goal to provide a high-quality product in a timely manner at a low cost. The process often involves “sprints,” which are incremental, iterative work sequences. This approach embraces change and focuses on delivering tested products in short iterations—think of software companies that release many versions (e.g., beta 1 version, beta 1.1 version, etc.) of a product in quick succession that make incremental steps of improvement with each new release.

Organizations can implement agile processes throughout their operations, thus affecting any function. When agile is implemented throughout the organization, internal audit must recognize that the business processes will have changed and the employees engaged in these processes will have a different mind-set and approach to project management. Additionally, the internal audit function itself may implement the agile method to conduct and manage its audit activities. In this case, the nature of the internal audit work will change such that internal auditors must be more efficient and flexible.

Effects on the Organization/Risks

There are a number of risks internal auditors should be aware of when the organization (or the internal audit function) implements agile processes. Survey respondents noted that agile requires a cultural shift and new way of thinking throughout the organization. The shift to agile introduces more ambiguity and constant change. As such, agile requires more discipline than in the past because often during a sprint, business process owners may not focus on internal controls and documentation. This can result in more problems for internal auditors, but because the nature of sprints is meant to be fast, they may struggle to perform their duties and provide timely recommendations.

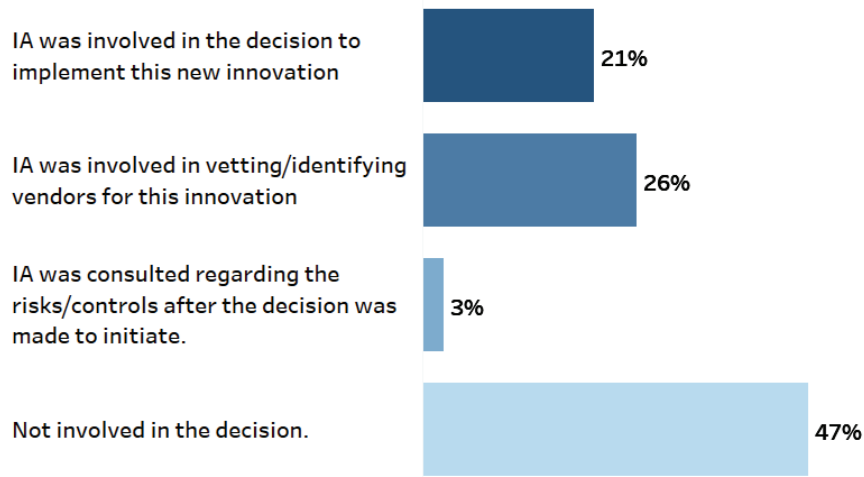
As an example of the change of thinking that is required of internal audit when an organization shifts to agile processes, consider a recent experience of the CIO of a large educational institution. The IT group had switched to agile processes but still had traditional internal audits conducted. The internal audit group conducted audits in a traditional way—set up a meeting, evaluate processes or controls, review all of their materials, and then provide recommendations/findings. The challenge from the perspective of the CIO is that by the time internal audit provided the recommendations for what they found, the IT group had already released two new iterations of the process that was audited. The findings of internal audit were simply irrelevant because of the fast-paced nature of the agile process. This left a sour taste in the mouth of the CIO. From the CIO's perspective, internal audit was an exercise of compliance that added little value because they could not keep up with the speed of the IT group. To provide value in an agile process world, internal audit must make significant adaptations to perform audits and report findings in a much closer to real-time fashion.

Survey Results

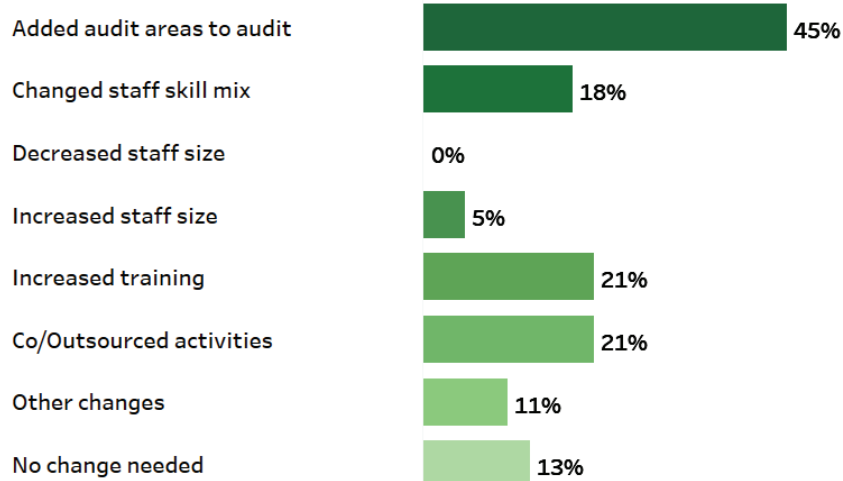
Of the respondents, 38% indicated that agile processes have been implemented by their organization (and/or within the internal audit function) and represent an important innovation (rank 4th). **Figure 4-6** shows that survey respondents report that internal audit is less involved in the decision to implement agile processes throughout the organization than the average of all innovations combined. However, when agile processes are implemented, internal audit is more likely to add new audit areas to the audit universe and annual plan than for almost all other innovations (only cloud computing had a greater number of responses).

Figure 4-6: Agile Processes

Internal Audit's Involvement in the Agile Processes Innovation Decision



Changes made because of Agile Processes Innovation



In addition, internal auditors feel relatively unprepared for agile process changes, but they believe they are of average efficacy in responding to this innovation. These results are likely because agile methodologies change the way audit activities are carried out, not just the focus of the audit (as with most of the other innovations described). Therefore, when an organization embraces agile practices, the internal audit function is likely to make changes to its entire audit process. Relatedly, internal auditors indicate that they have turned to outsourced/co-sourced providers for help with agile processes more than for any other innovation in our sample.

Insights

Survey respondents noted that moving to agile can cause greater burnout in staff auditors because of the pace of work and the constant change. A majority of respondents also indicated that their biggest challenge with agile is the lack of resources, especially in terms of individuals who understand this process. Finally, one interviewee reported that agile can require a different mindset related to annual planning. As one CAE explained, “We used to have an annual plan and that was our plan and we would stick to it, and we would show it to the audit committee in December and then we would execute everything in the next year. But now, it’s much more of an ongoing agile approach. When something pops up... we say, okay, let’s look at what we have for the next four months and reprioritize something.” (C4)

Best Practices

Survey respondents provided numerous suggestions for how to deal with the risks brought about by the implementation of agile methodologies, as described below.

- **Open communication:** Respondents overwhelmingly reported the need to have open communication between senior management and the internal audit function and for internal audit to be involved in the decision to implement agile. In particular, respondents recommended that internal audit attend regular meetings as the agile methodology is implemented and all training or demonstration of products used to facilitate the transition to agile processes.
- **Leveraging expertise through co-sourcing/outsourcing:** Several respondents indicated that employing co-sourced/outsourced talent can be especially valuable early on in the efforts to implement agile.
- **Recognize the learning curve:** One respondent provided an important reminder—“expect ramp-up time and decreased efficiency at first as the team adapts.”

Mobile Technology

Definition

Mobile technology relates to using cellular technology to connect phones, tablets, or laptops to communicate. Respondents indicated a broad range of applications for mobile technology—from tracking people and assets (e.g., planes, trucks, etc.), to converting paper-based documentation efforts to digital using tablets, to providing solutions for customers.

Effects on the Organization/Risks

The respondents indicated the typical cyber risks (e.g., privacy, data integrity, security, etc.) for this technology with an added emphasis on the availability of computer systems. They also had concerns around

theft and unauthorized access because there were more points available to exploit by hackers. Furthermore, many technology multinationals and foreign governments forbid their people from bringing private or company smartphones or laptops to different countries. Although not explicitly mentioned by our respondents, organizations and internal audit functions also need to consider “bring-your-own-device” (BYOD) policies. If organizations allow individuals to choose which technology they use, the organization is exposed to the risks of whatever software is on employees’ personal devices.

Survey Results

As seen in **figure 4-7**, internal audit had little involvement in this innovation except for vetting/identifying vendors to implement the mobile technology. Internal auditors largely believed they did not need to change their audit processes in response, except to add audit areas to their annual audit plan. The respondents also had relatively high evaluations of preparedness and effectiveness.

Insights

Creating a working framework to monitor and control the specific risks is complicated in organizations, especially because of the heterogeneous mobile technology landscape. Often, the COBIT framework is used to develop the potential risks and responses coming from mobile technology. Therefore, it is important that enterprises identify all internal and external processes and resources influencing their mobile activities to effectively govern the technology.

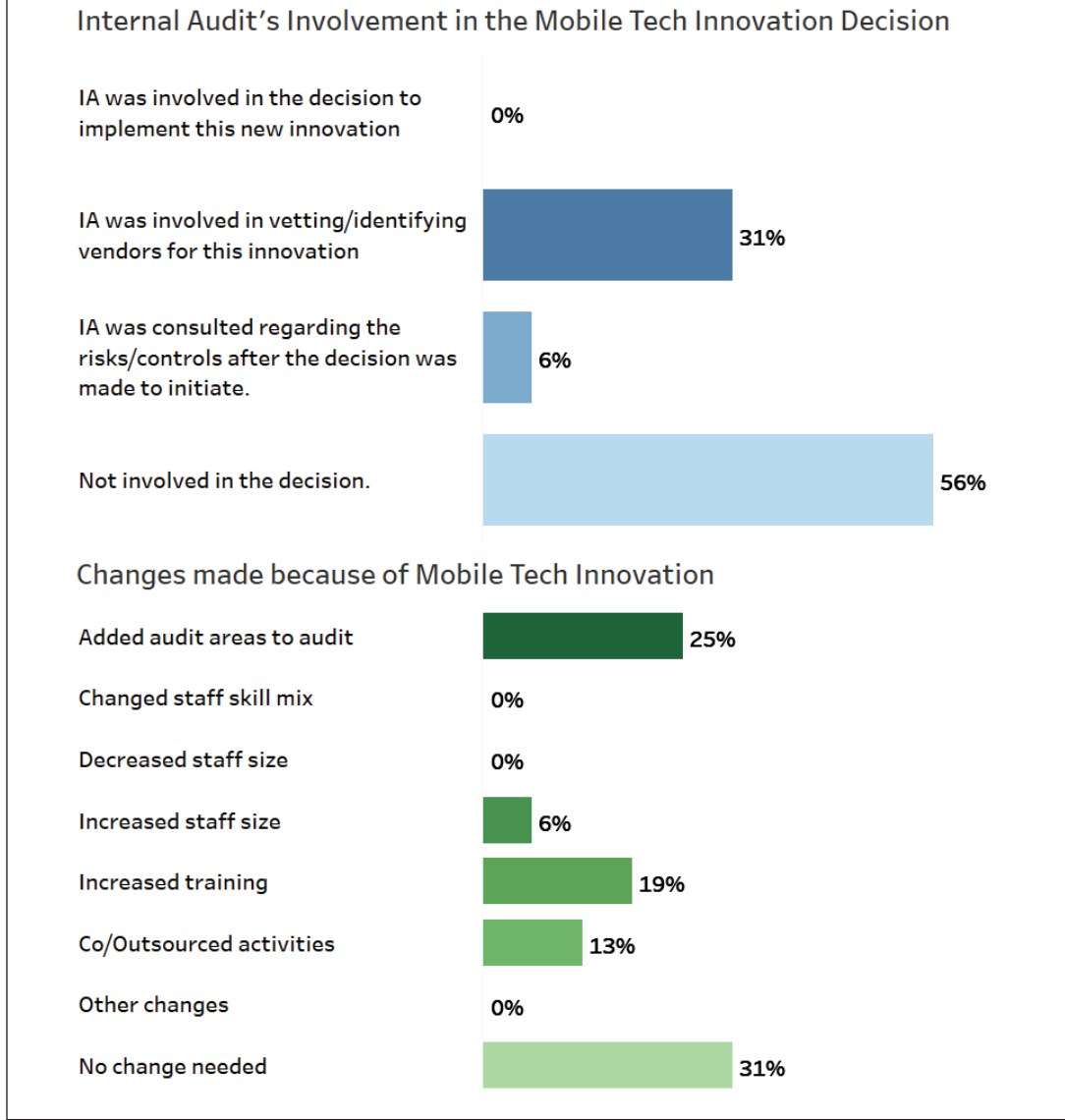
Additionally, one CAE we interviewed works for an organization in the transportation industry that is in the middle of a major digital innovation that will transform the way customers interact with the company and the product. S/he described internal audit’s current role as performing advisory audit projects:

“We [currently] have an ongoing advisory audit project that relates to the mobile ticketing application. We provide an independent assessment every four to six weeks on project progress, project deliverables, milestones and things of that nature. [The organization is] also looking to revamp our second mobile application, a mobile informational app, and internal audit is involved in the back end due diligence around the vendor we’re selecting to do that service. So we’re involved in an advisory capacity.” (C3)

Best Practices

- **Strategic and operative objectives of mobile technology:** Internal auditors have to understand why and how mobile technology is implemented so that the internal audit function can identify the potential risks and necessary controls.
- **Alignment with relevant functions and creating a risk culture:** Because mobile technology (and especially mobile devices) are used for numerous purposes and in nearly all areas of an

Figure 4-7: Mobile Technology



organization, it is necessary to collaborate with other involved functions such as IT, corporate security, etc. to align all activities and create a risk culture for mobile technology.

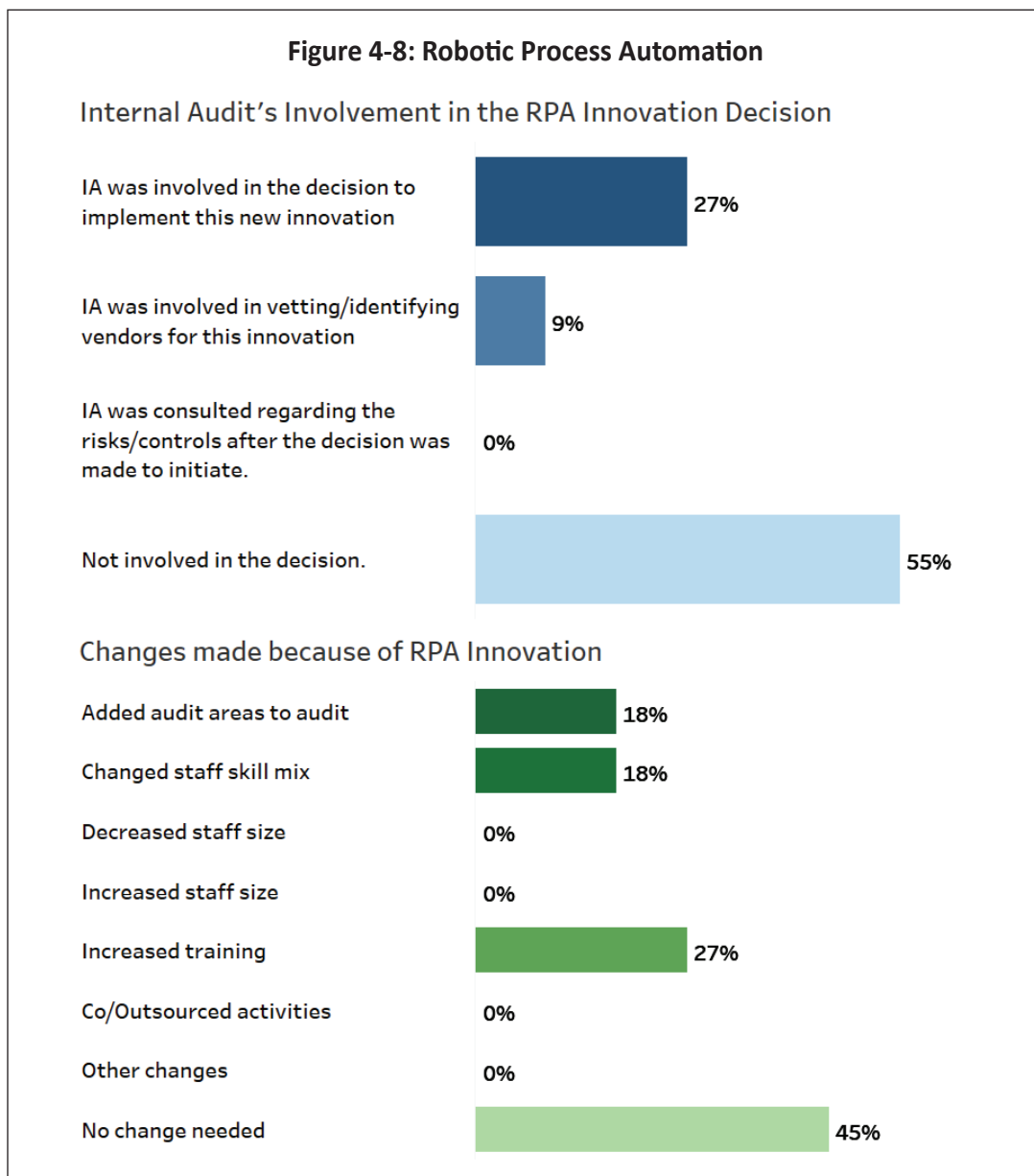
Robotic Process Automation

Definition

Robotic process automation (RPA) is a type of automation that allows the user to design a “robot” or “bot” that performs routine, systematic tasks. Bots essentially do the exact same steps that a human would perform. They do not have “intelligence” like AI, although groups are working to build intelligent process automation (IPA).

Survey Results

The quantitative answers to RPA are intriguing. Internal audit is not heavily involved in the decision to implement RPA—55% indicate they had no involvement (see **figure 4-8**). Of all the innovations, RPA is the one respondents believe they need to make the fewest changes. A full 45% of respondents said no changes were needed in response to the RPA innovation in their organization. Also, internal auditors are most confident in their preparation for RPA relative to all other innovations. This is likely because, as described by a CAE from the financial industry, RPA could essentially be audited the same way these activities were audited when executed by a human. The bigger concern s/he raised was that it is critical that *bad processes* are not automated because, given the efficiency with which RPA can perform activities, mistakes can be exacerbated quickly.



Yet, internal auditors also believe they have not been very effective with auditing RPA in the past. This combination of a relative lack of involvement, no perceived need to change for this technology, high confidence in preparation, but low assessment of past effectiveness is puzzling. It seems like internal auditors may either not fully understand what this change involves or else may be overconfident in their abilities to perform well with it.

Insights

The qualitative responses shed little additional light on this issue. The respondents indicate that when RPA is used in internal auditing, it is mostly used to automate tasks and controls related to the U.S. Sarbanes-Oxley Act of 2002. They recognize that there are significant risks for a poorly designed bot—it could be highly efficient at doing the wrong thing. The technology is powerful, as shown by case studies that show incredible return on investment when properly implemented. For example, one business did a trial run of using RPA by having an employee self-train and automate the process of rolling up the data for 400 tax reporting entities into a single tax entity. The employee was able to build a bot for the process. While the previous process took four people two weeks to complete, the bot did the entire roll-up in less than 24 hours. Although the technology has tremendous potential for efficiency and effectiveness gains (Cooper, Holderness, Sorenson, and Wood, 2019), as with all technologies, it can be misapplied and create significant organizational problems.

The same risk exists when RPA is used throughout the organization. For example, as a CAE from the oil and gas industry described:

“When we have a [bot or drone] collecting data, then we need to understand what is happening. If everything is automated, there is a lot of risk around it, because as soon as the bot or drone starts doing something wrong, it’s going to keep doing it wrong until we catch it. That is the risk around bots in general. They are great because they don’t have human error, but they also don’t have the human brain. Once they start doing something wrong, they are going to keep doing it wrong until a human brain intervenes...”

Our responsibility in audit is to understand the controls that are in place and to make sure that the bot is functioning as designed. I really emphasize to our auditors that it is important to bring our risk and control framework to these processes and realize that we may not understand how the bot works. But, we do need to help the client identify the risks and controls in place and if there is a control gap. Then we need to focus on testing the controls and not the actual process.” (C4)

Best Practices

- **Recognize your limitations and focus on what you know:** While some survey responses suggested that auditors feel confident that they know enough about technology to perform an effective audit of RPA, others cautioned against overreaching. Instead, as described above, auditors should focus on what they know well—the risks and controls of the process—and not try to audit a technology that they do not truly understand. When needed, seeking input and expertise from subject matter experts or outsourcing aspects of RPA audits are appropriate alternatives.

Continuous Auditing

Definition

Continuous auditing is the application of computer technology to the audit such that tasks that were previously performed manually and infrequently can be performed in an automated, real-time, or near-real-time manner. Although there are numerous possible definitions (see also Eulerich and Kalinichenko, 2018, for a discussion), The IIA offers helpful guidance. As described by an IIA Global Technology Audit Guide (GTAG), “Continuous auditing comprises ongoing risk and control assessments, enabled by technology and facilitated by a new audit paradigm that is shifting from periodic evaluations of risks and controls based on a sample of transactions to ongoing evaluations based on a larger proportion of transactions. Continuous auditing also includes the analysis of other data sources that can reveal outliers in business systems, such as security levels, logging, incidents, unstructured data, and changes to IT configurations, application controls, and segregation of duty controls” (IIA, 2015).

The concept of continuous auditing is not new. In fact, internal auditors have been striving for continuous auditing for decades. However, the emergence of sophisticated data analysis tools and the availability of full populations of data make the execution of continuous auditing possible for more organizations. As a result, for many survey respondents, continuous auditing represents an important innovation that is changing the way they audit.

Effects on the Organization/Risks

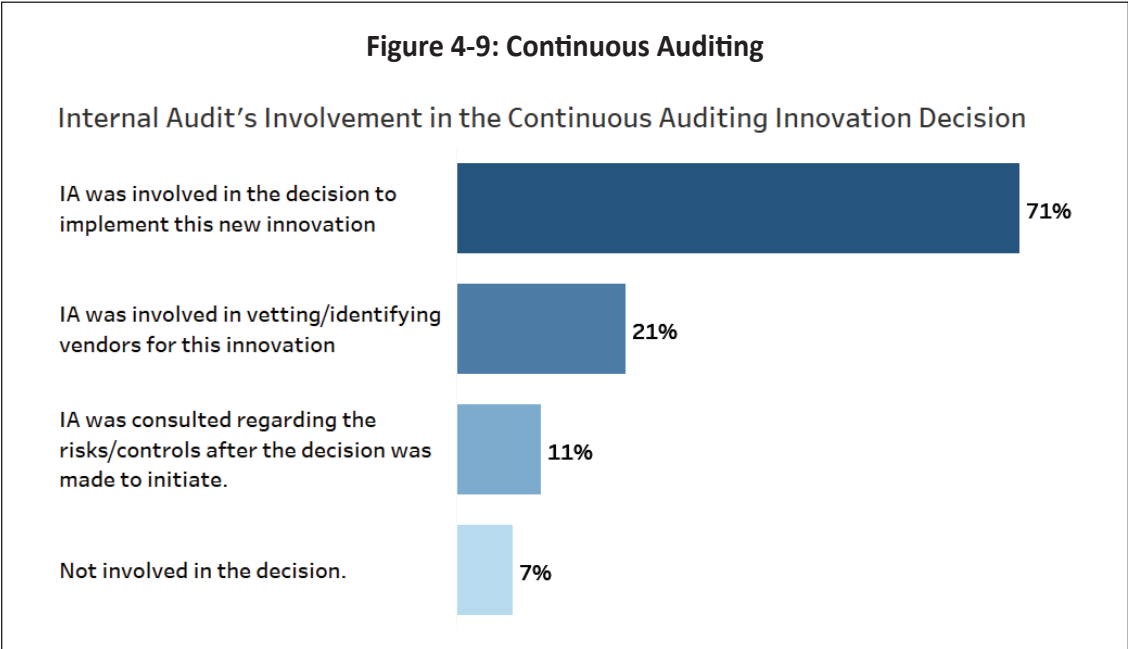
Continuous auditing involves ongoing risk and control assessments aided by technology-based audit activities. It allows internal audit to have a more real-time view of the risks and controls in the organization. This allows internal audit to be more agile and respond to changes in risk or lack of control more quickly. With more real-time monitoring and response, internal audit should be more apprised of risks and thus better able to provide value by focusing audit attention where needed. Indeed, as described in the related GTAG, continuous auditing should help the internal audit function revise the audit plan such that it is more responsive to risk. One concern described by survey participants is that continuous auditing can lull internal auditors into a false sense of security. If the continual checks are not properly

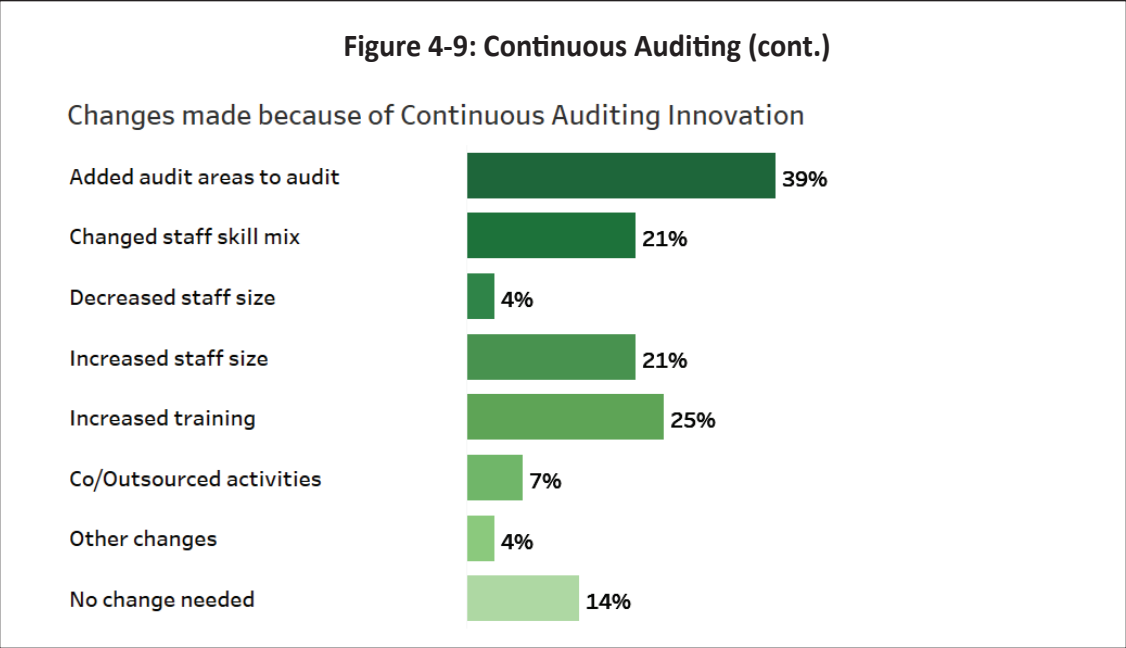
designed, or if internal auditors have a misunderstanding of the process, internal audit may believe controls are effective when they are not.

Survey Results

Of all the innovations surveyed, internal audit was the most involved in this innovation, with only 7% of respondents indicating they were not somehow involved in the implementation of continuous auditing. Further, 86% of respondents indicated that implementing continuous auditing practices required changes to the internal audit function. This is not surprising given that continuous auditing necessarily involves a transformation of internal audit practices.

Somewhat surprisingly, survey respondents indicated that when continuous auditing practices were implemented, the size of the internal audit function staff most often *increased*. In fact, this innovation increased staff size more often than any other innovation measured. Finally, respondents reported that they were relatively effective and prepared in implementing this innovation. Results can be seen in **figure 4-9**.





Insights

The qualitative responses to the survey reveal differences in opinions as to how continuous auditing influences staff size. This is illustrated by the following two comments on the opposite ends of the spectrum:

“13 years ago it was decided internal audit would do the same [continuous] audits. Now one director can oversee one staff auditor per location. This saved the company over 20K per auditor and the entire salary of audit managers that we no longer have.”

Versus:

“[We] doubled the size of our staff to accommodate the additional workload.”

The difference is very likely in how continuous auditing is implemented from organization to organization. As one survey respondent noted, “If [implemented] incorrectly, [continuous auditing] can also introduce unnecessary administrative burden, high numbers of false positive values, etc.” Whereas another respondent noted that continuous auditing “if done right...is truly transformative.”

Best Practices

- **Close relationship with management:** Having a close relationship with management should help avoid duplication in continuous auditing and continuous monitoring done by various operational units. Also, it was noted that a close relationship with management can increase the perceived

value of internal audit's effort, resulting in greater buy-in from management. Indeed, as described in the related GTAG, continuous auditing, if implemented effectively, should reduce overlap and the associated "audit fatigue" felt by process owners who believe there is duplication of effort across the three lines of defense.

- **Coordination with other governance functions.** Because continuous auditing and continuous monitoring also can be settled with functions of the second defense line, the coordination between the governance functions and the clear assignment of responsibilities and tasks are of central importance.

New Organizational Strategies

Definition

The "new organizational strategy" innovation relates to either the business or the internal audit function implementing a new strategy, a new market, or a new business model.

Effects on the Organization/Risks

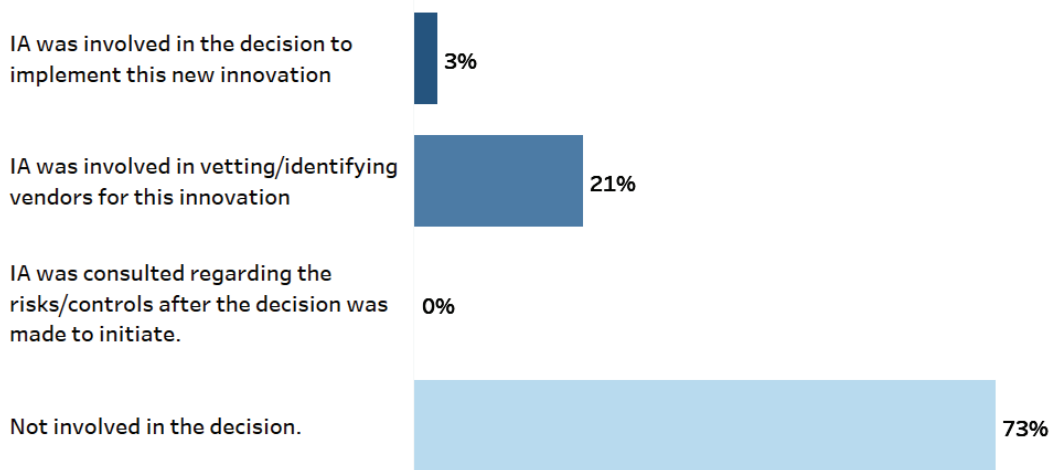
Survey respondents described several risks that arise when organizations implement new strategies. First, new strategy can cause change fatigue, reducing audit quality and increasing turnover. Several respondents also noted that during implementation it is "difficult to audit moving targets." The transition can also be difficult as internal auditors have opinions about the strategy itself—indicating things like the strategy is overly simplified, has an unrealistic implementation schedule, etc. Internal auditors report struggling when the culture of the organization is that one should not disagree with top management who designed the strategy.

Survey Results

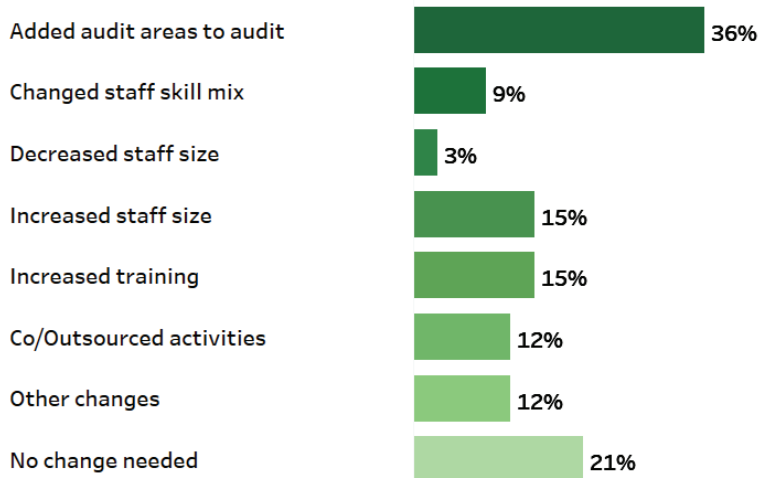
Internal audit had the least participation in this innovation compared to all innovations. Indeed, respondents said this was the biggest problem and their most important recommendation—" [internal auditors] want to be involved in the strategy discussion," stated one participant. Although wanting to be more involved in the strategy decision, the data shows that internal auditors do not exude confidence regarding their preparation or their effectiveness in response to new strategies. These results can be seen in **figure 4-10**.

Figure 4-10: Organizational Strategy

Internal Audit's Involvement in the New Strategy Innovation Decision



Changes made because of New Strategy Innovation



Insights

Academic research suggests that internal audit can be effective in helping with strategy. Specifically, Jiang, Messier, and Wood (2019) find that when internal audit is involved in strategy advisory or consulting services, the organization has a higher return on assets. Academic research also suggests several reasons why internal auditors may not have a seat at the table. First, research shows that external auditors and business professionals have a relatively negative perception of internal auditors (Burton, Starliper, Summers, and Wood, 2015; Bartlett, Kremin, Saunders, and Wood, 2016, 2017).

Furthermore, when internal auditors are perceived negatively, they add less value and are less persuasive in their communication (Eulerich, Kremin, Saunders, and Wood, 2019). Survey respondents echoed

these sentiments: “management does not see value in [internal audit]” and “internal audit is still struggling to recover from being [perceived as] a ‘watch dog’ type [group].”

Best Practices

- **Educate senior management:** Internal auditors need to be aware of how they are perceived and be proactive in creating positive perceptions about their group. As one respondent recommends, “Educate senior management on the role of internal audit. It is more than testing and reporting.”
- **Attend a diverse set of trainings:** To be part of the conversation around strategy in an organization, internal auditors need to have a broad set of skills. They should consider attending diverse trainings to develop a holistic understanding of their business and industry.

Artificial Intelligence

Definition

AI is the use of computer programs to perform tasks that typically require human intelligence or judgment. Examples of AI currently under development or in use at organizations in this research include using chatbots for customer service, making product-buying recommendations, and performing actuarial work.

Effects on the Organization/Risks

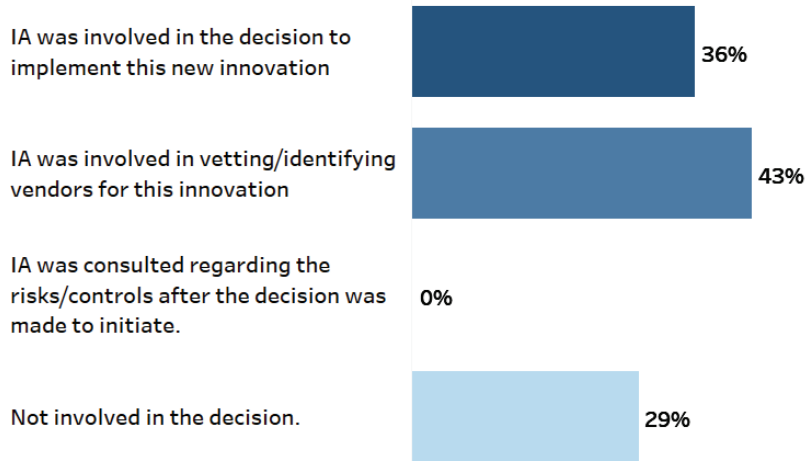
AI has the potential to be as transformative to business as the internet has been over the past several decades. Yet, AI is still in its infancy and there is a great deal to understand about its influence in organizations. In this vein, it is not surprising that one survey respondent indicated that internal auditors are prone to overestimate their expertise and ability in this domain. Respondents indicate that understanding AI will take more work as there are steep learning curves to gain more than just a perfunctory understanding of the technology. Indeed, one of the greatest risks identified of using AI is that individuals may *use* some form of AI but not understand what the AI is actually doing. When a new scenario is introduced, the concern is that the AI can be misapplied because of this lack of understanding.

Survey Results

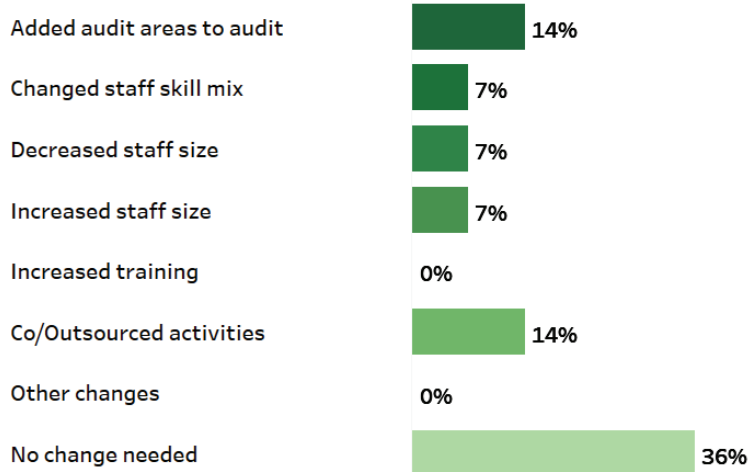
Fourteen survey respondents (and three interviewees) indicated that their organizations are implementing AI to some extent. As **figure 4-11** shows, internal audit was relatively highly involved in the decisions to implement AI, with nearly 80% of survey respondents indicating that internal audit was either generally involved in the implementation decision or vetted potential AI vendors.

Figure 4-11: Artificial Intelligence

Internal Audit's Involvement in the Artificial Intelligence Innovation Decision



Changes made because of Artificial Intelligence Innovation



Relative to other innovations, respondents indicate that very little change has been needed (to date) to respond to AI innovations within the organization (i.e., the second least amount of change of all innovations). However, several respondents indicated this was the case because this innovation was still new and at a very early stage in their organizations; therefore, internal audit has not begun auditing AI processes in earnest. Also interesting is that media outlets often report that AI is going to replace jobs; yet, respondents indicated an equal number of organizations that were going to increase or reduce staff because of AI.

Finally, of all the innovations measured, respondents report that they are the least prepared and least effective in the area of AI. This is likely due to the significant technological skills required to review and understand the underlying code that is used to program the AI. Results are illustrated in figure 4-11.

Insights

When examining written responses from survey participants, several noted that they are concerned about the “black box” nature of AI. That is, they are not sure if/how to audit the technology when they cannot observe how the machine is making its decisions. They are also concerned with the performance of the AI and the potential for largescale error if the machine learning is not accurate. For example, chatbots are one AI technology that some firms are adopting. The purpose of a chatbot is to interact with customers—generally to answer questions related to customer service. However, if the customer’s questions are not phrased in a way that is recognizable to the chatbot, its response (or lack thereof) can be nonsensical or insufficient, thus frustrating the customer. Customer dissatisfaction is often further exacerbated upon realization that s/he is interacting with a bot and not a human.²

Best Practices

In preparing for this innovation:

- **Training:** Internal auditors need training, and as one respondent described, internal auditors must “understand the principles of AI, not just [recognize] the phrase as a buzzword.”
- **Understand the organizational plan for AI:** Another respondent recommended that internal audit functions get a road map for how process owners and executive management plan to roll out AI in the future so internal auditors can prepare.

Regulatory Changes

Definition

Regulatory changes involve all requirements imposed on an entity by an external group such as a government, funding source, stock exchange, etc. Respondents indicated that there is a very broad and diverse set of regulatory changes that influence their organizations. As an example of this diversity, participants cited regulatory changes by industries, including banks, government contractors, insurance, gaming, and health care; by different levels of governments, including local, state, federal, and international governments; and by types of activities, including taxes, cybersecurity/privacy, financial reporting, and privacy laws. As stated by one participant, “Regulatory rule changes on an ongoing basis every year. We just try to adapt to whatever changes are expected of us.”

² There have been a number of high-profile chatbot failures where chatbots provided insensitive, racist, or sexist responses to questions such as Microsoft’s Tay, which can cause significant public relations problems for the organization.

Effects on the Organization/Risks

There are several risks that respondents indicated were critical when responding to regulatory changes. The most present on the minds of respondents is that failure to “get this right” can cause the business to suffer fines, reputational damage, or even shutdowns. They also cautioned that there is a strong tendency for individuals to want to go back to the more familiar “old” process. Change is also time-consuming. As stated by one respondent, “The Internal Audit Department will need to review and revise all the audit programs and other documentation used in order to implement the new regulatory changes. This is going to be a lot of work.”

Survey Results

As seen in **figure 4-12**, internal auditors report that their response to regulatory changes are usually two-fold: to change the audit plan and to increase training. Indeed, this innovation required the second-highest increase in training. Outsourcing/co-sourcing received the second-highest rating as well, where respondents look to receive help from others for this innovation.

Given the constant nature of regulatory change and internal audit’s deep experience in this domain, it is not surprising that internal auditors believe they are the most effective in responding to regulatory change of all the innovations surveyed. They also believe they are prepared for this innovation, second only to RPA. There seems to be confidence in internal audit’s ability to handle regulatory changes. As stated by one participant, “Regulations change all the time. This is not something you need to ‘respond to.’ You simply modify certain procedures, forms, etc.”

Insights

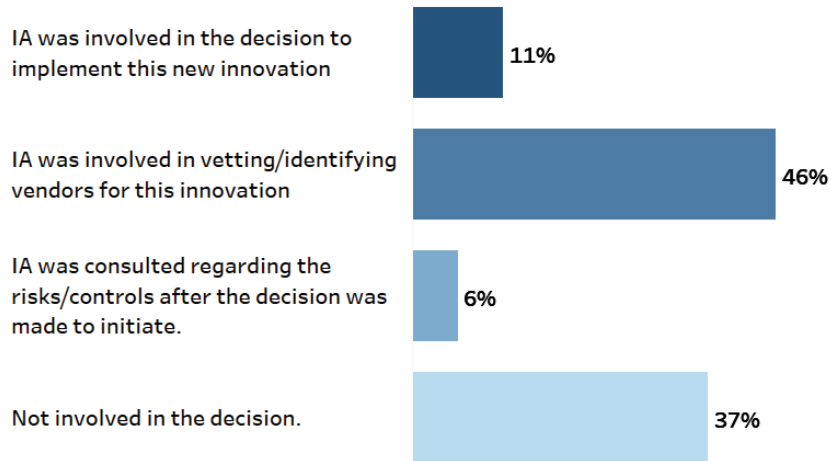
Most of the interviewees mentioned regulation as either the disruption they are facing or a factor that will deeply impact the innovation they are considering. As a result, regulation is front and center in their minds. In general, CAEs emphasized the importance of being knowledgeable about current and potential regulations. Anticipating the risk and changes that will arise when a new regulation is established is key to the internal audit function being seen as a trusted advisor and adding value to the organization.

Best Practices

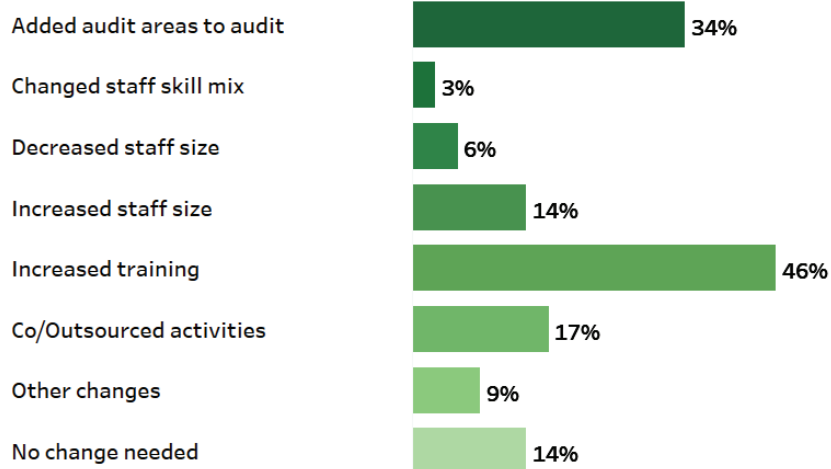
- **Coordinate with the second line of defense:** Participants suggested partnering with the second line of defense or the compliance function is a key way to keep pace with regulatory changes. For example, one respondent noted that “access to legal counsel and policy staff regarding the regulation and how it was developed, implemented, and is being operated” is very helpful.

Figure 4-12: New Regulation

Internal Audit's Involvement in the Regulatory Changes Innovation Decision



Changes made because of Regulatory Changes Innovation



Digitalization

Definition

Digitalization is changing a business model by the use of digital technologies to provide new, value-producing opportunities.

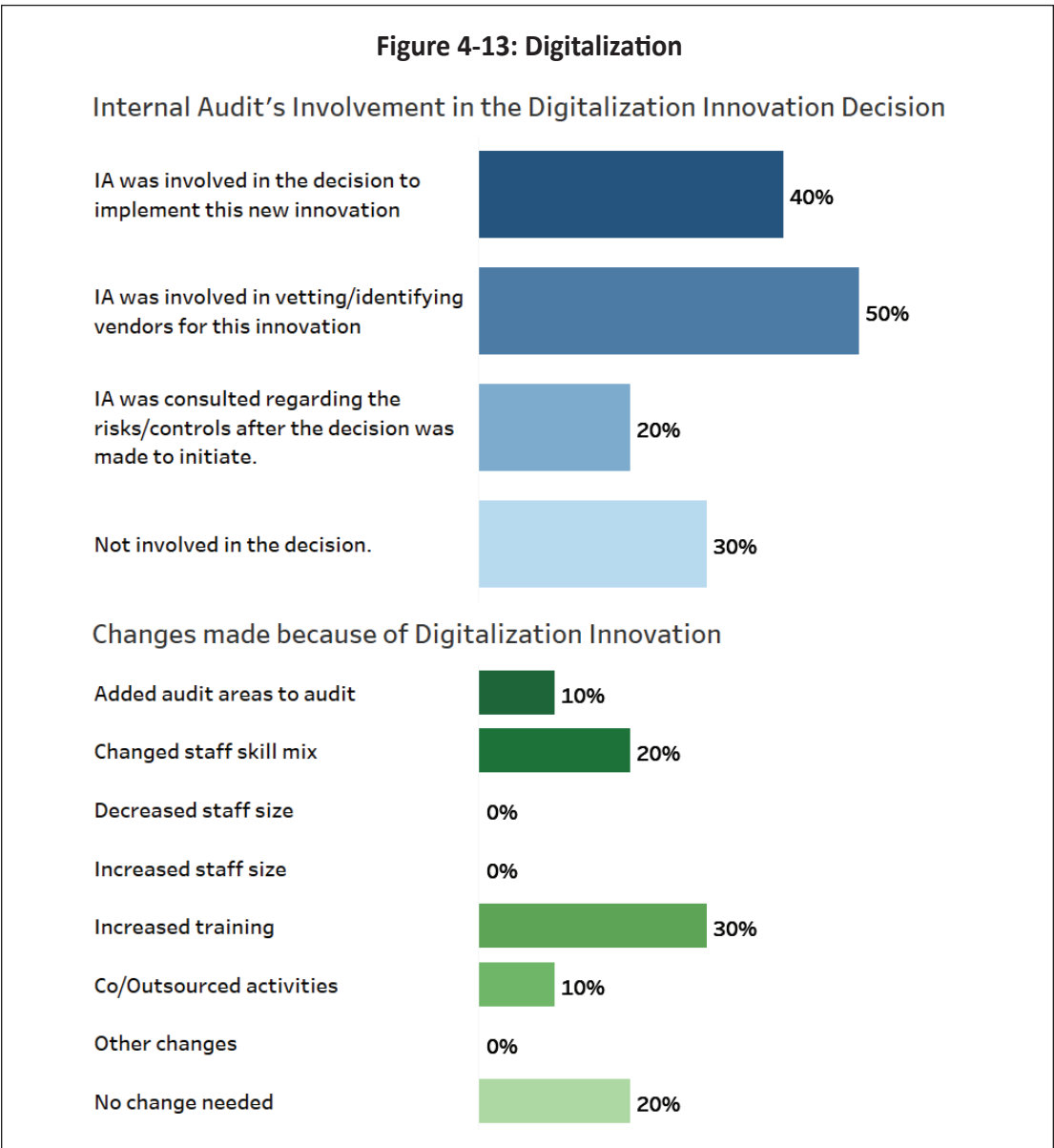
Effects on the Organization/Risks

As organizations become more digital, the tools and processes used to deliver products and services to customers transform. With these changes there are new risks for organizations (and the internal audit function) to consider. In particular, digitalization is associated with increased cybersecurity risks because

now key data and inputs are collected, recorded, stored, and processed electronically. Relatedly, there are key risks related to the functionality of the technology itself. Technology failure or obsolescence can have a major impact on operational performance or the value proposition of the organization. Digitalization also (most likely) requires partnership with third-party vendors.

Survey Results

As seen in **figure 4-13**, internal auditors were highly involved in the decision to implement the technology and in vetting/identifying vendors for digitization. Respondents indicated this innovation was their second-highest involvement of those studied. More so than the other innovations, internal auditors were consulted about the risks and controls that would be effected by digitalization. Digitalization also



commonly results in a change in staff skill mix and requires substantial training efforts. The internal auditors also felt relatively unprepared for digitization (3rd least) and ineffective in their audit efforts (2nd least). Clearly, this is an innovation that stretches internal auditors' skillset and deserves significant attention and preparation by internal audit before the organization implements it.

Respondents in the health-care industry were the most likely to undertake this innovation. Several respondents indicated that their digitalization efforts focused on digitizing records (e.g., patient health records). As such, internal auditors indicated risks related to data security, integrity, and privacy as critical risks to manage. Another respondent outside the health-care industry reported that a significant challenge was managing the transition from the old way of doing business to the new way of doing business. It was not as easy as flipping a switch. It required significant planning and effort to manage the transition period.

Insights

One CAE described a recent digital transformation at his/her organization that changes the customer experience. Essentially, the digital interface allows customers to interact with the organization's system in real time. For example, if a customer needs to change his address, once he enters it into the digital application, the change has been (officially) made in the organization's system (rather than through a batch process, as is the case with a typical mainframe system).

One of the primary risks associated with such a digital transformation is execution risk. The resource investment required for a project like this is really high and the product development time is considerable. So, while the payoff will be very high, the organization has to work efficiently to execute its digital products. If it does not, its competitor will. "If we don't get this right, we actually become exposed to new—new entrants to the market, disruptors that can do digital things really fast."

This CAE continued to explain internal audit's role in this innovation:

"We do a lot of advisory work on it up front. We'll do risk assessment work with [the appropriate department]. And then as they get closer to implementation, we'll start doing pre-implementation audit work. [Reviewing the process to determine whether they are] doing the right testing and have good triggers for go/no-go decisions. And whether there are red flags to watch for. Just your typical pre-implementation audit work." (C11)

A different CAE from the financial industry also pointed out that with increasing digitalization, customer transactions that previously would have had a physical audit trail now only have a digital imprint. So now there is increased risk around cybersecurity and maintaining system security because all of the information about transactions is now sitting on storage devices and the cloud instead of in a paper file somewhere. S/he continues:

“I think one of the things for internal audit is to really understand, you know, what levels of protection do you need when you’re dealing in the internet of things, and then how do you audit and make sure that your cybersecurity and all of your technology protections are in place?” (C7)

Best Practices

- **Hiring the right (technology-focused) skillset:** As organizations move to digitalize their operations, it becomes more critical that the internal audit staff have the appropriate technical acumen and IT risk knowledge. As a CAE for a governmental agency described when asked how s/he can best prepare for these challenges, “I’ll continue to push the envelope on more skills around data analytics, around knowledge of mobile risks, cybersecurity risks, other technology-driven risks.” (C3)
- **Invest in your people:** Innovation (like digitalization) requires a flexible, agile internal audit workforce. CAEs also recommend really investing in the existing audit staff by increasing targeted training and working to make them true experts in the field. Specific training/skills described include cybersecurity and network security. While this may make the internal auditors targets for other jobs within and outside the organization, it should still be the goal of the internal audit function to truly invest in its people.

Chapter 5

Overall Best Practices

Review of interview and survey data reveals several important themes or best practices to help the internal audit function effectively respond to innovation within the organization.

1. Have a Seat at the Table

The single most common and important piece of advice given by interviewed CAEs was to ensure that the internal audit function is informed about all innovations very early in the process. Ideally, this means the head of internal audit should have a seat at the table during the innovation decision. Of course, all CAEs were careful to specify that the internal auditors should be *present* when the innovation decisions were being made, but should not be involved in a manner that violates independence and objectivity standards. Instead, they should be called upon to help the organization identify the new risks and potential control activities that would be necessary if the innovation were implemented. Relatedly, they can help vet potential vendors.

By having a seat at the table, internal auditors can provide critical risk and control information that can help the organization make wise innovation decisions that are more likely to be successful. Further, an additional benefit of their early involvement is that they will be informed of the innovation before it is implemented. This allows them to prepare—perhaps by hiring auditors with the requisite skillset, engaging in innovation-specific training, and/or adding the innovation to the audit plan. Without this early notice of a major change coming down the pike, internal audit is stuck in a reactionary mode, sometimes not even becoming involved until something goes wrong.

2. Effective Communication

The second-best practice described is to ensure effective communication between the internal audit function and other organizational personnel involved in the innovation (e.g., senior management or the functional manager responsible for the innovation). This effective communication can start with internal audit having a seat at the table as described previously, but it should also continue throughout the process. Innovation-specific successes and failures should be communicated to internal auditors so that they can adjust their audit plan accordingly and review or provide assurance on innovation activities in a timely manner.

When it comes to innovation, a common piece of advice given throughout the business world is to “fail fast.” If a new process, technology, or product is not going to work, it is better for the organization to figure that out quickly and cut its losses—possibly before the problem grows out of control—or it faces significant reputational and market effects. Communicating with internal audit throughout the innovation implementation and process should increase the likelihood that the internal audit function will be able to perform more timely assessments and provide meaningful recommendations to management about the innovative new practice.

3. Strong Governance

While “strong governance” seems like an obvious best practice for all organizations, it becomes even more critical in organizations that are encouraging innovation. Several interviewees described situations at their companies where individual people, divisions, or business units were innovating on their own without adhering to an organization-wide strategy or policy on innovation governance. As a result, 1) the internal audit function was not always informed about innovations that were implemented until it was too late to provide guidance, 2) similar but different innovations were implemented across the organization, making comparison and evaluation nearly impossible, and 3) innovations such as sophisticated data analytics were performed in such a way that data integrity could not be confirmed or data access policies were violated. In each of these cases, the lack of a strong, coherent governance structure put the organization at significant risk, which could have been avoided with effective forethought, governance development, and meaningful communication.

4. Role in ERM

Again related to ensuring that the internal audit function is knowledgeable about any and all innovations being discussed and implemented, CAEs interviewed recommended that the internal audit function have some involvement in ERM. To some extent, this involvement could substitute for internal audit having a seat at the table because, assuming that the ERM function is included in the innovation discussions, internal audit would also be informed due to its ERM role. But, in general, this recommendation highlights the importance of internal auditors being knowledgeable about all organizational risks early enough that they can prepare to address them in an audit capacity as needed.

5. The Internal Audit Function Should Be an Innovator Itself

The internal audit function should be a leader in the organization. This means that it should also be working to innovate its practices so that they are more effective and more likely to add value to the organization. Further, as experts in risk, the organization should be able to rely on internal audit to be aware of the innovations and disruptions affecting other organizations in the industry and area. Through involvement in professional organizations, attendance at meetings, and broad training and

development, internal auditors should be knowledgeable about the changes that might be coming even before the organization begins its exploration.

As a result, a variety of the innovations affecting organizations on a broad level could also affect the internal audit function specifically. Practices such as data analytics, robotics, AI, agile, and drone technology could be used in internal audit long before the organization considers implementing them. As such, the organization could look to internal audit for training and insight. Indeed, when discussing data analytics specifically, many internal auditors have been using data analytics for a longer time and to a greater extent than back-office functions like finance and accounting. The organization can then look to the internal audit function for help, staffing, and expertise. While it may cause short-term staffing difficulties if the organization hires data analytics experts out of the internal audit function, the long-term benefit of being seen as a source of skill and leadership is well worth that cost.

Also, many internal audit functions suffer from the image of “watch dogs” or being primarily backward looking. As an organization innovates, it would not be surprising that they would not seek guidance from a division that is not perceived to be particularly cutting edge or innovative itself. By innovating within the internal audit function, internal auditors can signal that they have the right expertise and their input is helpful—no—critical when the organization is making innovation decisions.

6. Cultivate the Right Skillset

As the organization innovates, whether the internal auditors are called upon for insight up front or for assurance services once the innovation has been implemented, it is important that they have the right skillset to meet the needs of the organization. Of course, given the highly technical nature of many of the innovations that organizations are currently implementing, technical savvy and IT know-how are increasingly important. However, potentially more important is for internal auditors to be intellectually curious, flexible, and willing to learn about the new practices and technologies that come with the innovation. Eagerness and the ability to learn quickly are critical. Today’s environment is fast-paced and exciting. Internal auditors need to embrace the challenge of addressing new risk!

Chapter 6

Conclusion

Today, innovations and disruptive strategies are part of state-of-the-art organizations and stand as a symbol of strength and success. However, when organizations innovate, it means that management, boards of directors, and audit committees need new information to fulfill their responsibilities and internal audit must understand and provide assurance over new (disruptive) audit objectives.

Technology and management practices are changing at lightning speeds and organizations require adequate risk coverage and knowledge of potential risks. The internal audit function must be aware of its role in supporting the entire organization with regard to technological changes so that stakeholders receive information about innovation and disruptive threats timely and the risk of inaction is minimized.

Ideally, the internal audit function would assess the risks of potential innovations so early and proactively that the organization could use these insights to inform the innovation decision, thereby protecting the organization from making a poor decision. Unfortunately, such a priori risk assessments of innovations are difficult to execute and may be more akin to looking into a crystal ball than a systematic and structured auditing process. Nevertheless, the organization and, in particular, the internal audit function must establish a system or process to promptly identify risks related to innovations within the organization. In other words, a good internal audit function should ensure that the innovation strategies and changes fit into the organization and the respective risk appetite. For this reason, close cooperation and communication among management, the executive board, and the audit committee is necessary and should inform internal audit's audit plan.

The most innovative organizations are using existing and new technologies to evolve in unprecedented ways, which can even redefine competition across multiple industries. As a result, innovation changes not just one business unit but entire organizations, often across industries. Internal audit should take this opportunity to give its stakeholders independent insight and evaluative foresight. Because of its organization-wide activities, internal audit offers an extremely valuable perspective for addressing innovation and creating added value in an innovative environment through its assurance and advisory activities. Thus, the internal audit function can do much more, for example, by examining innovations at an early stage or auditing activities geared to the organization's innovative processes and business models.

Although internal audit is an ideal contact to support the organization in innovative processes, not least because of its experience in reviewing processes and risks, not every internal audit function is involved in the innovation process. Internal audit is thus faced with the challenge of strengthening its image as a competent partner of management and creating an awareness of the fact that it can generate additional added value if it is informed of changes at early stages of the innovation process. The goal for internal audit is to be involved in assessing and uncovering risks and weaknesses before innovations are implemented. However, this also applies from the perspective of the internal audit function itself. Only when the internal audit function is prepared to face the innovative processes and, if necessary, adapt its own approaches can it unfold its full potential against this background.

The lack of awareness on the part of management as an obstacle to better preparation of the internal audit function for dealing with innovations was viewed quite critically by the participants. However, the internal auditors not only reflect on how they are perceived by other stakeholders but also on the potential for improvement in the audit departments themselves. According to the participants in this study, the future of internal auditing will be shaped by closing knowledge gaps through innovation-specific training or the recruitment of specialists, especially IT experts. These approaches are key factors for success.

Interestingly, some of the internal auditors in this study state that they are better prepared to react to future innovations and changes than to innovations already introduced in the organization. Although The IIA's International Professional Practices Framework (IPPF) states that the internal audit function should be future-oriented and proactive, the question arises as to whether these statements are realistic with regard to future changes in the organization, especially since disruptive technologies, the dynamic environment, and a high level of uncertainty characterize the future of many organizations. While the preparation for future innovations is of enormous importance, internal audit's ability to react to currently relevant and recently introduced innovations should not be considered less important. The present results therefore invite reflection on the current strengths and weaknesses of internal audit.

It is important that innovations be more than “buzzwords”—they must be conscientiously implemented and monitored. Ultimately, internal audit is challenged to identify and understand both the risks and the opportunities to support the new technologies introduced in the organization. It also must have enough critical knowledge and skills to effectively manage innovation, both as an audit objective and to support its own work in the internal audit function. In the context of innovation, internal auditors can create additional added value if they openly and proactively addresses the new issues. As trusted advisors, they create trust and an understanding of risk and ideally identify further potential room for improvement.

As a provider of independent and objective assurance and consulting services, the internal audit function may not be the “spearhead” of innovation in an organization. But, by providing a critical examination of innovations and innovative approaches, it can further hone its skills and reputation as a value-added function. An important goal to motivate internal auditors should be that the internal audit function is perceived in the long term as a future-oriented supporter of the organization.

Appendix A

Detailed Participant Information

Interview Participants

Semi-structured interviews were conducted with 11 CAEs (or internal audit directors) over the course of three weeks. **Table A-1** provides basic demographic information about each interviewee. These CAEs come from a diverse set of organizations. All are headquartered in North America (and their internal audit functions are operating out of North America), but five of the organizations have global operations. The size and scope of the internal audit operations at these organizations vary as well. However, each is an active member of The IIA and these CAEs and their organizations are recognized as having effective internal audit functions. Indeed, each described their relationship with management and operations personnel as more of a trusted advisor than a watchdog. Therefore, we look to these CAEs to provide best practice recommendations and lessons learned that can be helpful to other internal auditors and their organizations.

Table A-1: Interviewee Demographics and Identified Innovations

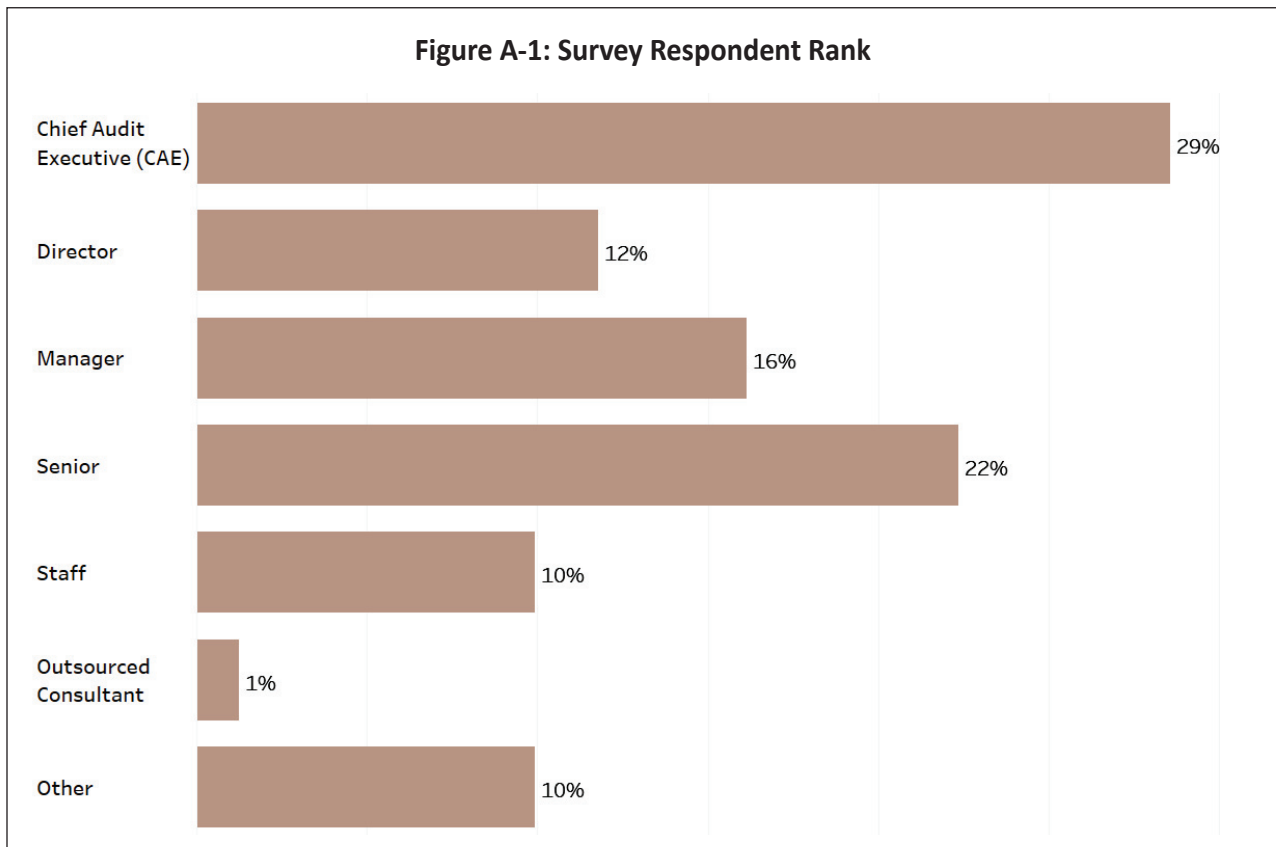
Company Identifier	Industry	Interviewee Role	Geographic Scope	Public/Private	Fortune Ranking	IA Size
C1	Automotive	CAE and CRO	North America	Public	Fortune 500	9
C2	Retail	VP of IA and ERM	North America	Public	Fortune 1000	8
C3	Transportation	CAE	Local	Quasi-Governmental	N/A	16
C4	Energy	Director of Audit Services	Global	Public	Fortune 100	25
C5	Food and Bev.	CAE	Global	Public	Fortune 100	95
C6	Governmental	CAE	Local	Governmental	N/A	13
C7	Financial	VP and CAE	North America	Public	Fortune 500	175
C8	Manufacturing	CAE	Global	Public	Fortune 500	29

Table A-1: Interviewee Demographics and Identified Innovations (cont.)

Company Identifier	Industry	Interviewee Role	Geographic Scope	Public/Private	Fortune Ranking	IA Size
C9	Energy	VP and CAE	North America	Public	Fortune 500	57
C10	Medical	VP of Internal Audit	Global	Public	Fortune 100	30
C11	Financial	Senior VP of Internal Audit	Global	Public	Fortune 500	50

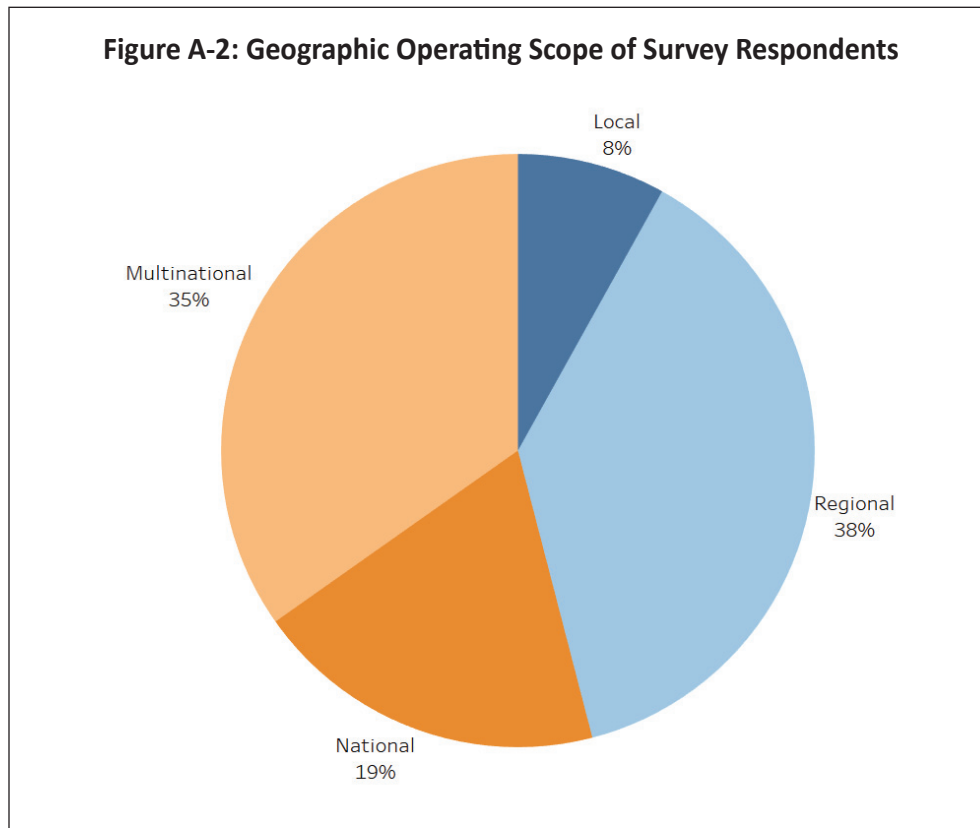
Survey Participants

As shown in **figure A-1**, CAEs made up the largest percentage of our responses (approximately 30%).³ Accordingly, respondents were quite experienced with a median of 25 years of general work experience and a median of 11 years of internal audit experience. Approximately 16% of respondents are Certified Internal Auditors (CIAs), 30% hold a Certified Public Accountant (CPA) license, and 53% hold various other certifications.



³ We note that the 10% of “other” respondents hold a wide variety of titles. Respondents usually indicated “other” if they had a more descriptive title than the ones presented in table 3-2. For example, respondents indicated they were internal auditor data analytics managers, IT auditors, governmental auditors with different titles than those presented (e.g., audit officer), or over specific programs like ERM.

Respondents represent a wide variety of organizations. The median sales revenue of organizations represented was approximately \$1.8 billion (ranging from \$50,000 to over \$100 billion). As shown in **figure A-2**, there is considerable variation in the geographic scope of respondents' organizations. Similarly, the sample is diverse in that 32% of the sample are from public companies, 30% from government entities, 16% from private companies, and 13% from nonprofit entities (with the remaining respondents indicating they come from other types of entities).



The respondents also operate in 20 different industry groupings, with many indicating they operate in several industries. The industries with greatest representation include finance and insurance (16% of the sample), health care and social assistance (12% of the sample), and public administration (9% of the sample). The four least-represented industries were accommodation and food services, management of companies and enterprises (each less than 1% of the sample), wholesale trade and administrative, and support and waste management and remediation services (each 1% of the sample). Such diversity in our sample is important as it allows us to obtain insights, perspectives, and experiences from internal auditors with a wide range of experience with different organizational innovations and disruptions.

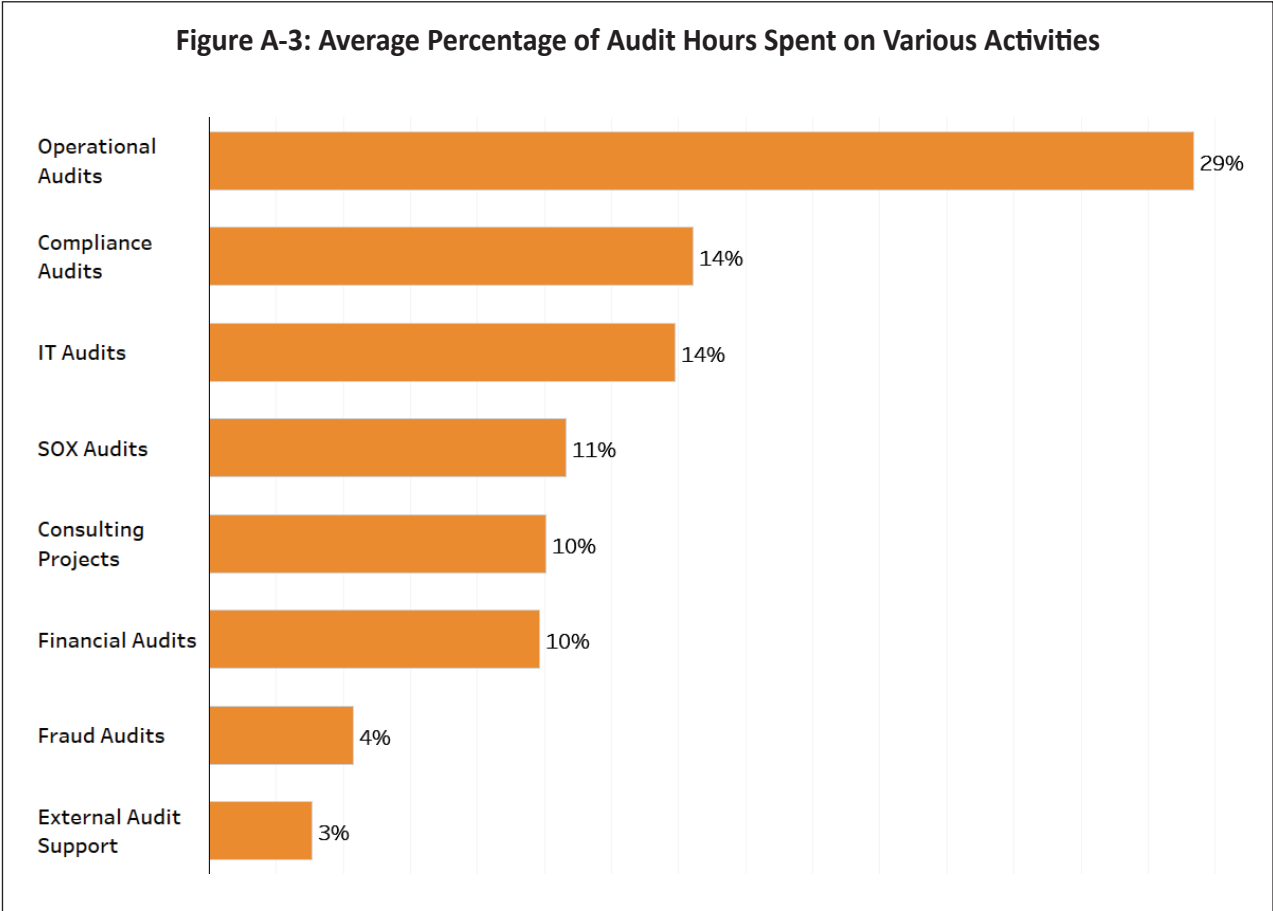
Finally, we provide a few statistics about the internal audit functions of respondents. The average respondent comes from an internal audit function with a median number of 18 employees—again ranging widely from one person to more than 1,500. On average, the respondents “somewhat agreed” (average score of 4.3 on a seven-point agree/disagree scale) that the current internal audit staff size

was appropriate for its responsibilities. The respondents indicated that the median amount of their budget that they outsourced/co-sourced was 9% (ranging from 0% to 85%). Below are four figures that describe the:

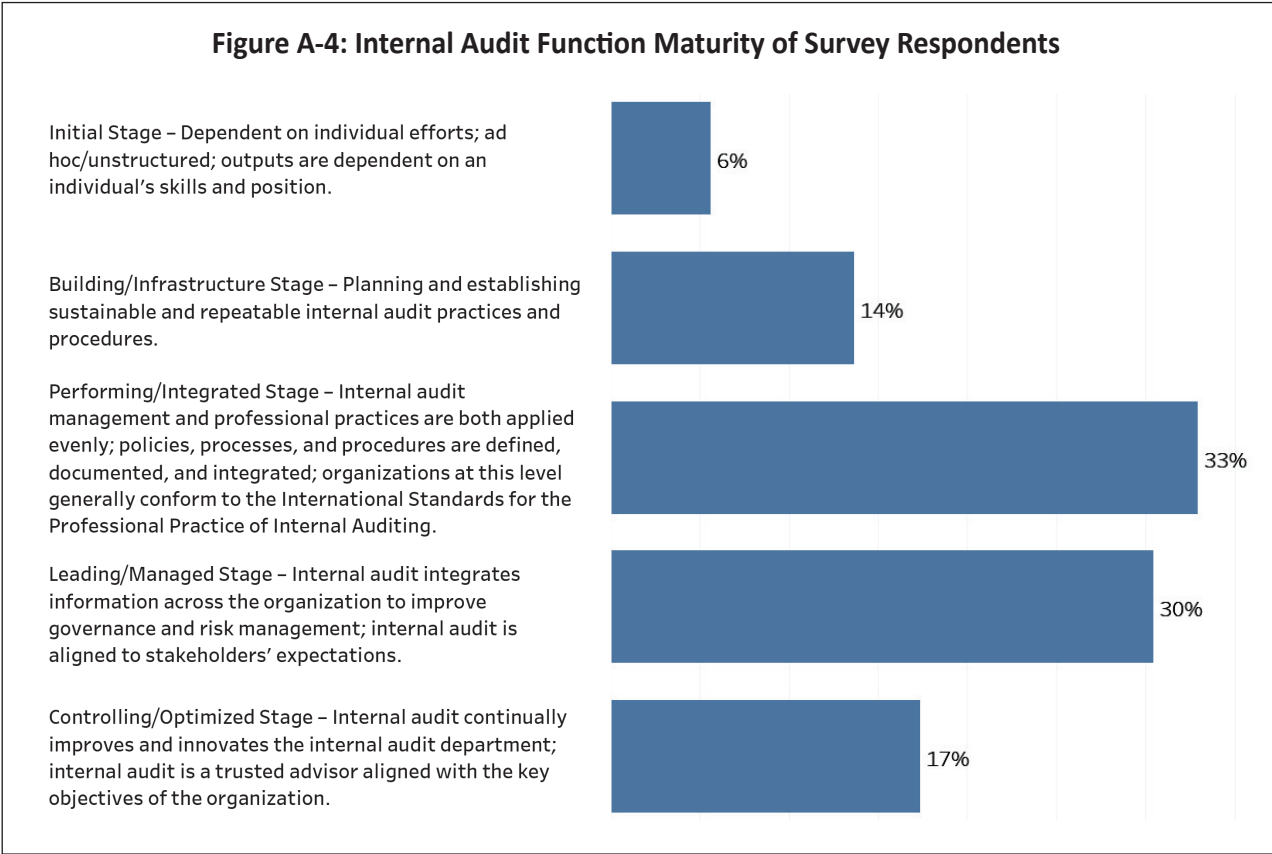
- 1. Percentage of work dedicated to different types of tasks,
- 2. Maturity of the internal audit function,
- 3. Operating procedures of the internal audit function, and
- 4. Responsibilities of the internal audit function regarding ERM.

Each of these figures provides some insight into the maturity, structure, and responsibilities of the internal audit functions represented in our study. Overall, the respondents represent a diverse set of organizations in North America.

Results shown in **figure A-3** indicate that the participating internal audit functions generally have a stronger focus on operational audit activities, followed by compliance audits, IT audits, financial audits, and consulting projects. This reflects the typical scope of internal audit functions and the results of the prior Common Body of Knowledge (CBOK) study (e.g., CBOK, 2011; CBOK, 2014).



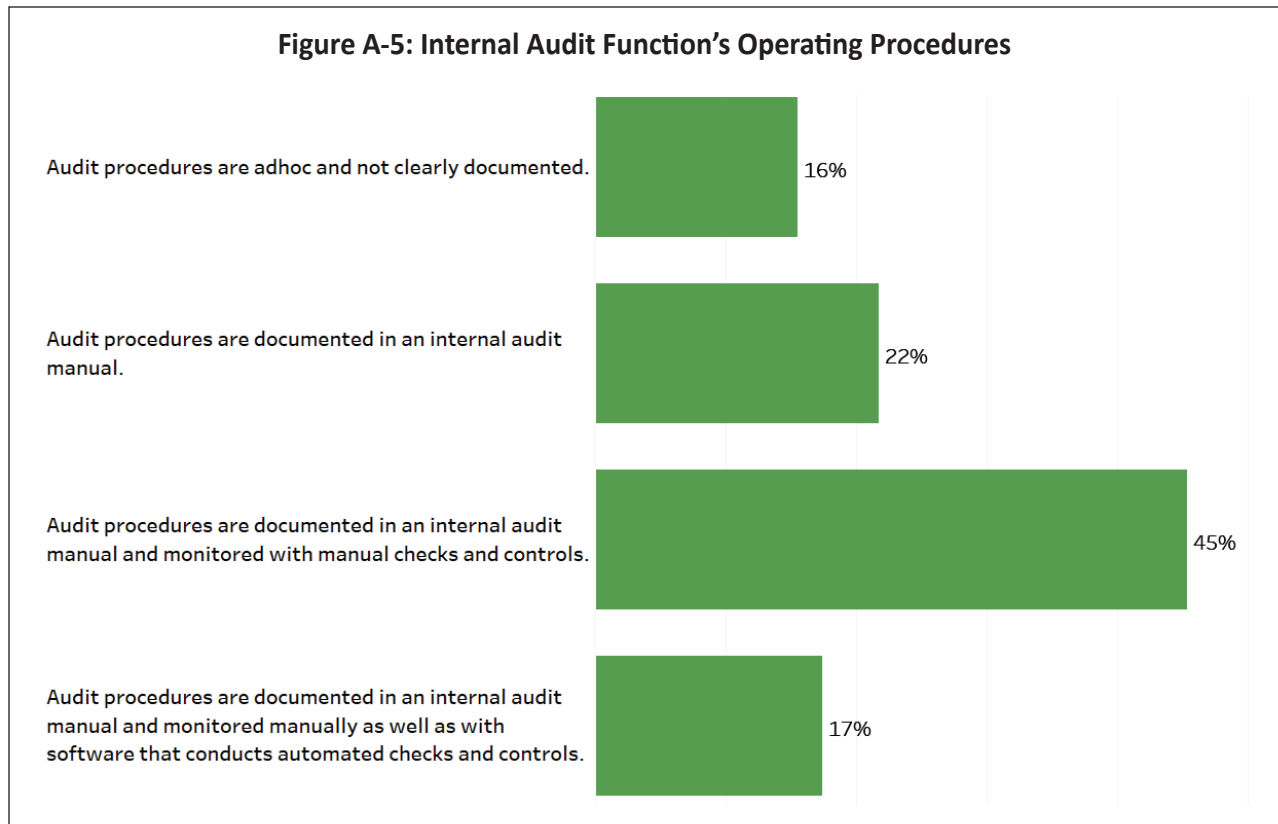
We asked survey participants to classify their internal audit function maturity based on the Internal Audit Capability Model (IA-CM), which establishes a systematic basis for describing the current state of the function (e.g., IIA, 2009). As shown in **figure A-4**, 80% of our respondents are from internal audit functions that are at least at the performing/integrated stage of maturity. At these stages, internal audit processes and methodologies are defined and consistently executed.



Consistent with the relatively more mature internal audit functions, **figure A-5**, page 54 shows that the majority of our respondents have documented internal audit procedures, as well as processes and controls for monitoring the effectiveness of those procedures. Again, we expect that internal audit functions that are well-managed and controlled are likely to address organizational change more effectively and are thus appropriate for this study.

The extent to which organizations employ formal ERM processes can vary greatly. Similarly, for those organizations that have formal ERM processes, there is wide variation as to how they are managed and facilitated. In some organizations, ERM is owned by the internal audit function. In others, internal audit may be involved by performing the risk assessments or engaging in intense communication with the ERM owners. Alternatively, in some organizations, ERM processes may be done by a completely separate organizational division with little to no involvement on the part of internal audit (Christ and Ricci, 2015). Through our interviews, we identified the internal audit function's formal involvement in the ERM processes as an important factor (or best practice) for facilitating effective responses to innovation.

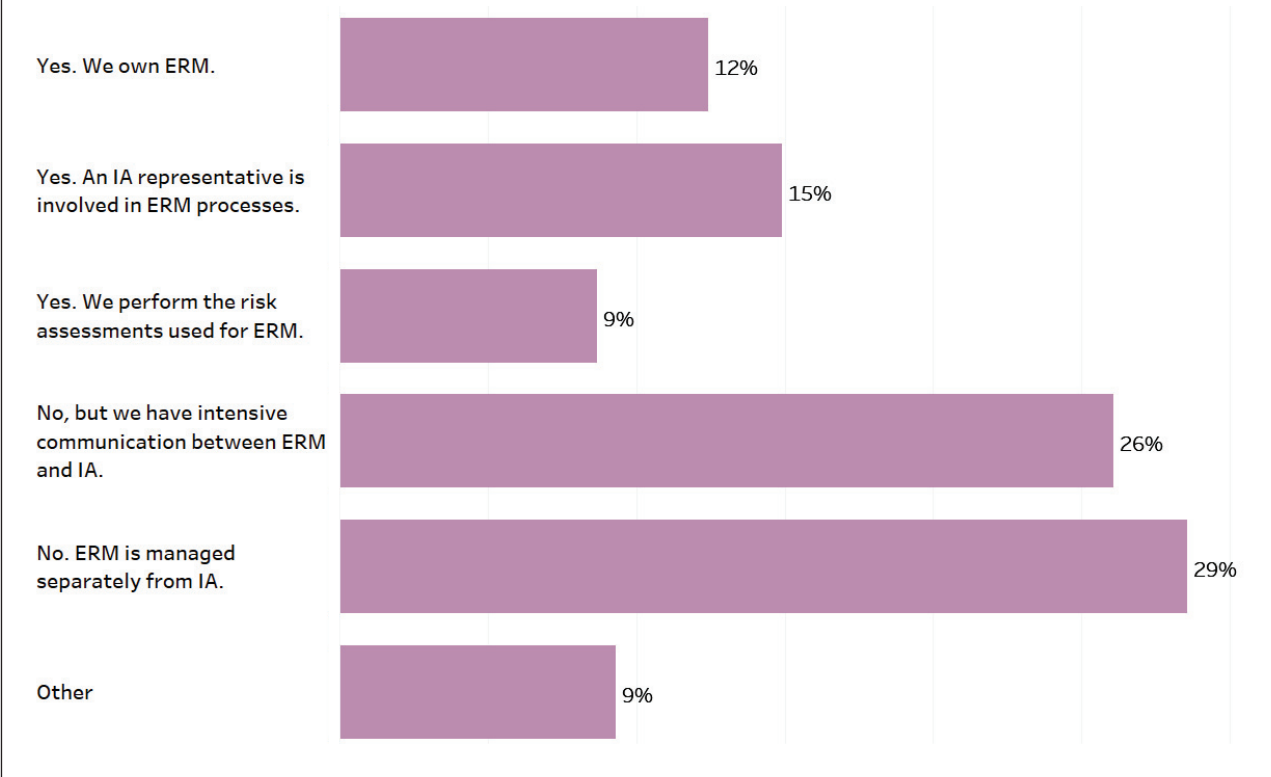
Figure A-5: Internal Audit Function's Operating Procedures



As shown in **figure A-6**, 29% of the participating internal audit functions indicated that ERM practices in their organization were managed and conducted separately from internal audit. Of the respondents, 26% indicated that the internal audit function is well-informed of ERM activities and engages in intense communication with the ERM owner. Of the participating internal audit functions, 12% own the ERM and 9% perform the risk assessment used for the ERM. Although there is some debate regarding whether ownership of ERM processes within the internal audit function is a violation of the Three Lines of Defense model (IIA, 2013) supported by The IIA, many internal audit functions can effectively perform both ERM and internal audit practices by implementing control measures to maintain independence (Christ and Ricci, 2015).

In total, the sample obtained provides a diverse view of internal audit functions across North America and thus is suitable for a detailed study of how internal audit functions respond to innovations in their organizations.

Figure A-6: ERM Responsibilities



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Internal Auditors' Response to Disruptive Innovation

Organizations are embracing innovation and disruptive technology at breakneck speed. While these changes have many positive effects, they are also associated with new and sometimes unknown risks. As competent assurance providers, internal auditors can provide meaningful input to the innovation decision and should be relied upon to ensure emerging risks are effectively mitigated. But, fulfilling these responsibilities can be challenging for them if they are not adequately informed or prepared.

This report explores the innovations and disruptions that organizations are currently facing and how internal audit is evolving to react to these changes. Through surveys and interviews conducted with chief audit executives (CAEs), the following questions are examined.

- What innovations and disruptions are organizations currently implementing?
- To what extent is internal audit involved in the innovation decision?
- How has internal audit changed to respond to organizational innovation and disruption?
- What best practices could internal audit adopt to effectively address organizational innovation and disruption?

Ultimately, internal auditors are challenged to identify and understand both the risks and the opportunities to support the new technologies introduced in the organization. In the context of innovation, they can create additional added value if they openly and proactively identify further potential room for improvement.




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