

Green IT Perceptions and Activities of Internal Auditors in Australia, Canada, and the United States

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ABSTRACT: Green IT and sustainability reporting receive considerable attention. Internal auditors are considered control experts and provide assurance that controls have been designed and are functioning properly. However, literature indicates discrepant findings in terms of internal auditors' role in sustainability activities. Based on a theoretical link between environmental regulations and internal auditors' role in sustainability activities, we examine whether internal auditors' roles in green IT differ across Australia, Canada, and the U.S. We find that internal auditors' current green IT perceptions and involvements in the three countries are essentially interchangeable, even though their regulations are significantly different. We find that their perceived roles differ across most green IT activities across industries, but their current involvement does not. Future research needs to identify whether there are cultural reasons or deeper, profound systemic reasons why internal auditors are not more proactively involved in the highly visible, rapidly growing, value-added areas of sustainability.

Keywords: internal auditor; green IT; sustainability; corporate social responsibility.

I. INTRODUCTION

Organizations face escalating sustainability accounting and reporting processes complying with federal, state, local, and, if applicable, international sustainability regulations. In order to meet this growing demand for sustainability reporting, many organizations voluntarily disclose sustainability information to various stakeholders and internally monitor sustainability metrics and key performance indicators (KPIs). Green IT is receiving growing attention in organizations

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(Molla, Pittayachawan, Corbitt, and Deng 2009) and is a significant part of most organizations' overall sustainability strategy (Murugesan 2008).¹ Jenkin, Webster, and McShane (2011) define green IT as, "addresses energy consumption and waste associated with the use of hardware and software, [and] tends to have a direct and positive impact . . . improving the energy efficiency of hardware and data centers, consolidating servers using virtualization software, and reducing waste associated with obsolete equipment."

Existing studies suggest various motivating forces influencing an organization's green IT strategy such as organizational (e.g., leadership and culture), regulatory-market (e.g., laws and regulations), socio-cultural (e.g., social norms), and technological forces (Molla and Abareshi 2011; Jenkin et al. 2011; Radu 2016). Among those motivating forces, laws and regulations are particularly significant factors that influence an organization's green IT strategy and practice, thereby affecting environmental orientations (i.e., environmental attitude, cognitive, and behaviors at individual and organization levels), which in turn largely determine the success of green IT (Jenkin et al. 2011). Since mandatory reporting motivates management to incorporate social responsibility into their managerial practices (Ioannou and Serafeim 2014), regulations mandating sustainability reporting are likely to influence an organizational strategy, as well as the perceptions and involvement of individuals, including internal auditors, in sustainability and green IT activities.

Prior literature underscores the internal auditors' role in sustainability activities and reporting (Darnall, Seol, and Sarkis 2009; Ridley, D'Silva, and Szombathelyi 2011; Peters and Romi 2014; A. Trotman and K. Trotman 2015). The IIA frequently encourages internal auditors to be more broadly involved in sustainability-related activities (e.g., see, IIA 2010). Because of their existing IT familiarity from conducting traditional IT-related internal audits, green IT compliance activities seem like a natural evolutionary step for internal auditors. However, when Gray, No, and Miller (2014) report on green IT perceptions and involvement of U.S. and Canadian internal auditors, they found that internal auditors were only minimally involved in green IT activities, and any involvement was in traditional assurance roles—not in the additional facilitator or consultant roles encouraged by the IIA (2010). Those findings would seem to indicate that other internal audit activities have a much higher priority, and the various sustainability-related motivating factors are not strong enough to shift those priorities. Our study explores one of those potential motivating factors more closely; namely, the impact of sustainability-related laws and regulations. Our literature review suggests that no attempt has been made to investigate whether laws and regulations influence internal auditors' roles and perceptions regarding green IT activities. The main objective of the study is to fill this gap by examining the effect of sustainability laws and regulations on internal auditors' perceptions and involvement in green IT by comparing internal auditors from the more highly regulated Australia to internal auditors in the U.S. and Canada.

By conducting a similar green IT survey in Australia, this paper compares Australian internal auditors to U.S. and Canadian internal auditors from Gray et al. (2014) in terms of their perceptions and involvements in green IT. Multi-country research is a frequently used research method to examine the association between regulations and decisions or behaviors at the individual or organization levels (Seetharaman, Gul, and Lynn 2002; Elshandidy, Fraser, and Hussainey 2015). Australia, Canada, and the U.S. have similar English-language, Anglo-Saxon, and common law traditions and have mandatory sustainability regulations. However, the scope and specificity of the regulations differ across the three countries. Hence, comparing the three countries allows us to examine the impact of sustainability regulations on internal auditors' green IT perceptions and involvement.

To systematically evaluate those differences, we utilize "Carrots and Sticks: Sustainability reporting policies worldwide—Today's best practice, tomorrow's trend" (KPMG, GRI, CCGA, UNEP 2013), which divides sustainability reporting regulations into three categories reflecting the scope of the organizations affected by the regulations: *Generic*, *Sector-Specific*, and *Thematic*. For instance, among the three countries only Australia has mandatory sustainability reporting regulations in the *Generic* category, which applies to the broadest population of organizations or topics and is considered as more extensive sustainability reporting regulations than the *Sector-Specific* and *Thematic* categories. Given that sustainability regulations are more intense in Australia, we expect that Australian internal auditors' perceptions and involvements in green IT would be greater than their U.S. and Canada counterparts. Contrary to our expectations, except for just one green IT activity (i.e., involvement in designing/developing specifications), internal auditors' perceptions and involvements in green IT are essentially parallel in the Australia, Canada, and the U.S. Because the level of regulation varies by industry within each country, we conduct additional industry-level analysis, but it does not change the overall results. If increased regulations are not motivating increased internal audit involvement in green IT, it would appear there are deeper systemic issues that need to be identified in future research.

The findings of this study contribute to two broad themes in the internal audit domain and result in critical future research questions. A long-running theme in the internal audit domain is that internal auditors must be more proactive in becoming early

¹ Green IT is also referred to as green ICT (information and communications technology), reflecting the fact that telephone systems and other office electronics are also digital equipment and are included in the green IT domain.

participants in a wide variety of organizational activities.² The other long-running theme is that internal auditors must broaden the services they provide outside of the traditional assurance services such as facilitating and consulting services.³ The belief of the IIA is that the realization of these two themes will greatly improve the value of internal audit to their organizations. This study extends the limited number of prior studies into the roles of internal auditors in sustainability activities. Prior studies show possible theoretical forces motivating an organization's sustainable strategies that might influence the internal auditors' roles (Jenkin et al. 2011). However, such studies did not empirically examine external factors such as environmental regulations but mainly focus on an internal variable, such as an organization's environmental strategy (Gray et al. 2014) or interviews with practitioners, to understand the forces (Trotman and Trotman 2015). Gray et al. (2014) find that internal auditors in the U.S. and Canada were not proactive, and their very limited involvement in green IT was almost exclusively assurance activities with no expansion into facilitating or consulting activities. The primary contribution of our study is that it finds that even in a more rigorous sustainability regulatory environment, Australian internal auditors are also minimally involved in green IT. Because of their heavy involvement in IT auditing, proactive and expanded (facilitating and consulting) services seem like a logical evolution for internal auditors. Future research needs to explore more deeply why this evolution seems to be stunted. Is the general lack of green IT involvement (whether proactive, expansive, or not) by internal auditors an issue of misplaced priorities, staffing, training, or lack of confidence on management's part as to whether internal audit has a role in sustainability and green IT activities?

The remainder of this paper is organized as follows. Section II provides background and literature reviews. Section III presents our research hypotheses. Section IV describes the details of the research methodology. Section V discusses our research results. Finally, Section VI provides a summary of results, a discussion of limitations, and suggestions for future research.

II. BACKGROUND AND LITERATURE REVIEWS

This section is divided into three major subsections. The first subsection provides a brief overview of the regulatory environment in Australia, Canada, and the U.S. The second subsection provides a summary of green IT literature. The third subsection discusses why internal auditors would be expected to be involved in green IT.

Environmental Regulations

Every country has a different mix of environmental regulations, reporting, and enforcement mechanisms that influence societies differently (La Porta, Lopez-De-Silanes, and Shleifer 2006). Mandatory reporting tends to motivate management to incorporate social responsibility into their managerial practices (Ioannou and Serafeim 2014). In a country requiring environmental performance disclosure, managerial practices are likely to achieve performance beyond the mandated requirements, thereby presenting organizations more favorably to the public and investors. While Australia, Canada, and the U.S. have mandatory sustainability regulations, the scope and specificity of the regulations differ. The "Carrots and Sticks" report (KPMG, GRI, CCGA, UNEP 2013) divides sustainability reporting regulations into three categories reflecting the scope of the organizations affected by the regulations (see Appendix A): *Generic* applies to the broadest population of organizations or topics, and *Thematic* and *Sector-Specific* cover limited groups of organizations or topics. Since more organizations are subject to regulations in the *Generic* category, countries that have more regulations in the *Generic* category are considered to be enforcing stronger sustainability reporting regulations than those in *Thematic* and *Sector-Specific* categories. The following paragraphs briefly describe examples of regulations in each country.

Australia

Australia has eight mandatory sustainable reporting regulations and, among those, the three are categorized as *Generic*. For instance, the Financial Services Reform Act requires that issuers of financial products state "the extent to which labor standards or environmental, social or ethical considerations are taken into account in the selection, retention or realization of the investment" in a Product Disclosure Statement.⁴ Regulatory Guide 247 on Operating and Financial Review (OFR) requires that listed companies include relevant information in their directors' reports.⁵ In particular, under OFR, companies are mandated to include a discussion of sustainability risks that affect their financial performance. Companies are also required to describe whether they have any substantial environmental risks and how they manage those risks under the

² For a preliminary discussion of this long-running theme, see G. Gray and M. Gray (1994).

³ For a broad discussion of the expanded-services theme, see IIA (2010).

⁴ For more detail, see <https://www.legislation.gov.au/Details/C2005C00498>

⁵ For more detail, see <http://download.asic.gov.au/media/1247147/rg247.pdf>

Australian Securities Exchange (ASX) listing rules regarding Corporate Governance Council Principles and Recommendation.⁶

Canada

Canada has five mandatory sustainability reporting regulations, but none of them are categorized as *Generic*. For instance, the Greenhouse Gas Emissions Reporting Program requires facilities that emit the equivalent of 50 kilotons or more of greenhouse gases in carbon dioxide equivalent units per year to submit a report.⁷ Under the Public Accountability Statement, banks and federally incorporated insurance, trust, and loan companies having equity valued at one billion dollars or more must disclose their financial contributions to the Canadian economy and society in their annual reports.⁸

United States

The United States has nine mandatory sustainability reporting regulations, but none of them are categorized as *Generic*. For example, Presidential Executive Order 13514 requires federal agencies to evaluate and report on their sustainability performance, including an assessment of their supply chain.⁹ Unlike Australia and Canada, the SEC rules do not address sustainability (or integrated) reporting to stockholders. Several organizations, such as Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and International Integrated Reporting Council (IIRC), are developing and promoting sustainability reporting frameworks or standards and are encouraging voluntary sustainability reporting. In fact, because of concern that these organizations, particularly the SASB, may confuse public filers and investors, the SEC has been compelled to explicitly state that reporting standards for public companies are promulgated by only the FASB and the SEC (Gallagher 2014).¹⁰

In summary, Australia, Canada, and the U.S. have mandatory sustainability regulations, but the scope and specificity of the regulations vary. In general, Australia has more extensive sustainability reporting regulations than Canada or the U.S.

Industry Nature and Sustainability

While an organization's direct involvement in sustainability activities is influenced by applicable regulations, organizations voluntarily conduct sustainability activities beyond the compliance with required regulations (Eisner 2004). For instance, according to the Investor Responsibility Research Center Institute (IRRCi 2013, 4), "499 companies [from the S&P 500] made at least one [voluntary] sustainability-related disclosure." Some of these reports are brief (e.g., <https://www.abbvie.com/responsibility.html>), and others are extensive (e.g., <https://www.apple.com/environment/>).

Studies in various business disciplines have extensively examined the effect of sustainability activities on improving an organization's reputation among customers (Ellen, Mohr, and Webb 2000; Homburg, Stierl, and Bornemann 2013) and financial performance (Peloza 2009). Accounting literature often examines whether sustainability disclosures influence the decisions of capital market participants (Richardson and Welker 2001; Dhaliwal, Li, Tsang, and Yang 2011; Dhaliwal, Radhakrishnan, Tsang, and Yang 2012). Richardson and Welker (2001), for instance, find a significant and positive relationship between corporate social responsibility (CSR) disclosure and the cost of equity capital. In a similar line, Dhaliwal et al. (2011) show that companies with a high cost of equity capital are likely to initiate disclosing CSR activities, thereby reducing the cost of equity capital.

Competition in an organization's industry might encourage it to adopt more extensive green IT strategies. Porter and van der Linde (1999) argue that to accomplish a sustainable competitive edge, organizations can utilize a cost-based strategy, an effort to achieve lower production costs than competitors, or a differentiation-based strategy, striving to "seek to be unique in its industry along some dimensions that are widely valued by buyers." In terms of a cost-based strategy, an organization's green IT practices can enhance its competitiveness by saving energy and resources. With respect to a differentiation-based strategy, an organization can improve its competitiveness by improving its customer reputation through significant environmental and sustainability activities (Porter and van der Linde 1999). In this line, prior studies show that green IT enhances a business's competitive advantages (Kao, Liu, Huang, and Chang 2010; Chuang and Huang 2015). Accordingly, an organization in a

⁶ For more detail, see <https://www.asx.com.au/documents/asx-compliance/cgc-principles-and-recommendations-3rd-edn.pdf>

⁷ For more detail, see <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting.html>

⁸ For more detail, see <https://laws-lois.justice.gc.ca/eng/regulations/sor-2002-133/fulltext.html>

⁹ For more detail, see <https://www.fedcenter.gov/programs/eo13514/>

¹⁰ To see examples of the SEC's current thoughts and issues associated with sustainability reporting, see Chair Mary Jo White's June 27, 2016 speech (<https://www.sec.gov/news/speech/chair-white-icgn-speech.html>) and the Business and Financial Disclosure Required by Regulation S-K (<https://www.sec.gov/rules/concept/2016/33-10064.pdf>).

competitive industry, or having other competitors pursuing environmental strategies such as green IT, is likely to be forced to expand its sustainability activities (Russo and Fouts 1997; Eisner 2004).

Green IT and Internal Audit

The value of the internal audit profession is cyclical. The passage of the Foreign Corrupt Practices Act (FCPA) in 1977 greatly increased the profession's value by mandating internal audit requirements for public companies. Then, over time, the value seems to decrease with many companies outsourcing their internal audit function to external auditing firms—frequently the same firm that provided external audit services. The Sarbanes-Oxley Act of 2002 (SOX) prohibited external auditors from providing internal audit services to their external audit clients. SOX Section 404 mandated evaluating internal control over financial reporting (ICFR), which requires significantly more work for both external and internal auditors. Paying two different outside organizations to perform Section 404a (internal) and 404b (external) work would mean a huge increase in fees. Hence, the value and status of an in-house internal audit function increased as a means to preemptively reduce some of these increases. According to Gray (2004), after the implementation of SOX, management viewed their internal auditors as their control experts. In the years immediately following the passage of SOX, internal auditors were provided better technology and were somewhat immune to any company-wide staff reductions. However, according to a recent PwC (2017) study, the post-SOX value seems to be in decline. PwC (2017) states that the percentage of “stakeholders reporting Internal Audit contributes significant value” dropped from 54 percent in 2016 to 44 percent in 2017. PwC (2017, 3) summarizes this point by saying, “Internal Audit appears to be losing ground in trying to keep pace with stakeholder expectations,” and goes on to say, “many stakeholders support Internal Audit taking a more value-added role.” As the following paragraphs explain, green IT could definitely be a value-added role to empower internal audit, to boost their value to stakeholders, and to counteract the current decline in value.

Prior studies and other publications show that internal auditors play an important role in sustainability activities and reports (Darnall et al. 2009; PwC 2011; Trotman and Trotman 2015). Internal auditors are often considered as control experts who provide assurance whether appropriate controls have been designed and are functioning correctly to produce accurate and timely reports. The Committee of Sponsoring Organizations of the Treadway Commission's (COSO 2013) *Internal Control—Integrated Framework* emphasizes the critical roles of internal auditors as the final line of defense to ensure that controls are working properly and that reports leaving the organization do not include material errors or misrepresentations. Since sustainability accounting emphasizes nonfinancial metrics (e.g., tons of carbon emitted), sustainability accounting controls are outside of the external financial statement auditing domain. While an external organization could provide sustainability accounting assurance services, the organization's own internal audit function could be the assurance provider. In a similar line, the Institute of Internal Auditors (IIA 2010) encourages internal auditors to support an organization's environmental compliance activities by evaluating the activities, facilitating environmental control self-assessments, and consulting on designing and implementing environmental activities and controls.

Green IT is one area of corporate sustainability activities where internal auditors' involvement would be highly beneficial. Some aspects of green IT can be considered low-hanging fruit because many green IT actions are relatively easy to implement (versus retrofitting buildings, replacing heavy equipment, etc.). On the emission side, information and communications technology (ICT) carbon emissions are about 2 percent to 2.5 percent of all carbon emissions worldwide, and the carbon footprint is expected to triple from 2002 to 2020.¹¹ On the cost side, total IT spending is estimated to be \$3.5 trillion worldwide in 2011 and growing at 5 percent annually (Operations Management Technology Consulting [OMTCO] 2011). A 2007 U.S. Environmental Protection Agency (EPA 2007) report opines that data centers could reduce energy use by 30 percent by implementing current best practices and up to 70 percent “using high efficiency technologies for cooling and power equipment and virtualization techniques.” With these kinds of numbers, even very small percentage improvements can be very significant.

Green IT, therefore, would be a natural entry point for internal auditors to proactively become involved in their organizations' sustainability activities. The internal auditors should already have an intimate knowledge of an organization's IT operations because of their traditional IT auditing. Many aspects of green IT do not require deep technology knowledge because, ultimately, green IT benefits are measured, for example, in reductions in emissions, in electricity, gas, and water usage, and in the disposal of IT components.

Although research on green IT is in the early stages, most existing green IT studies either focus on conceptual aspects of green IT or perform organizational-level analysis (e.g., Elliot 2007; Elliot and Binney 2008; Huang 2009). Furthermore, there is a paucity of research on the roles of internal auditors in green IT and, particularly, whether differences exist in these roles across countries and industries. Jenkin et al. (2011) introduce a theoretical framework for green IT research and argue that

¹¹ For more detail, see <http://www.greenit.net/whygreenit.html>

environmental forces such as organizational, regulatory-market, socio-cultural, ecological, and technological forces influence an organization's green IT strategies and practices. In this paper, we particularly examine whether regulatory-market forces, defined as the level of regulatory requirements and the nature of an organization's industry, influence internal auditors' perceptions and involvement in green IT.

III. RESEARCH HYPOTHESES

Jenkin et al. (2011) introduce a theoretical framework that addresses how green IT relates to sustainability in an organization. According to Jenkin et al. (2011), an organization's green IT strategies and practices are influenced by various environmental sustainability motivating forces such as organizational, regulatory-market, socio-cultural, and technological forces. They claim that the success of green IT is largely determined by the degree to which employees adopt and implement their organization's green IT strategies and practices. They also argue that successful green IT not only relies on shared environmental expectations, values, and beliefs within an organization, but also depends on the alignment among employees' tendency toward the environmental issues and initiatives, attitudes toward the environmental issues, and their participation in green IT practices. Ramus and Steger (2000) document that employees are more likely to engage in green IT activities if they perceive a strong signal from their organization regarding environmental policy. Therefore, to achieve an organization's environmental sustainability goals or strategies, it is necessary that employees' involvement in green IT and their perceived roles (i.e., cognitions and attitudes) in green IT are consistently aligned with their organizations' environmental sustainability strategies.

Prior literature reports on the actual and potential roles of internal audit in sustainability activities. For instance, Peters and Romi (2014) show that internal audit is considered as a significant resource to provide assurance and monitoring of sustainability reporting. However, internal audit is frequently utilized as a substitute for external assurance of sustainability since it can provide the benefits of reducing the cost (Darnall et al. 2009).¹² Trotman and Trotman (2015), based on corporate governance theory, anticipate that internal auditors play a significant role in the assurance of sustainability reports, especially greenhouse gas emissions and energy usage reporting. In particular, they highlight that in an agency theory perspective, internal audit function can support board members and management by monitoring the process of providing information, by protecting shareholders, by ensuring precise and sufficient information, and by protecting the organization from sanctions and penalties associated with regulations. Furthermore, they argue that in terms of an institutional theory perspective, internal auditors are in charge of ensuring compliance with sustainability reports, and resource dependency theory suggests that internal audit is employed to support strategic goals and to reduce cost related to sustainability activities.

In 2010, the IIA (2010) published an international professional practices framework (IPPF) practice guide, *Evaluating Corporate Social Responsibility/Sustainable Development*. The guide encourages internal auditors to play three broad roles to support environmental compliance activities: auditor role (evaluating an organization's environmental activities), facilitator role (facilitating environmental control self-assessments), and consultant role (consulting on designing and implementing an organization's environmental activities and controls). Since having a negative reputation due to greenwashing can have a detrimental impact on organizations, internal auditors are likely to be involved in green IT and more likely to believe that they should be more involved in green IT whether personally involved or not. However, prior literature shows that internal auditors' current involvement in green IT is not aligned with their perceived potential roles in green IT (Gray et al. 2014). That is, internal auditors' actual involvement in green IT is limited, even though auditors believe that they should be more involved in green IT. They also found that the types of environmental sustainability strategies practiced by organizations influence internal auditors' current involvement in green IT, but not their perceived roles in green IT.

This study extends Gray et al. (2014) by conducting a similar green IT survey in Australia to compare Australian internal auditors to their counterparts in Canada and the U.S. Considerable variations exist across countries in terms of the breadth, depth, and enforcement of environmental regulations. As KPMG (2011, 2013) surveys show, there are significant differences in corporate social responsibilities reporting across countries, reflecting differences in environmental laws and regulations. Since environmental laws and regulations (regulatory-market forces) are important factors that influence organizations' green IT strategies and practices, thereby affecting their employees' environmental attitudes, beliefs, and behaviors, such country differences should also have a significant effect on internal auditors' involvement in green IT and their perceived roles.

In summary, we argue that countries with relatively strong enforcement processes and regulations will have more impact on organizations' environmental strategies and practices, which, in turn, influences internal auditors' involvement in green IT since they will perceive a strong signal from their organizations regarding environmental issues. Subsequently, we also argue that internal auditors' perceptions and involvement in green IT will differ across the three countries due to the scope and specificity of regulations. This leads to the following hypotheses:

¹² According to KPMG (2013), 59 percent of sustainability reports use external assurance.

TABLE 1
Survey Responses

Country	Number of Surveys Sent	Number of Responses	Number of Surveys Successfully Completed
Australia	421	72	43
Canada	Approx. 25,000	652	48
U.S.			331
Overall	Approx. 25,421 (100%)	771 (3%)	422 (1.6%)

H1a: Internal auditors' current involvement in green IT activities differs among Australia, Canada, and the U.S.

H1b: Internal auditors' perceived involvement for internal auditors in green IT activities differs among Australia, Canada, and the U.S.

Because industry-specific environmental regulations can vary substantially, industry is a significant determinant of an organization's environmental strategic decisions or its attitude toward environmental issues (e.g., [Henriques and Sadorsky 1999](#); [Sharma 2000](#)). In addition, the level of competitiveness in industry and the competitors' environmental strategies also influence an organization's environmental strategies. Given that the nature of industry influences organizations' sustainability activities and that internal auditors play an increasing role in their organizations' sustainability activities, it is expected that internal auditors' roles in green IT may vary across industries. Therefore, the following hypotheses are examined:

H2a: Internal auditors' current involvement in green IT differs across industries.

H2b: Internal auditors' perceived involvement for internal auditors in green IT activities differs across industries.

[Gray et al. \(2014\)](#) find that internal auditors believe that they should be more involved in green IT, but their level of current involvement is not aligned with their perceived level of involvement. Our final hypothesis is to examine whether their findings are also observed in Australia, leading to the following hypothesis.

H3: Internal auditors' level of current involvement in green IT activities is not aligned with their perceived level of involvement in the three countries.

IV. RESEARCH METHOD

Internal Auditor Green IT Survey

To collect data on Australian internal auditors, we conducted a web-based survey based on the [Gray et al. \(2014\)](#) survey instrument. The initial survey instrument was shortened based on the comments received from ten Australian IIA members who volunteered to serve on a roundtable to improve the questionnaire's flow and respondent comprehension. A total of 38 questions were designed to investigate internal auditors' current involvement and their perceived roles in green IT activities as well as their organizations' green IT strategies and activities.^{13,14} Appendix A provides a summary of questions.

Invitations to participate in the survey were emailed to the members of Australia IIA jurisdiction.^{15,16} For Canadian and U.S. internal auditors, we obtained the survey results from [Gray et al. \(2014\)](#). As Table 1 shows, the total number of email

¹³ Overall, the survey collected 67 data elements because several of the questions had sub-questions.

¹⁴ The [Gray et al. \(2014\)](#) article was part of a bigger study sponsored by the IIA Research Foundation (in the U.S.). As such, the Australian survey did not include all the questions from [Gray et al. \(2014\)](#). On the other hand, the technical director of the Australian IIA asked that some Australia-specific questions be added to collect opinions on some Australian issues. Ten Australian IIA members volunteered to serve on a roundtable to modify the Australian-specific aspects of the survey. This paper does not report on the Australia-specific questions. In sum, individual survey questions that are needed to address the hypotheses were retained and not changed. The overall scope of the two surveys was about the same, so the cognitive tasks were about the same.

¹⁵ The IIA Research Foundation sent the solicitation email to approximately 25,000 members of the North America IIA jurisdiction and 421 members of the Australia IIA jurisdiction. The North America IIA survey was conducted between November 2010 and December 2010, and the period for the Australia IIA survey was between July 2012 and September 2012.

¹⁶ Institutional Review Board approval was granted by the corresponding universities.

TABLE 2
Internal Auditors' Current Involvement and Their Perceived Role Measures

Internal Auditors' Current Involvement in Green IT Activities

Based on your experiences, your department's experiences, and the combined skills of your internal audit department, select the most appropriate answer for each of the following broad green IT activities:

- Design/develop specifications for green IT activities.
- Design/develop controls to monitor green IT activities to ensure compliance with green IT specifications.
- Monitor controls to determine whether green IT specifications are being complied with.
- Provide assurance that the green IT monitoring controls are being used properly by others (outside of internal auditing).

Internal Auditors' Perceived Role in Green IT Activities

Assuming a hypothetical internal audit department has the skills to perform each of the following activities, should they perform those activities in light of internal auditing standards—particularly, regarding independence and objectivity?

- Design/develop specifications for green IT activities.
- Design/develop controls to monitor green IT activities to ensure compliance with green IT specifications.
- Monitor controls to determine whether green IT specifications are being complied with.
- Provide assurance that the green IT monitoring controls are being used properly by others (outside of internal auditing).

Environmental Sustainability Green IT Strategies

Does your organization have a general green (social responsibility) statement?

- No statements and no ecological impact in decisions.
- No statements but consider ecological impact in decisions.
- Not part of mission statement and not actively publicized—Type 0 (image-oriented) strategy.
- Not part of mission statement but actively publicized—Type 1 (prevent/control) strategy.
- Integral part of mission (or vision) statement—Type 3 (sustainable development) strategy.

invitations sent out is 25,421, and overall a total of 771 individuals participated in the two surveys (approximately a 3.1 percent response rate). Among them, 224 did not fully complete the survey. We further excluded 95 responses that were not from Australia, Canada, or the U.S.¹⁷ We further excluded 30 responses where there was more than one participant from the same organization so that multiple responses from the same organizations would not distort statistical results.¹⁸ Accordingly, our final combined sample consists of 422 responses from Australia, Canada, and the U.S.

Measures

Internal auditors' green IT perceptions and involvements were measured in terms of four broad activities: (1) designing/developing specifications for green IT activities, (2) designing/developing controls to ensure compliance with green IT specifications, (3) monitoring controls to determine whether green IT specifications are being complied with, and (4) providing assurance that the green IT monitoring controls are being used properly. According to the IIA's (2010) CSR practice guide framework, the first two items would be a mix of consulting and facilitating roles for the internal auditors, and the last two items are the more traditional audit and assurance role. Four survey questions measured each area of internal auditors' current involvement using a seven-point scale ranging from 1 (definitely not) and 7 (definitely yes). Another four questions measured the perceived roles in each area. The eight questions are listed in Table 2. With respect to industry type, Standard Industrial Classification (SIC) information was collected.

Control Variables: Environmental Strategy and Organization Size

Prior literature shows that organizations' environmental strategies influence their employees' environmental attitudes, beliefs, and behaviors (Gray et al. 2014; Jenkin et al. 2011) and that organization size also plays an important role in an organization's environmental disclosures (Roberts 1992; Spicer 1978). Accordingly, organizations' environmental strategies and organization size were used as control variables for the statistical analysis.

¹⁷ These excluded 95 responses were distributed thinly over many other countries and, therefore, it would not have been possible to conduct a statistically valid between-country analysis. We also conducted analyses by including these 95 responses and found they had no effect on the results.

¹⁸ We examined respondents' emails, IP addresses, and the demographic information collected on the respondents' organizations to identify responses from the same organization. However, we acknowledge that our approach may not completely eliminate multiple responses from the same organizations.

TABLE 3
Demographics

Panel A: Audit Department and Auditor Statistics

Country	n (%) ^a	Total Number of Internal Auditors					Total Number of Internal IT Auditors					Work Experience					Work Experience as an Internal Auditor				
		M ^b	MD ^c	SD ^d	Min. ^e	Max. ^f	M	MD	SD	Min.	Max.	M	MD	SD	Min.	Max.	M	MD	SD	Min.	Max.
Australia	43 (10.2%)	23.0	5	80.8	0	500	6.8	1	32.2	0	200	24.0	24	10.3	0	45	12.1	10	8.0	0	30
Canada	48 (11.4%)	14.6	6	25.6	0	155	1.9	1	4.3	0	27	19.9	19	11.6	1	52	9.0	7	8.2	0	31
U.S.	331 (78.4%)	28.9	6	81.1	1	808	4.9	1	16.8	0	200	20.0	20	11.2	1	54	9.6	7	8.1	0	45
Overall	422 (100%)	26.7	6	76.9	0	808	4.8	1	18.0	0	200	20.4	20	11.2	0	54	9.7	7	8.1	0	45

^a Number of respondents.

^b Mean.

^c Median.

^d Standard deviation.

^e Minimum.

^f Maximum.

Panel B: Revenue

	U.S.		Canada		Australia		Overall	
Revenue								
< \$50M	55	(16.6%)	7	(14.6%)	6	(14%)	68	(16.1%)
\$50M–\$100M	24	(7.3%)	3	(6.3%)	2	(4.7%)	29	(6.9%)
\$100M–\$500M	65	(19.6%)	10	(20.8%)	12	(27.9%)	87	(20.6%)
\$500M–\$1B	41	(12.4%)	8	(16.7%)	5	(11.6%)	54	(12.8%)
\$1B–\$5B	70	(21.1%)	11	(22.9%)	8	(18.6%)	89	(21.1%)
\$5B–\$10B	28	(8.5%)	2	(4.2%)	6	(14%)	36	(8.5%)
> \$10B	48	(14.5%)	7	(14.6%)	4	(9.3%)	59	(14%)

(continued on next page)

For environmental strategies, we used the four types of environmental sustainability strategies introduced by [Jenkin et al. \(2011\)](#): Type 0 (image-oriented strategy—portraying an image indicating the organization's commitment to the environment, but not implementing these policies), Type 1 (prevent/control strategy—efficiently use the organization's resources and minimize waste to reduce negative environmental impacts), Type 2 (product stewardship strategy—minimizing negative environmental impacts throughout a product's lifecycle), and Type 3 (sustainable development strategy—embedding the organization's environmental sustainability considerations into all of its activities to minimize the organization's global environmental impacts). To that end, one question was developed to capture the environmental strategy for each respondent's organization (see Table 2). For organization size, organization's total revenue was used.

V. RESEARCH RESULTS

This section presents our research results. The demographics of the survey respondents are presented first, and then green IT activities in our respondents' organizations are briefly summarized. Finally, our hypotheses are examined.

Demographics

Table 3 shows the demographic information of the 422 survey respondents from all three countries, specifically, 10.2 percent (43 organizations) were from Australia, 11.4 percent (48 organizations) were from Canada, and 78.4 percent of the respondents (331 organizations) were from the U.S. The size of internal audit departments ranged from 0 to 808 non-IT auditors and from 0 to 200 IT auditors. On average, there were roughly 27 non-IT auditors and 5 IT auditors per organization. The total years of work experience ranged from less than one year to 54 years, with an average of 20 years. The number of years of experience as an internal auditor ranged from less than one year to 45 years, with an average of approximately ten years. In terms of organization size, total revenues of roughly 44 percent of the organizations were greater than \$1 billion. In terms of industry classifications by major SIC division, Services (28 percent) has the highest representation, followed by Public

TABLE 3 (continued)

Panel C: Educational Background

	U.S.		Canada		Australia		Overall	
Educational Background								
Accounting	188	(56.8%)	28	(58.3%)	31	(72.1%)	247	(58.5%)
IT/IS	24	(7.3%)	3	(6.3%)	0	(0%)	27	(6.4%)
Joint Acct. and IT/IS	20	(6%)	3	(6.3%)	3	(7%)	26	(6.2%)
Other Business	52	(15.7%)	10	(20.8%)	7	(16.3%)	69	(16.4%)
Engineering	17	(5.1%)	0	(0%)	1	(2.3%)	18	(4.3%)
Nonbusiness	2	(0.6%)	2	(4.2%)	1	(2.3%)	5	(1.2%)
Other	28	(8.5%)	2	(4.2%)	0	(0%)	30	(7.1%)

Panel D: Industry

	U.S.		Canada		Australia		Overall	
Industry								
Mining	10	(3%)	2	(4.2%)	0	(0%)	12	(2.8%)
Construction	5	(1.5%)	0	(0%)	0	(0%)	5	(1.2%)
Manufacturing	24	(7.3%)	1	(2.1%)	3	(7%)	28	(6.6%)
Transportation	39	(11.8%)	4	(8.3%)	6	(14%)	49	(11.6%)
Wholesale/Retail	7	(2.1%)	3	(6.3%)	1	(2.3%)	11	(2.6%)
Finance	75	(22.7%)	9	(18.8%)	6	(14%)	90	(21.3%)
Services	92	(27.8%)	8	(16.7%)	18	(41.9%)	118	(28%)
Public Administration	79	(23.9%)	21	(43.8%)	9	(20.9%)	109	(25.8%)

Panel E: Current Position

	U.S.		Canada		Australia		Overall	
Current Position								
Internal Audit Staff	137	(41.4%)	24	(50%)	10	(23.3%)	171	(40.5%)
Internal Audit Manager	71	(21.5%)	6	(12.5%)	7	(16.3%)	84	(19.9%)
Internal Audit Director	32	(9.7%)	5	(10.4%)	6	(14%)	42	(10%)
IT Audit Staff	21	(6.3%)	2	(4.2%)	0	(0%)	23	(5.5%)
IT Audit Manager	11	(3.3%)	1	(2.1%)	2	(4.7%)	14	(3.3%)
IT Audit Director	3	(0.9%)	0	(0%)	0	(0%)	3	(0.7%)
Chief Audit Executive	27	(8.2%)	5	(10.4%)	10	(23.3%)	42	(10%)
External Public Acct.	2	(0.6%)	1	(2.1%)	1	(2.3%)	4	(0.9%)
Audit Services	5	(1.5%)	0	(0%)	1	(2.3%)	6	(1.4%)
Other	22	(6.6%)	4	(8.3%)	6	(14%)	32	(7.6%)

Administration (25.8 percent), Finance, Insurance, and Real Estate (21.3 percent), Transportation, Communications, Electric, Gas, and Sanitary Services (11.6 percent), Manufacturing (6.6 percent), Mining (2.8 percent), Wholesale/Retail Trade (2.6 percent), and Construction (1.2 percent).

A little more than half (58.5 percent) of the respondents indicated accounting as their primary education. A total of 298 respondents (80.6 percent) were non-IT internal auditors (i.e., internal audit staff, internal audit manager, internal audit director, and chief audit executive), and 40 respondents (9.5 percent) were IT auditors (i.e., IT audit staff, IT audit manager, and IT audit director).

Organizational Green IT Practices

This subsection reports environmental motivating drivers, environmental strategies, and green IT activities to understand the environs within which the internal auditors are working.

TABLE 4
Green IT Motivating Forces

Country	Drivers	Not Important (1)	Somewhat Important (2)	Important (3)	Very Important (4)	M	SD	n	Not Sure	Total n
Australia	Reducing operational costs (e.g., energy use)	0 (0%)	6 (14.3%)	17 (40.5%)	19 (45.2%)	3.31	0.72	42	1 (2.3%)	43
	Socially responsible thing to do	2 (4.8%)	4 (9.5%)	15 (35.7%)	21 (50%)	3.31	0.84	42	1 (2.3%)	43
	Government regulations	0 (0%)	7 (16.7%)	17 (40.5%)	18 (42.9%)	3.26	0.73	42	1 (2.3%)	43
	Meet organization's overall green initiatives	2 (4.9%)	9 (22%)	18 (43.9%)	12 (29.3%)	2.98	0.85	41	2 (4.7%)	43
	Actions of competitors	9 (25%)	14 (38.9%)	9 (25%)	4 (11.1%)	2.22	0.96	36	7 (16.3%)	43
Canada	Reducing operational costs (e.g., energy use)	1 (2.4%)	9 (21.4%)	19 (45.2%)	13 (31%)	3.05	0.79	42	6 (12.5%)	48
	Socially responsible thing to do	6 (14.3%)	5 (11.9%)	14 (33.3%)	17 (40.5%)	3.00	1.06	42	6 (12.5%)	48
	Government regulations	1 (2.2%)	9 (20%)	16 (35.6%)	19 (42.2%)	3.18	0.83	45	3 (6.3%)	48
	Meet organization's overall green initiatives	1 (2.3%)	10 (23.3%)	23 (53.5%)	9 (20.9%)	2.93	0.74	43	5 (10.4%)	48
	Actions of competitors	20 (45.5%)	15 (34.1%)	5 (11.4%)	4 (9.1%)	1.84	0.96	44	4 (8.3%)	48
U.S.	Reducing operational costs (e.g., energy use)	17 (5.6%)	40 (13.2%)	115 (38%)	131 (43.2%)	3.19	0.87	303	28 (8.5%)	331
	Socially responsible thing to do	30 (10.4%)	44 (15.3%)	101 (35.1%)	113 (39.2%)	3.03	0.98	288	43 (13%)	331
	Government regulations	23 (7.3%)	49 (15.6%)	131 (41.6%)	112 (35.6%)	3.05	0.90	315	16 (4.8%)	331
	Meet organization's overall green initiatives	37 (13.1%)	60 (21.2%)	114 (40.3%)	72 (25.4%)	2.78	0.97	283	48 (14.5%)	331
	Actions of competitors	76 (27.2%)	89 (31.9%)	76 (27.2%)	38 (13.6%)	2.27	1.01	279	52 (15.7%)	331
Overall	Reducing operational costs (e.g., energy use)	18 (4.7%)	55 (14.2%)	151 (39%)	163 (42.1%)	3.19	0.85	387	35 (8.3%)	422
	Socially responsible thing to do	38 (10.2%)	53 (14.2%)	130 (34.9%)	151 (40.6%)	3.06	0.98	372	50 (11.8%)	422
	Government regulations	24 (6%)	65 (16.2%)	164 (40.8%)	149 (37.1%)	3.09	0.87	402	20 (4.7%)	422
	Meet organization's overall green initiatives	40 (10.9%)	79 (21.5%)	155 (42.2%)	93 (25.3%)	2.82	0.94	367	55 (13%)	422
	Actions of competitors	105 (29.2%)	118 (32.9%)	90 (25.1%)	46 (12.8%)	2.21	1.01	359	63 (14.9%)	422

Motivating Forces

Prior literature suggests that an organization's environmental strategies are influenced by several environmental motivating forces such as organizational, regulatory-market, socio-cultural, ecological, and technological forces (Bansal 2002; Bansal and Roth 2000). Table 4 summarizes these forces. In general, the respondents indicated that all five drivers are at least somewhat important (all overall $M > 2.21$). However, the most important green IT drivers were different for each country: socially responsible thing to do (socio-cultural force) in Australia, government regulations (regulatory-market forces) in Canada, and reducing operational costs (organization force) in U.S.; while the least important green IT driver in all three countries was the actions of competitors.

Environmental Strategies

Panel A of Table 5 shows the organizational environmental strategies. Overall, 153 respondents (36.3 percent) indicated that their organizations did not have a formal written statement covering environmental sustainability strategies. Among them, 86 organizations (20.4 percent) considered ecological impact in their decisions, even though they did not have a formal written statement. In contrast, 269 organizations (63.7 percent) had some form of formal green (social responsibility) statement. Organizations in the U.S. (67.4 percent) were more likely to have a formal written statement than those in Australia (53.5 percent) and Canada (47.9 percent). According to the environmental sustainability strategies introduced by Jenkin et al. (2011), 33 organizations (7.8 percent) have a Type 0 (image-oriented) strategy, 140 organizations (33.2 percent) have a Type 1 (prevent/control) strategy, and 96 organizations (22.7 percent) have a Type 3 (sustainable development) strategy. Type 1 was

TABLE 5
Environmental Strategy, Measuring Carbon Footprint, and Monitoring IT-Related Energy Spending

Panel A: Formality of Environmental Decisions

Country	No Formal Statement				Formal Statement							Total n
	No St. 1 ^a	No St. 2 ^b	Total	Type 0 ^c	Type 1 ^d	Type 3 ^e	Total	M	SD			
	(1)	(2)								(3)	(4)	
Australia	8 (18.6%)	12 (27.9%)	20 (46.5%)	9 (20.9%)	11 (25.6%)	3 (7%)	23 (53.5%)	2.74	1.24	43		
Canada	16 (33.3%)	9 (18.8%)	25 (52.1%)	5 (10.4%)	12 (25%)	6 (12.5%)	23 (47.9%)	2.65	1.48	48		
U.S.	43 (13%)	65 (19.6%)	108 (32.6%)	19 (5.7%)	117 (35.3%)	87 (26.3%)	223 (67.4%)	3.42	1.40	331		
Overall	67 (15.9%)	86 (20.4%)	153 (36.3%)	33 (7.8%)	140 (33.2%)	96 (22.7%)	269 (63.7%)	3.27	1.42	422		

^a No St. 1: No statements and no ecological impact in decisions.

^b No St. 2: No statements but consider ecological impact in decisions.

^c Type 0: Type 0 (image-oriented) strategy—Not part of mission statement and not actively publicized.

^d Type 1: Type 1 (prevent/control) strategy—Not part of mission statement but actively publicized.

^e Type 3: Type 3 (sustainable development) strategy—Integral part of mission (or vision) statement.

Panel B: Measuring Carbon Footprint

Country	No		Yes		Not Sure		Total n
Australia	11	(25.6%)	22	(51.2%)	10	(23.3%)	43
Canada	18	(37.5%)	17	(35.4%)	13	(27.1%)	48
U.S.	132	(39.9%)	66	(19.9%)	133	(40.2%)	331
Overall	161	(38.2%)	105	(24.9%)	156	(37%)	422

Panel C: Monitoring IT-Related Energy Spending

Country	No, and We Have No Plan to Do So in the Near Future		No, but We Plan to in the Near Future		Yes		M	SD	n	Not Sure		Total n
	(1)	(2)	(3)	(4)	(5)	(6)						
Australia	22	(64.7%)	5	(14.7%)	7	(20.6%)	1.56	0.82	34	9	(2.1%)	43
Canada	11	(44%)	4	(16%)	10	(40%)	1.96	0.93	25	23	(5.5%)	48
U.S.	56	(30.8%)	15	(8.2%)	111	(61%)	2.30	0.91	182	149	(35.3%)	331
Overall	89	(36.9%)	24	(10%)	128	(53.1%)	2.16	0.94	241	181	(42.9%)	422

the most prevalent environmental sustainability strategy in all three countries. Type 0 was the least prevailing strategy in Canada and the U.S., whereas Type 3 was the least prevailing strategy in Australia.

Measuring Carbon Footprint and Monitoring IT-Related Energy Spending

Panel B of Table 5 indicates that 105 organizations (24.9 percent) calculated their carbon footprint, whereas 161 (38.2 percent) organizations did not measure their carbon footprints. As expected, due to the pending (one month after the survey) implementation of the mandatory Carbon Emissions Reporting (CER) regulation, Australia (51.2 percent) had the highest proportion of organizations measuring carbon emissions, followed by Canada (35.4 percent) and the U.S. (19.9 percent). In addition, Panel C of Table 5 indicates that 128 organizations (53.1 percent) monitored their IT energy spending. In contrast, 89 organizations (36.9 percent) did not monitor their IT energy spending, and only 24 organizations (10 percent) had plans to monitor it in the future. Organizations in the U.S. (61 percent) were more likely to monitor their IT-related energy spending than those in Australia (20.6 percent) and Canada (40 percent). Although many respondents knew what their organization was

doing in terms of green IT practices, many respondents were not sure about what their organizations were doing: measuring carbon footprint (156 respondents, 37 percent) and monitoring IT-related energy spending (181 respondents, 42.9 percent).

Green IT and Internal Auditor

This subsection summarizes internal auditors' current involvement and their perceived role regarding four specific green IT activities and hypotheses testing results.

Internal Auditors' Current Involvement in Green IT Activities

Table 6 shows a summary of responses regarding current involvement in four specific green IT activities. Overall, current green IT involvement is quite limited. Overall, 9.6 percent of respondents indicated that they personally or their department (without them) participated in designing/developing specifications. Specifically, 3.4 percent of the respondents personally participated in this activity, whereas, 6.2 percent of respondents indicated that their department participated in this activity, but the respondents were not personally involved. Also, only 7.7 percent of respondents stated that they or their department were involved in designing/developing controls (4 percent for their department and 3.7 percent personally involved). Similarly, 10.2 percent of respondents or their departments participated in monitoring controls: 6.3 percent for the department and 3.9 percent for the individual. With respect to providing assurance, 9.7 percent of respondents or departments were involved in the activity: 6 percent for the department and 3.7 percent for the individual. Table 6 also indicates that at the department level, Canada had the highest involvement in all four green IT activities, whereas Australia had the highest involvement at the individual level. The U.S. had the lowest involvement in designing/developing controls (individual level) and all four green IT activities (department level).

Internal Auditors' Receptions Regarding Green IT Activities

Table 7 summarizes respondents' perceptions as to the prospective level of internal auditor involvement in green IT activities whether they were personally involved or not. Overall, in contrast with their current involvement, for traditional assurance and facilitator roles, 75.1 percent of respondent indicated that internal auditors probably (29.1 percent) or definitely (46 percent) should be involved in monitoring controls, and 84.8 percent of respondents stated that they probably (27.9 percent) or definitely (56.9 percent) should be involved in providing assurance. On the other hand, regarding consulting roles, only 18.6 percent of the respondents stated that internal auditors probably (14.1 percent) or definitely (4.5 percent) should be involved in designing/developing specifications. Likewise, 35.6 percent of the respondents expressed that internal auditors probably (21.4 percent) or definitely (14.2 percent) should be involved in designing/developing controls. Furthermore, Table 7 shows that respondents in Australia had the highest level of perception regarding consulting-related activity: designing/developing specifications and designing/developing controls, whereas respondents in Canada had the lowest perception levels. With respect to monitoring controls and providing assurance, Canada showed the highest perception levels. Australia revealed the lowest perception level regarding monitoring controls, whereas the U.S. showed the lowest perception level for providing assurance.

Testing H1 and H2

An analysis of covariance (ANCOVA) was conducted to determine whether internal auditors' current involvements in green IT activities differ among the three countries (i.e., H1a) and across industries (i.e., H2a). As addressed before, environmental strategy (*STRATEGY*), based on Types 0–3, and organization size (*FIRM SIZE*), based on annual revenue, were used as control variables based on prior literature. The ANCOVA results in Panel A of Table 8 show a marginally significant effect of *COUNTRY* for the consulting-related designing/developing specifications ($F_{(7, 374)} = 3.824$, $p = 0.062$, $\eta^2 = 0.015$), suggesting that internal auditors' current involvements in designing/developing specifications differ among the three countries. Eta (η) is 0.122, which, according to Cohen (1988), can be considered as a small effect.¹⁹ Bonferroni-corrected means comparisons were conducted to compare internal auditors' current involvements between countries. The comparison results (not provided in tabular form) show a significant difference between Australia and the U.S. ($p = 0.044$), suggesting that internal auditors in Australia ($M = 2.946$, $SE = 0.269$) tended to be more involved in designing/developing specifications than those in the U.S. ($M = 2.227$, $SE = 0.113$). The effect of *COUNTRY* for all other three green IT activities is not significant, indicating that Australian internal auditors' current involvement in three of the four green IT activities was not greater than Canada and the

¹⁹ Cohen (1988) provided guidelines for interpreting the size of the "effect" for common effect size measures such as γ , η , and ϕ . According to Cohen (1988), $\eta > 0.10$ is a small effect, $\eta > 0.24$ is a medium effect, and $\eta > 0.37$ is a large effect in social science research.

TABLE 6
Internal Auditors' Current Involvement in Green IT Activities

Country	Green IT Activities	Could Not Do This with Current Dept. Skills					My Dept. Has Not Done This, but They Have the Skills to Do This					I Have Not, but My Dept. Has Done This					I Have Personally Done This					Total				
		(1)	(2)	(3)	(4)	(5)	M	SD	n	Not Sure	n	M	SD	n	Not Sure	n	M	SD	n	Not Sure	n					
Australia	Designing/developing specifications ^a	16 (42.1%)	10 (26.3%)	6 (15.8%)	4 (10.5%)	2 (5.3%)	2.11	1.23	38	5 (11.6%)	43															
	Designing/developing controls ^b	12 (31.6%)	10 (26.3%)	12 (31.6%)	2 (5.3%)	2 (5.3%)	2.26	1.13	38	5 (11.6%)	43															
	Monitoring controls ^c	5 (13.2%)	11 (28.9%)	15 (39.5%)	3 (7.9%)	4 (10.5%)	2.74	1.13	38	5 (11.6%)	43															
	Providing assurance ^d	6 (15%)	9 (22.5%)	18 (45%)	3 (7.5%)	4 (10%)	2.75	1.13	40	3 (7%)	43															
Canada	Designing/developing specifications	16 (40%)	9 (22.5%)	7 (17.5%)	7 (17.5%)	1 (2.5%)	2.20	1.22	40	8 (16.7%)	48															
	Designing/developing controls	12 (29.3%)	11 (26.8%)	13 (31.7%)	3 (7.3%)	2 (4.9%)	2.32	1.13	41	7 (14.6%)	48															
	Monitoring controls	5 (11.9%)	12 (28.6%)	19 (45.2%)	5 (11.9%)	1 (2.4%)	2.64	0.93	42	6 (12.5%)	48															
	Providing assurance	8 (20%)	12 (30%)	15 (37.5%)	4 (10%)	1 (2.5%)	2.45	1.01	40	8 (16.7%)	48															
U.S.	Designing/developing specifications	101 (36.6%)	101 (36.6%)	54 (19.6%)	11 (4%)	9 (3.3%)	2.01	1.01	276	55 (16.6%)	331															
	Designing/developing controls	61 (22.3%)	102 (37.2%)	93 (33.9%)	9 (3.3%)	9 (3.3%)	2.28	0.96	274	57 (17.2%)	331															
	Monitoring controls	34 (12%)	83 (29.3%)	142 (50.2%)	15 (5.3%)	9 (3.2%)	2.58	0.88	283	48 (14.5%)	331															
	Providing assurance	40 (14.8%)	78 (28.8%)	131 (48.3%)	14 (5.2%)	8 (3%)	2.53	0.91	271	60 (18.1%)	331															
Overall	Designing/developing specifications	133 (37.6%)	120 (33.9%)	67 (18.9%)	22 (6.2%)	12 (3.4%)	2.04	1.06	354	68 (16.1%)	422															
	Designing/developing controls	85 (24.1%)	123 (34.8%)	118 (33.4%)	14 (4%)	13 (3.7%)	2.28	0.99	353	69 (16.4%)	422															
	Monitoring controls	44 (12.1%)	106 (29.2%)	176 (48.5%)	23 (6.3%)	14 (3.9%)	2.61	0.92	363	59 (14%)	422															
	Providing assurance	54 (15.4%)	99 (28.2%)	164 (46.7%)	21 (6%)	13 (3.7%)	2.54	0.95	351	71 (16.8%)	422															

^a Designing/developing specifications for green IT activities.

^b Designing/developing controls to monitor green IT activities to ensure compliance with green IT specifications.

^c Monitoring controls to determine whether green IT specifications are being complied with.

^d Providing assurance that the green IT monitoring controls are being used properly by others.

TABLE 7
Internal Auditors' Perceived Role in Green IT Activities

Country	Green IT Activities	Maybe or Maybe Not					Definitely Should (5)	Probably Should (4)	M	SD	n	Not Sure	Total n
		Definitely Not (1)	Probably Not (2)	Maybe Not (3)	Probably Should (4)	Definitely Should (5)							
Australia	Designing/developing specifications ^a	7 (17.1%)	13 (31.7%)	8 (19.5%)	6 (14.6%)	7 (17.1%)	2.83	1.36	41	2	(4.7%)	43	
	Designing/developing controls ^b	2 (4.9%)	9 (22%)	14 (34.1%)	8 (19.5%)	8 (19.5%)	3.27	1.16	41	2	(4.7%)	43	
	Monitoring controls ^c	1 (2.4%)	5 (11.9%)	7 (16.7%)	13 (31%)	16 (38.1%)	3.90	1.12	42	1	(2.3%)	43	
	Providing assurance ^d	0 (0%)	1 (2.4%)	5 (11.9%)	13 (31%)	23 (54.8%)	4.38	0.79	42	1	(2.3%)	43	
Canada	Designing/developing specifications	16 (34.8%)	16 (34.8%)	8 (17.4%)	5 (10.9%)	1 (2.2%)	2.11	1.08	46	2	(4.2%)	48	
	Designing/developing controls	13 (28.3%)	8 (17.4%)	9 (19.6%)	10 (21.7%)	6 (13%)	2.74	1.42	46	2	(4.2%)	48	
	Monitoring controls	2 (4.3%)	5 (10.9%)	2 (4.3%)	16 (34.8%)	21 (45.7%)	4.07	1.16	46	2	(4.2%)	48	
	Providing assurance	0 (0%)	1 (2.2%)	3 (6.7%)	9 (20%)	32 (71.1%)	4.60	0.72	45	3	(6.3%)	48	
U.S.	Designing/developing specifications	100 (32.3%)	84 (27.1%)	71 (22.9%)	45 (14.5%)	10 (3.2%)	2.29	1.16	310	21	(6.3%)	331	
	Designing/developing controls	84 (26.8%)	50 (15.9%)	69 (22%)	68 (21.7%)	43 (13.7%)	2.80	1.40	314	17	(5.1%)	331	
	Monitoring controls	17 (5.4%)	22 (7%)	39 (12.4%)	88 (28%)	148 (47.1%)	4.04	1.17	314	17	(5.1%)	331	
	Providing assurance	7 (2.2%)	12 (3.8%)	32 (10.2%)	90 (28.7%)	173 (55.1%)	4.31	0.96	314	17	(5.1%)	331	
Overall	Designing/developing specifications	123 (31%)	113 (28.5%)	87 (21.9%)	56 (14.1%)	18 (4.5%)	2.33	1.18	397	25	(5.9%)	422	
	Designing/developing controls	99 (24.7%)	67 (16.7%)	92 (22.9%)	86 (21.4%)	57 (14.2%)	2.84	1.38	401	21	(5%)	422	
	Monitoring controls	20 (5%)	32 (8%)	48 (11.9%)	117 (29.1%)	185 (46%)	4.03	1.16	402	20	(4.7%)	422	
	Providing assurance	7 (1.7%)	14 (3.5%)	40 (10%)	112 (27.9%)	228 (56.9%)	4.35	0.92	401	21	(5%)	422	

^a Designing/developing specifications for green IT activities.

^b Designing/developing controls to monitor green IT activities to ensure compliance with green IT specifications.

^c Monitoring controls to determine whether green IT specifications are being complied with.

^d Providing assurance that the green IT monitoring controls are being used properly by others.

TABLE 8
Analysis of Covariance Results

Panel A: Internal Auditors' Current Involvement in Green IT Activities—Designing/Developing Specifications

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>	<u>η^2</u>
<i>FIRM SIZE</i>	1	0.275	0.201	0.654	0.001
<i>STRATEGY</i>	1	0.085	0.062	0.803	0.001
<i>COUNTRY</i>	2	3.824	2.802	0.062	0.015
<i>INDUSTRY</i>	7	1.952	1.431	0.191	0.026
<i>COUNTRY * INDUSTRY</i>	11	1.849	1.355	0.192	0.038
Error	374	1.364			

“Not Sure” responses are not included.

Panel B: Internal Auditors' Current Involvement in Green IT Activities—Designing/Developing Controls

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>	<u>η^2</u>
<i>FIRM SIZE</i>	1	0.983	0.504	0.478	0.001
<i>STRATEGY</i>	1	2.452	1.259	0.263	0.003
<i>COUNTRY</i>	2	1.600	0.821	0.441	0.004
<i>INDUSTRY</i>	7	1.293	0.664	0.703	0.012
<i>COUNTRY * INDUSTRY</i>	11	1.018	0.523	0.888	0.015
Error	378	1.948			

“Not Sure” responses are not included.

Panel C: Internal Auditors' Current Involvement in Green IT Activities—Monitoring Controls

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>	<u>η^2</u>
<i>FIRM SIZE</i>	1	0.204	0.148	0.700	0.001
<i>STRATEGY</i>	1	0.012	0.008	0.927	0.001
<i>COUNTRY</i>	2	0.522	0.380	0.684	0.002
<i>INDUSTRY</i>	7	0.941	0.685	0.685	0.012
<i>COUNTRY * INDUSTRY</i>	11	1.043	0.759	0.681	0.022
Error	379	1.373			

“Not Sure” responses are not included.

Panel D: Internal Auditors' Current Involvement in Green IT Activities—Providing Assurance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>	<u>η^2</u>
<i>FIRM SIZE</i>	1	0.321	0.378	0.539	0.001
<i>STRATEGY</i>	1	0.412	0.486	0.486	0.001
<i>COUNTRY</i>	2	0.044	0.051	0.950	0.001
<i>INDUSTRY</i>	7	1.410	1.664	0.117	0.030
<i>COUNTRY * INDUSTRY</i>	11	0.855	1.009	0.438	0.029
Error	378	0.848			

“Not Sure” responses are not included.

(continued on next page)

U.S. In addition, the effect of *INDUSTRY* is not significant for all four green IT activities, suggesting that internal auditors' current involvement in green IT activities did not differ across industries. Therefore, H1a is partially supported for one specific green IT activity (i.e., designing/developing specifications) between Australia and the U.S., and H2a is not supported.

Another ANCOVA was conducted to determine whether internal auditors' perceptions as to the prospective levels of internal auditor involvement in green IT activities differ among the three countries (i.e., H1b) and across industries (i.e., H2b). The ANCOVA results in Panels E–H of Table 8 indicate that after controlling for environmental strategy and organization size,

TABLE 8 (continued)

Panel E: Internal Auditors' Perceived Roles in Green IT Activities—Designing/Developing Specifications

Source	df	MS	F	p	η^2
<i>FIRM SIZE</i>	1	0.109	0.103	0.749	0.001
<i>STRATEGY</i>	1	19.362	18.264	0.001	0.052
<i>COUNTRY</i>	2	0.234	0.220	0.802	0.001
<i>INDUSTRY</i>	7	1.829	1.726	0.102	0.035
<i>COUNTRY * INDUSTRY</i>	11	1.022	0.964	0.479	0.031
Error	331	1.060			

“Not Sure” responses are not included.

Panel F: Internal Auditors' Perceived Roles in Green IT Activities—Designing/Developing Controls

Source	df	MS	F	p	η^2
<i>FIRM SIZE</i>	1	0.222	0.234	0.629	0.001
<i>STRATEGY</i>	1	8.683	9.173	0.003	0.027
<i>COUNTRY</i>	2	0.668	0.705	0.495	0.004
<i>INDUSTRY</i>	7	2.782	2.939	0.005	0.059
<i>COUNTRY * INDUSTRY</i>	11	1.505	1.590	0.100	0.050
Error	330	0.947			

“Not Sure” responses are not included.

Panel G: Internal Auditors' Perceived Roles in Green IT Activities—Monitoring Controls

Source	df	MS	F	p	η^2
<i>FIRM SIZE</i>	1	1.632	2.047	0.153	0.006
<i>STRATEGY</i>	1	8.267	10.371	0.001	0.030
<i>COUNTRY</i>	2	0.314	0.394	0.674	0.002
<i>INDUSTRY</i>	7	1.903	2.387	0.021	0.047
<i>COUNTRY * INDUSTRY</i>	11	1.062	1.332	0.205	0.041
Error	340	0.797			

“Not Sure” responses are not included.

Panel H: Internal Auditors' Perceived Roles in Green IT Activities—Providing Assurance

Source	df	MS	F	p	η^2
<i>FIRM SIZE</i>	1	2.417	2.913	0.089	0.009
<i>STRATEGY</i>	1	10.726	12.923	0.001	0.038
<i>COUNTRY</i>	2	1.229	1.480	0.229	0.009
<i>INDUSTRY</i>	7	2.585	3.115	0.003	0.062
<i>COUNTRY * INDUSTRY</i>	11	1.102	1.328	0.207	0.043
Error	328	0.830			

“Not Sure” responses are not included.

the main effect of *COUNTRY* is not significant for all green four IT activities, implying Australian internal auditors' perceived level of activity did not differ significantly from Canada and the U.S. However, the main effect of *INDUSTRY* is statistically significant for three green IT activities: designing/developing controls ($F_{(7, 330)} = 2.939$, $p = 0.005$, $\eta^2 = 0.059$), monitoring controls ($F_{(7, 340)} = 2.387$, $p = 0.021$, $\eta^2 = 0.047$), and providing assurance ($F_{(7, 328)} = 3.115$, $p = 0.003$, $\eta^2 = 0.062$). Etas (η) are 0.24, 0.22, and 0.25, respectively. According to Cohen (1988), the results can be considered as a medium effect, a small effect, and a medium effect, respectively. Therefore, H1b is not supported, whereas H2b is partially supported.

Furthermore, Bonferroni-corrected means comparison results regarding designing/developing specifications (not provided in tabular form) indicate a marginally significant difference between “Transportation, Communications, Electric, Gas, and Sanitary Services” and “Services” ($p = 0.059$) and a significant difference between “Services” and “Public Administration” (p

= 0.004). These results suggest that the respondents' perceptions as to the prospective levels of internal auditor involvement in designing/developing specifications was higher in the "Services" industry ($M = 2.792$, $SE = 0.147$) than both in the "Transportation, Communications, Electric, Gas, and Sanitary Services" industry ($M = 1.948$, $SE = 0.227$) and "Public Administration" ($M = 1.999$, $SE = 0.149$). With respect to monitoring controls, the comparison results show a significant difference between "Services" and "Public Administration" ($p = 0.018$), indicating that the respondents' perceived role in monitoring controls was higher in the "Services" industry ($M = 3.012$, $SE = 0.135$) than in "Public Administration" ($M = 2.369$, $SE = 0.131$). The comparison results also reveal a significant difference between "Services" and "Public Administration" ($p = 0.001$) with respect to providing assurance, revealing that the respondents' perceived role in providing assurance was higher in the "Services" industry ($M = 2.987$, $SE = 0.138$) than in "Public Administration" ($M = 2.181$, $SE = 0.134$).

As a side note, although the IIA's (2010) *Evaluating Corporate Social Responsibility/Sustainable Development* practice guide encourages auditors to play the roles of assurer, facilitator, and consultant in sustainability activities, in past studies, questions that ask internal auditors about designing or developing controls or specifications are controversial and have generated negative comments from the IIA reviewers regarding the survey. The internal auditing standards clearly state that internal auditors must maintain their objectivity. As such, critics will say that internal auditors should *never* be involved in designing or developing controls or specifications. However, prior focus groups with internal auditors, as well as surveys, indicate that some internal auditors are clearly involved in these activities (Gray 2004). Sometimes, organizations are large enough such that internal auditors can be segregated into groups that design controls and those that audit controls so that individual auditors will not be in a position of auditing their own work. Several auditors have clearly stated that management insists that internal auditors be involved in designing and developing activities. Those managers believe it is better that internal auditors are involved in front-end design activities than be involved in criticizing the controls after the fact (pejoratively referred to as bayoneting the wounded).

In summary, regarding H1 and H2, the ANCOVA results suggest that internal auditors' involvement in four broad green IT activities did not vary among the three countries except that Australian internal auditors are slightly more involved in designing/developing specifications. In addition, internal auditors' current involvement in green IT activities did not differ across industries. The results also reveal that internal auditors' perceived levels of involvement regarding green IT activities did not vary among the three countries. On the other hand, statistically significant differences were found regarding perceptions in three green IT activities across industries (i.e., designing/developing controls, monitoring controls, and providing assurance). However, such differences were mainly observed between two industries (i.e., the "Services" industry and "Public Administration").

Testing H3

Paired samples t-tests were conducted to examine whether internal auditors' current involvement in green IT activities is aligned with their perceptions as to the prospective levels of internal auditor involvement in green IT activities (i.e., H3). In other words, are auditors with strong positive beliefs that auditors should be more involved in green IT more likely to be actually involved in green IT? The results reported in Table 9 indicate that all green IT activities are statistically significant (all $p < 0.05$) except for designing/developing specifications in Canada. According to Cohen (1988),²⁰ the differences in designing/developing specifications in the Australia column ($d = 0.45$), the U.S. column ($d = 0.23$), and the Overall column ($d = 0.22$), although statistically significant, can be considered as small. With respect to designing/developing controls, the differences are small for Canada ($d = 0.34$), the U.S. ($d = 0.33$), and Overall ($d = 0.37$), and medium for Australia ($d = 0.82$). Furthermore, the differences in monitoring controls and providing assurance are much larger than typical for all three countries and Overall (all $d > 1.00$), except for monitoring controls in Australia ($d = 0.79$), which can be considered as a medium effect size. Whether currently involved in green IT or not, auditors had a strong belief that auditors should be more involved in green IT. Therefore, H3 is supported, which confirms (Gray et al. 2014).

VI. CONCLUSIONS AND FUTURE RESEARCH

Although Australia, Canada, and the U.S. have a similar English-speaking, Anglo-Saxon, and common law history, one would expect that the stronger national attitudes (e.g., the ubiquitous concern about skin cancer because of the thinning ozone layer over Australia)²¹ and more robust government regulations regarding the environment and sustainability (e.g., the looming

²⁰ According to Cohen (1988), $d > 0.20$ is a small or smaller than typical effect, $d > 0.50$ is a medium or typical effect, $d > 0.80$ is a large or larger than typical effect, and $d > 1.00$ is a much larger than typical effect in social science research.

²¹ For more detail, see <http://www.environment.gov.au/protection/ozone/ozone-science/ozone-layer>

TABLE 9
Internal Auditors' Perceived Role in Green IT Activities and Current Involvement

Panel A: Australia

Australia						
	<u>M</u>	<u>SD</u>	<u>t</u>	<u>df</u>	<u>p</u>	<u>d</u>
Designing/developing specifications			-2.679	35	0.011	0.45
Current involvement	2.11	1.24				
Perceived role	2.78	1.33				
Designing/developing controls			-4.971	36	0.001	0.82
Current involvement	2.24	1.14				
Perceived role	3.30	1.10				
Monitoring controls			-4.802	36	0.001	0.79
Current involvement	2.73	1.15				
Perceived role	3.92	1.14				
Providing assurance			-7.743	38	0.001	1.24
Current involvement	2.74	1.14				
Perceived role	4.41	0.82				

Panel B: Canada

Canada						
	<u>M</u>	<u>SD</u>	<u>t</u>	<u>df</u>	<u>p</u>	<u>d</u>
Designing/developing specifications			0.114	38	0.910	0.02
Current involvement	2.15	1.20				
Perceived role	2.13	1.10				
Designing/developing controls			-2.162	39	0.037	0.34
Current involvement	2.28	1.11				
Perceived role	2.80	1.38				
Monitoring controls			-6.672	40	0.001	1.04
Current involvement	2.61	0.92				
Perceived role	4.12	1.19				
Providing assurance			-12.437	38	0.001	1.99
Current involvement	2.41	0.99				
Perceived role	4.69	0.66				

Panel C: U.S.

U.S.						
	<u>M</u>	<u>SD</u>	<u>t</u>	<u>df</u>	<u>p</u>	<u>d</u>
Designing/developing specifications			-3.726	269	0.001	0.23
Current involvement	2.01	1.01				
Perceived role	2.29	1.14				
Designing/developing controls			-5.418	272	0.001	0.33
Current involvement	2.29	0.95				
Perceived role	2.81	1.39				
Monitoring controls			-17.754	282	0.001	1.06
Current involvement	2.58	0.88				
Perceived role	4.02	1.19				
Providing assurance			-24.583	270	0.001	1.49
Current involvement	2.53	0.91				
Perceived role	4.37	0.90				

(continued on next page)

TABLE 9 (continued)

Panel D: Overall

	Overall					
	M	SD	t	df	p	d
Designing/developing specifications			−4.117	344	0.001	0.22
Current involvement	2.03	1.06				
Perceived role	2.32	1.16				
Designing/developing controls			−6.931	349	0.001	0.37
Current involvement	2.28	0.99				
Perceived role	2.86	1.37				
Monitoring controls			−19.474	360	0.001	1.02
Current involvement	2.60	0.92				
Perceived role	4.02	1.18				
Providing assurance			−28.123	348	0.001	1.51
Current involvement	2.54	0.95				
Perceived role	4.41	0.87				

deadline for the emissions cap regulation in Australia) would be reflected in the green IT perceptions and activities of the internal auditors in Australia compared to Canada and the U.S. However, only with one exception, we generally find that internal auditors' perceptions and activities are not statistically significantly different among the three countries.

Specifically, the internal auditors' current involvements in green IT are very low and not statistically different among the three countries. The only statistical difference is for one activity; namely, the somewhat controversial activity of designing and developing specifications. This activity is controversial because if not conducted properly, it can negatively reflect on the objectivity of the auditors involved. In terms of their perception of what their roles (i.e., auditor, facilitator, or consultant) could be or should be, no difference is found among the three countries.

In addition, no difference is found in terms of internal auditors' current involvement in green IT activities across industries. With respect to internal auditors' perceived roles of what they *should* be involved in concerning green IT, we find significant differences in three green IT activities across industries (i.e., designing/developing controls, monitoring controls, and providing assurance). However, such differences are mainly observed between two industries (i.e., the "Services" industry and the "Public Administration" industry). Regarding the alignment of internal auditors' actual levels of green IT activities and perceived levels of activities, internal auditors' current levels of involvement are not aligned with their perceived levels of involvement in green IT activities, and this gap is found across the three countries except for designing/developing specifications in Canada. In other words, in all three countries, the internal auditors believe that they should be more involved in green IT than they currently are. Why they are not currently more involved is an important question for future research.

Based on the results of this Australian extension of [Gray et al.'s \(2014\)](#) study, it is clear that internal auditors' green IT perceptions and involvements in these three countries are essentially interchangeable. It would appear that the auditors are not proactively pursuing activities in this particular long-term and significant green IT domain. The fact that this study finds minimal differences among the three countries provides an insightful contribution to the body of internal auditing research. One of the reasons for the low involvement in green IT activities might be the apparent general reluctance to be involved in technology-related activities. For example, several studies conducted in the IIA's North America jurisdiction consistently indicate that internal auditors have minimal involvement in IT-related activities: XBRL ([Gray and White 2005](#)), system development projects ([Gray, Gold, Jones, and Miller 2010](#)), and green IT ([Gray et al. 2014](#)). These studies also show that if internal auditors are involved in IT, it is almost exclusively in an assurance role (not in consulting or facilitating roles). However, the overarching reason may be due to externally driven and internally driven priorities that leave little time for internal auditors to pursue value-added activities such as green IT. For example, internal auditors in the U.S. spend a significant amount of their time in pursuing SOX-related activities. The boards encourage internal auditors' involvement in SOX-related activities because it reduces the potential fees paid to the external auditors. Although Australia and Canada do not have the full equivalent of SOX, like many other countries, Australia and Canada did implement some aspects of SOX.

Although climate awareness and regulations are stronger in Australia, the fact that there is little difference between the three countries has strong policy implications for the IIA International and local IIA jurisdictions. Both management and internal auditors are missing opportunities to efficiently and effectively improve their sustainability activities. Although the IIA has been encouraging their members for several decades to proactively expand their value-added services outside of financial

assurance services, our study indicates that those encouragements seem to be hitting a wall, and more research is needed to identify the specific inhibitors.

As with any study, there are several limitations that must be considered when interpreting the findings. The response rate from all three countries was low, and there is always a concern about the nonresponse bias. For the survey sent to members of the Australia IIA jurisdiction and North America IIA jurisdiction, follow-up emails were sent and generated additional responses. There did not appear to be any particular biases between the first group of respondents and the second group of respondents, which reduces our concern about the overall nonresponse bias.

Future research is needed to examine whether this infrequent green IT involvement and narrow assurance roles are just simply due to time constraints where the auditors are being directed by their boards and other executives to allocate higher priorities to other tasks (e.g., SOX-driven internal control evaluations in the U.S.). Considering the fact that the internal audit department has rather intimate knowledge of an organization's IT operations from their traditional IT audit activities, another research opportunity is to identify whether there are some broad systemic reasons other than time constraints as to why internal auditors are not being more proactively involved in the highly visible, rapid-growing, value-added areas of sustainability and green IT. Are the inhibitors primarily push, pull, or a combination? In other words, are internal auditors not proactively *pushing* on management to have a broader part of green IT activities? Moreover, if they are not pushing, is it due to the lack of skills (perceived or real), confidence, or time? Alternatively, is management not *pulling* on internal auditors to have a broader part of green IT activities? Historically, internal auditors are sometimes seen negatively as the company's police officers, and management, therefore, does not want to share information with them. Sometimes internal auditors are accused of bayoneting the wounded when they write negative reports, so management is going to be reluctant to have internal auditors that conduct a post-implementation review of green IT sustainability activities and reporting. If these old images are the primary inhibitors, future research needs to explore ways to change those images. Furthermore, it would be particularly interesting to conduct similar surveys in non-Anglo-Saxon countries and civil law (versus common law) countries. Given that Asian countries, such as China, Japan, and Korea, have very different cultures, it would be interesting to explore internal auditors' green IT involvement in those countries. Highly centralized countries such as Russia would also be an interesting subject—as would be developing countries.

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APPENDIX A

Panel A: Matrix of Sustainability Reporting Policies in Three Countries

Country	Generic	Sector-Specific	Thematic
Australia	<ul style="list-style-type: none"> • Corporation Act • Operating Financial Review (OFR) • ASX Listing Rules 	<ul style="list-style-type: none"> • Financial Services Reform Act (FSRA) 	<ul style="list-style-type: none"> • Clean Energy Act • Nat. GHG and Energy Rep. • Energy Efficiency Act • Nat. Pollutant Inventory
Canada	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Public Acc. Statements 	<ul style="list-style-type: none"> • GHG Program • The National Pollutant Release Inventory (NPRI) • Env. Rep. Guidance • TSX
U.S.	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Dodd-Frank Act • Pres. Exec. Order 13514 • EPA greenhouse gas emissions (GHG) Reporting Rule 	<ul style="list-style-type: none"> • EEO-1 Survey • Sarbanes-Oxley Act • CAA and CWA • Toxic Release Inventory • California Transp. in Supply Chains Act

Source: KPMG, GRI, CCGA, UNEP (2013).

(continued on next page)

APPENDIX A (continued)

Panel B: Summary of Survey Questions*Green IT Motivating Forces*

How important are the following drivers in your organization for adopting green IT initiatives?

Reducing operational costs (e.g., energy use).

Socially responsible thing to do.

Government regulations.

Meet organization's overall green initiatives.

Actions of competitors.

Environmental Sustainability Green IT Strategies

Does your organization have a general green (social responsibility) statement?

Yes, it is actually an integral part of our mission or vision statements.

Yes, it is not part of our mission statement, but it is on our website—and employees are reminded that it is there (e.g., via periodic emails to employees).

Yes, it is posted to our website, but it is not actively publicized to our employees.

There is no formal, written statement, but we do consider ecological impact in decisions.

No.

Not sure.

Other (please specify): _____

Measuring Carbon Footprint

Does your organization measure its carbon footprint (or other general measures of environmental impact)?

Yes, and IT is listed as a separate calculation.

Yes, but IT is not separately calculated.

No, but we plan to do the measurement in the near future.

No, and we have no plan to do so in the near future.

Not sure.

Other (please specify): _____

Monitoring IT-Related Energy Spending

Does your organization monitor IT-related energy spending?

Yes.

No, but we plan to in the near future.

No.

Not sure.

Other (please specify): _____

Internal Auditors' Current Involvement in Green IT Activities

Assuming a hypothetical internal audit department has the skills to perform each of the following activities, should they perform those activities in light of internal auditing standards—particularly, regarding independence and objectivity?

Design/develop specifications for green IT activities.

Design/develop controls to monitor green IT activities to ensure compliance with green IT specifications.

Monitor controls to determine whether green IT specifications are being complied with.

Provide assurance that the green IT monitoring controls are being used properly by others (outside of internal auditing).

Internal Auditors' Perceived Role in Green IT Activities

Based on your experiences, your department's experiences, and the combined skills of your internal audit department, select the most appropriate answer for each of the following broad green IT activities:

Design/develop specifications for green IT activities.

Design/develop controls to monitor green IT activities to ensure compliance with green IT specifications.

Monitor controls to determine whether green IT specifications are being complied with.

Provide assurance that the green IT monitoring controls are being used properly by others (outside of internal auditing).

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