

Accountants' IT Competencies and IT Responsibilities in Supporting IT Sustainability Practice Students' Perspective

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Accountants' IT Competencies and IT Responsibilities in Supporting IT Sustainability Practice: Students' Perspective

Abstract

¹⁵ This study aims to look at the perceptions of accounting students in Indonesia on accountants' role in IT sustainability practices through the IT competence of accountants in the utilization of information systems. This study measures different perceptions of accounting students based on gender (male and female), year of study (junior and senior), and the type of university (public and private). The majority of accounting students agree with the importance of accountants' role in IT sustainability practices by utilizing information systems. Differences in perceptions of accountants' IT responsibility, accountants' IT competence, and the importance of IT sustainability practice are found in the senior and junior student groups and groups of students from public and private universities, while in the gender group, there is no difference in perception. This study can be useful for accounting education providers and teachers who ³⁰ play an essential role in supporting students to understand the practical implementation in accounting professions regarding their role in sustainability through the utilization of information system technology.

Keywords: IT sustainability practice; information system technology; accountants' IT responsibilities; accountants' IT competencies; students' perception.

1. Introduction

⁴⁰ The rapid development of information technology affects the business world and other fields, such as health, education, government, and others. Accountants are ¹² a profession that has developed from century to century and has experienced ups and downs in maintaining its existence (Rosmida, 2019). The competence of an accountant must keep developing along with the increasing utilization of IT that enables businesses to capture an enormous amount of data. The use of information technology is intended to facilitate data processing and storage of data. The main goal is to make work easier, save costs, improve supervision, and increase productivity so that companies can maximize their profits (Junger da Silva et al., 2020a). Technological advances can help accountants'

work to organize, process, and analyze data faster so they can save costs and time (Kruskopf et al., 2020). In addition, the use of computers can automate making financial reports in real-time (Forsaithe et al., 2004).

The term IT in business perspective is related to ⁵any system for retrieving, collecting, processing, storing, and transmitting data, usually also known ¹⁸as Information Systems (IS). Over the past decade, IT has modified how data is collected, stored, processed, and distributed among business stakeholders (Dimitrios et al., 2013). Accountants are among the first group of professionals affected by this change, as IT has become an essential part of their profession (Rom & Rohde, 2007). Therefore, the international education accrediting agency used by the world's top universities, AACSB, makes a standard that accountants need to have ³⁹information technology skills and knowledge (AACSB International, 2014). The focus of these standards is accounting education providers ²should include learning experiences that develop skills and knowledge related to the integration of information technology in accounting and business, including data creation, data sharing, data analytics, data mining, data reporting, and data storage (Andiola et al., 2020).

In many parts of the world, electronic data processing has replaced paper-based transaction recording, making it more efficient and minimising paper usage. However, the rapid utilization of information technology can also generate other negative impacts to the environment, such as the high usage of electrical energy and electronic waste that is difficult to decompose and contains toxic materials that lead to severe human and environmental problems (Kiddee et al., 2013). IT sustainability practice is a developmental technology concept based on environmentally friendly and energy efficiency. IT sustainability practices include planning of buying environmentally friendly IT equipment, lower power consumption, recycling IT equipment, and an environment-friendly way of disposing of IT equipment (Bose & Luo, 2011, 2012). From an accounting perspective, accountants can directly contribute to IT sustainability practice through a deeper understanding of IT asset management, continuous energy consumption monitoring to achieve energy efficiency, and providing environmental reports as a management control system (Junger da Silva et al., 2020b).

Universities have an essential role in social change (Stephens et al., 2008), so the concern for sustainable technology can be planted since student age. Thus, accounting students need to understand their role, as future accountants, in supporting sustainability through the utilization of information system technology. However, research is still rare on how accounting students understand information system technology in sustainability. ³⁶Therefore, this study aims to measure the perception of accounting students in Indonesia about how important IT competence and IT responsibility for accountant, and their role as future accountant professionals in IT

sustainability practice. ¹⁵ This study also has important implications for accounting education providers and teachers who play an essential role in assisting accounting students in understanding accountant's role in sustainability.

2. Literature review

IT Competence and Accounting

IT competence in accounting studies has been discussed many decades ago since the computer era emerged. ⁵ In the early stages of IT utilization in business, ⁵ the IT competencies required by accountants relate to the ability to use specific software packages and the basic requirement by business (Bean & Medewitz, 1987). In the 90s, changes in IT competencies for accountants emerged toward information systems ⁵ such as accounting information systems and management information systems (Kaye & Nicholson, 1992). Heagy & Gallun (1994) categorized IT skills required for graduate accountants ²⁹ such as spreadsheets, database management systems, system development, accounting systems, and telecommunications. In the internet era, significant changes are in the importance of telecommunications and network competencies. Accountants must ¹¹ know how to transfer files, upload and download data, use local area networks, electronic commerce, the world wide web, and others (McLarres & Oyelere, 1999). Programming competence seems to have decreased, but system development competence has emerged. In the 2000s era, the requirements for IT competencies were shifted from a technological view to a more business view. More research argued to strengthen the need for accountants to broaden their IT competence on audit automation skills (Wessels, 2005), understanding IT governance and IT strategy (Damasiotis et al., 2015), and big data analytics skills ²² (Sledgianowski et al., 2017; Richardson & Shan, 2019; Dzuranin et al., 2018; Andiola et al., 2020).

It can be concluded that IT has become an essential part of the accounting profession. Accountants in this era are expected to have a hybrid of IT, accounting, and business strategy knowledge and skills. Therefore, in the education context, there are more demands for the needs of accounting graduates to have adequate IT-related skills. ⁸ Accounting students need to equip themselves to resist the threat of automation to the accounting profession, and data analytics knowledge and skills ⁸ increase the competitiveness of students in the job market (Richardson & Shan, 2019). AACSB, as a well-known business school accreditation, stated in its standard for accounting academic institution accreditation that accounting degree programs need to integrate IT-related components within the curriculum, for example, ²⁵ data creation/manipulation/management, security, and storage, data analytics, and technology agility (AACSB International, 2018). ²⁶ United Nations Conference on Trade and Development (UNCTAD) ¹⁷ also created a benchmark curriculum to describe the technical subject areas that an individual must master to become a professional accountant. This curriculum was formulated in collaboration with certified

professional accountants, ⁴¹ the International Federation of Accountants, and academicians worldwide. UNCTAD curriculum also specifies information technology knowledge and skills for accounting students, for example, system concept and management, IT infrastructure, interaction with IT staff, strategic decision about IT, data organization, internal control in IT-based business, and IT security (UNCTAD, 2011).

This study distinguished between accountants' IT competence and accountants' IT responsibility. IT responsibility refers to accountants' role or function with respect to IT, while IT competence refers to ³¹ knowledge and specific skills needed for accountants to perform in the roles and functions related to IT. The indicators for IT competence and IT responsibility are adopted from Model Accounting Curriculum (UNCTAD, 2011).

Accounting and Sustainability Issue

The accounting discipline is never a stranger to the sustainability issue. It is shown by, for example, social and environmental topics in accounting research can be drawn back to since 1990s. The number of research specified on this topic in critical perspectives on accounting journal was started from only around 15 research published in 1990s to 24 research in only five years between 2009 - 2014 (Deegan, 2017). In the last five years, there are more research related to sustainability issues from research on corporate social responsibility (Khan et al., 2020; She & Michelon, 2019), sustainability and integrated reporting (Bebbington et al., 2020; de Villiers & Sharma, 2020; Journeault et al., 2021), and sustainability issue related to the covid pandemic situation (Adams & Abhayawansa, 2021; Cho et al., 2021). There is also an increasing trend in sustainability reporting in worldwide companies, where accountants play an important role both as preparers or as auditors of the report. The KPMG ¹⁶ survey of sustainability reporting has found that 80 percent of the companies worldwide now report on sustainability, and the figure rise ²⁴ over 90 percent among the largest companies in the world (KPMG, 2020). ⁶ In Asia Pacific, sustainability reporting has grown by six percentage points since 2017 to 84 percent. This surge due to some countries ⁶ in the region are among the global leaders, including Japan (100 percent), Malaysia (99 percent), India (98 percent), Taiwan (93 percent) and Australia (92 percent).

Accounting contributes to sustainability reporting as a result of the sustainability accounting concept or also known as ⁴ environmental accounting. Environmental accounting includes a set of activities that increase the power of accounting systems to identify, record and report the effects of environmental degradation and pollution. ⁴ It provides information that helps managers in evaluating, operating, controlling, deciding, reporting, and protecting the environment ¹ (Rounaghi, 2019). Accountants play a pivotal role in sustainable development as they are those who measure, evaluate and disclose the progress made by companies in achieving sustainability

(Makarenko & Plastun, 2017). To assist accountants in sustainability reporting and its complexity, integration with information systems and technology would be helpful. There are many data and information needed to be managed from business activities and their impact on the environment in order to provide quality sustainability reporting. It can be said that one of the tools necessary for carbon accounting is a quality information system (Merhout et al., 2016).

Accounting education providers are responsible for graduating future professional accountants who will play an essential role in the decision-making and strategy development process in companies, including strategic issues related to sustainability (Boulianne et al., 2018). Higher education should be concerned with developing values, knowledge and understanding of their students by including sustainable development issues into its curriculum (Ebaid, 2021). In that way, higher education plays an important role that will help to shape the views of future citizens, leaders, and policymakers. One of the United Nations (UN) sustainable development goals is to ensure that all students acquire the knowledge and skills necessary to promote sustainable development (UNESCO, 2017). Therefore, accounting graduates also need to have the skills, knowledge, values and competencies to create a deal with sustainable development goals issue. Hence, it is crucial to develop accounting education so that sustainability issues are integrated in the curriculum. However, integrating sustainability in accounting education is not only about exposing students with information related to sustainability, but also encourage students to engage in learning activities that will enable them to practice critical thinking toward environmental and sustainability issues (Ceulemans et al., 2015). It also requires management commitment to integrate real-life practices on campus (Sterling, 2005) and problem-based learning (Wyness & Dalton, 2018) to help improving students' understanding of sustainability issues.

IT Sustainability Practice and Accounting

The focus of sustainable information technology is to reduce the energy costs of IT operations and the negative impacts to the environment from the rapid utilization of information technology. The environment impacts of IT utilization such as high volume of energy consumption that rise a major concern for the industry either from an environmental or economic perspective and also electronic waste. Kiddee et al. (2013) display in their study two ways of how electronic waste disposals may impact human health, contamination of toxic substances in the food chain and direct impact on labour in recycling areas due to exposure to toxic substances. It is supported by Rene et al. (2021) which highlight the need for a proper recycling system of electronic waste because of the inappropriate disposal practices that cause severe environmental pollution and health hazards.

Sustainable information technology practice will integrate the IT role of the organization's business with global sustainability and social responsibility (Vicente-Molina et al., 2018). It refers to aligning an organization's IT strategies with social responsibility to encourage changes in IT governance and management behaviour toward more environmentally friendly IT practices (Harmon et al., 2012). The practices include planning of buying environmentally friendly IT equipment, lower power consumptions, recycling IT equipment, and environment-friendly way of disposing of IT equipment (Bose & Luo, 2011, 2012).

Both company and customer may gain benefit from IT sustainability practices. Benefits for the company such as cost reductions as consequence of more efficient and strategy-related IT usage. Customer and society may benefit from higher satisfaction of the company products or services as consequence of less negative environmental impacts that leads to higher credibility and trust of the company's products or services (Harmon et al., 2012). Accounting may take part in IT sustainability practice by creating, monitoring, and evaluating environmental indicators and supported by applying an environmental management information system (EMIS). EMIS may help an organization automate environmental management activities, incorporate lifecycle assessments and environmental cost accounting, and meet compliance reporting requirements. This will allow organizations to successfully manage their carbon footprint and the complexity of carbon accounting and reporting.

This study aims to measures differences in perceptions of accountants' IT responsibility, accountants' IT competence, and the importance of IT sustainability practice of accounting students based on gender (male and female), year of study (junior and senior), and the type of university (public and private). Some previous studies have shown differences in perception from gender (Xiao & Hong, 2018; Olsson et al., 2019), year of study and type of university (Wang et al., 2020) toward sustainability issues. Therefore, research questions and Conceptual Model are structured as follows:

- RQ1. What is accounting students' perception on the importance of IT sustainability practice, accountants' IT responsibility, and accountants' IT competence?
- RQ2. Is there a different perception of accounting students in the gender, year of study, and university type group on accountants' responsibilities in the use of IS technology?
- RQ3. Is there a different perception of accounting students in the gender, year of study, and university type group on accountants' competence in the use of IS technology?
- RQ4. Is there a different perception of accounting students in the gender, year of study, and university type group on accountants' role in IT sustainability practice?

"Insert Figure 1 about here"

3. Methods

Data was collected using a questionnaire adopted from Junger da Silva et al. (2020a) that identified indicators for accountants' IT responsibilities and IT competencies from ISAR (2011). Questionnaire for IT sustainability practice was adopted from (Junger da Silva et al., 2020b) that summarizes 11 indicators for IT sustainability practice from previous studies based 3 categories, namely green data center, green cloud computing, and environmental management information system (EMIS). All variables identification is detailed in table 1.

"Insert Table 1 about here"

The perception of the students was measured using a Likert scale of 1-5. Questionnaires were distributed to active students majoring in accounting using purposive sampling. Respondents ages range from 18 to 22 years old from public and private universities in Indonesia. The number of answers studied was 387 respondents from university students in Surabaya, Semarang, Jakarta, Makassar, and Bali. The selection of the universities is both from private and public universities that have an accounting study program.

"Insert Table 2 about here"

Table 1 summarizes the respondent profiles from 387 valid answers. The gender profile consists of 26% male and 74% female, year of study profile consist of 48% respondents were first and second year that is junior students and 52% of respondents were third year and beyond that is senior students, and university type profile consist of 36% respondents from public university and 64% from a private university.

Data analysis consisted of normality test, validity test, reliability test. Mann-Whitney u-test and Kruskal Wallis test were also used to determine whether there were differences between male and female respondents, private university and public university respondents, and year of study in their perception regarding the importance of accountants' IT competencies and accountants' IT responsibilities in supporting IT sustainability.

4. Results (1000 – 1500 words)

The respondents' result was first verified for the reliability based on Cronbach's alpha coefficient. The first result about respondents' perception of accountants' IT competencies shows Cronbach's alpha of 0.883. The second result about respondents' perception of accountants' IT responsibilities shows Cronbach's alpha is 0.890. Lastly, the respondents' perception of the importance of IT sustainability practice shows Cronbach's alpha is 0.943. The Cronbach's alpha for all the three groups shows results bigger than 0.6. Therefore, the research items used for the questionnaire can be concluded as reliable.

Regarding the analysis of respondents' perception of the three variables, a category table needs to be set to interpret respondent's answers into the importance perception as in Table 3. The category table shows how the respondents' answers should be interpreted from very unimportant to very important. For example, the answer should be interpreted as very important if the mean fall between 4,20 and 5,00, interpreted important if the mean fall between 3,40 and 4,19, and so on. The class interval for each category in the category table was calculated using the difference between the highest and lowest answer value and then divided by the number of answer scales.

"Insert Table 3 about here"

Analysis for respondents' perception of accountants' IT competence shows an overall mean 4,21, which fall into the very important category, showing that students perceived IT competencies as a very important skill for accountants. Item COMP2 related to "Accountant needs to understand their role in IT infrastructure decisions" shows the highest result followed by item COMP1 related to "Accountant needs to understand about IT, and the scope of work of the IT department" with mean results 4,67 and 4,4 respectively as in Table 4. These results indicate that students viewed IT-related skills are very important skills for accountants. A solid understanding about IT and what the IT people do can be a good foundation for accountants in order to interact with the IT functional areas to contribute more on the strategic decision making regarding IT infrastructure.

"Insert Table 4 about here"

Analysis for respondents' perception of accountants' IT responsibilities shows overall mean 4,20, which fall into the very important category, showing that students perceived accountant plays a very important role in IT and needs to be involved in IT-related strategic decision making. Item RESP4 related to "Accountant needs to be involved in IT infrastructure decision making" shows the highest result followed by item RESP3 related to "Accountant needs to be involved in strategic decision making, such as allocating hardware and software resources" with mean result 4,51 and 4,36 respectively as shown in Table 5. These results indicate that students viewed accountant as a very important role to be involved in IT decision making, especially related to IT infrastructure. Decision making in IT infrastructure including ² make or buy, outsourcing or insourcing, adopt new technology, and disposal of hardware and software. This finding is in contrast with previous study that found ² strong disagree for accountants to participate in highly technical issues, such as IT infrastructure decisions, as it is not perceived as a primary function of accountants (Junger da Silva et al., 2020a).

"Insert Table 5 about here"

The importance of IT sustainability practice for accountant in students' perspective shows overall mean 3,98 which fall into the important category. This result showing that students perceived it is important for

accountant to understand IT sustainability practices. Item SUST10 related to “Accountants need to manage IT performance indicators” shows the highest result, followed by item SUST11 related to “Accountant needs to report IT environmental performance to external” with mean results 4,09 and 4,06 respectively as in Table 6. These results indicate that students viewed it is important for accountant to understand and contribute to IT sustainability practice related to manage IT performance indicators and IT environmental reporting. Accounting education is closely related to performance indicators and environmental reporting. Thus it can be said that accounting students value most of the IT sustainability practice items that are familiar to them.

"Insert Table 6 about here"

Regarding the analysis for lowest value items in each variable, accountants' IT competencies item COMP5 “Accountant needs to understand their role in IT decision-making processes” and COMP4 “Accountant needs to understand large-scale systems” show lowest result with 3,82 and 3,97 respectively. Accountants' IT responsibilities item RESP7 “Accountant needs to be involved in decision making to automate business functions” and RESP10 “Accountant needs to be involved in assisting in making decisions about the use of IT strategies” show lowest result with 4,01 and 4,02 respectively. IT sustainability practice item SUST6 “Accountants need to understand how to manage electronic waste properly and correctly” and SUST2 “Accountants need to understand how to optimize data center cooling” show lowest result with 3,74 and 3,84 respectively. A possible explanation for these results is that concepts about large-scale systems, decision making in IT, electronic waste, and data center cooling are still too vague for students. This can be compared with the highest value items, wherein COMP2, RESP4, and RESP3 the decision making is specified for IT infrastructure and in SUST10 and SUST11, the IT sustainability practice is related to familiar terms such as performance indicators and environmental reporting. However, since these results still fall in the important category, students are open to understanding the concept of large-scale systems, IT decision making, electronic waste, and data center cooling.

²⁸ The non-parametric test, Mann-Whitney u-test, shows no significant differences in the gender group for all three dependent variables. The year of study group shows significant differences result between junior and senior students in IT sustainability practice variable and in some items of accountants' IT responsibilities. The university type group shows significant differences between public and private university students in accountants' IT responsibilities and IT sustainability practice also in some items of accountants' IT competence.

5. Discussion

The majority of accounting students agree with the importance of accountants' role in IT sustainability practices by utilizing information systems. Utilizing information systems means that accountants have the competence and realize their role with respect to IT, or in other words accountants' IT competence and IT responsibilities. Students show high perceptions in the need for accountant to understand IT and IT-related scope of work, to be involved in IT strategic decision, and manage IT and environmental performance. The difference in students' perception regarding the highest and lowest results show that some IT sustainability terms are still unfamiliar for students. Consequently, the recommendation accounting education provider is to design an accounting curriculum that is integrated with IT competencies, accountants' role in IT strategic decision, and introducing more to the students related to their future professional role on IT sustainability issues.

This study is in line with some previous studies that emphasize on the importance of infused IT-related skills in the accounting curriculum. Dzurani et al. (2018) in their study shows the importance of developing students' data analytics mindset as the most important data analytics topic to include in the accounting curriculum. Data analytics mindset related to data-driven critical thinking skills, which means developing students' ability to ask questions that can be answered using data. Their study also suggests accounting education provider developing students' ability to communicate processes and outcomes of data analytics processing effectively. Andiola et al. (2020) in their study on leaders of AACSB accredited accounting programs, shows results suggest that standard A7 has had a significant impact on promoting change in the accounting curriculum regarding the importance of teaching technology-related skills and data analytics. The study also shows that most of the leading AACSB accredited accounting programs have already implemented the changes in their curriculum despite some challenges to fully implement the change in the curriculum. Finally, Anis (2017) in his study shows an important perspective from professional accountants expectations and accounting students actual skills. The study compares accounting educators' and auditors' perceptions of accounting education gaps and their impact on audit quality in Egypt. The results indicate that accounting educator focuses more on developing accounting knowledge rather than generic skills, despite generic skills, including information technology skill, are significantly and positively responsible for audit quality in the Egyptian auditing market.

Regarding the gender group, it is found that there is no significant difference. It can be interpreted that both male and female students have the same perception about the importance of accountants' role in IT sustainability practice. This finding is also in agreement with some previous studies (Oztekin et al., 2017; Al-Naqbi & Alshannag, 2018; Junger da Silva et al., 2020b) that found no significant difference on gender group

about the perception of students about sustainable development concerns in higher education. The result is different from some previous studies that stated differences in gender perception toward sustainability issues (Xiao & Hong, 2018; Olsson et al., 2019; Wang et al., 2020). This could be caused by most of the studies that investigate gender influence in sustainability issues are focused on environmentally friendly behavior, and it is different from students' future professions' role in sustainability issues.

The result shows significant perception differences in the year of the study group for accountants' IT responsibilities and IT sustainability practice variable, resulting in junior students are higher than senior students in understanding the importance of the accountants' role in the IT sustainability practice. This study is in line with (Wang et al., 2020) that found differences in sustainability consciousness perception of different students' levels. Junior students are usually still enthusiastic and have high expectations about starting to learn in accounting major, so the IT responsibility, IT competence, and their future profession's role in IT sustainability are seen as essential things. While for senior students, even though they relatively have more exposure to IT-related courses, they show less in understanding the importance of the role of accountants in the IT sustainability practice. This result may indicate that either the content or the method of delivering IT-related accounting courses does not match students' expectations or does not motivate enough for senior students, but this warrants further investigation.

The statistically significant difference shown in the university type group refers to different perceptions between students in private universities and public universities regarding the importance of the role of accountants in the IT sustainability practice. This is in line with Wang et al. (2020) that specifically compare the perception of students toward sustainable development in public and private universities in China. They find higher level of perceptions from private university's students compared to public universities is due to active campus sustainability engagement and positive stakeholder relationship managed by university management. In the current study, the result shows inversely that students in public universities have a higher perception than students in private universities toward IT sustainability issues. This may happen because, in Indonesia, private universities do not emphasize enough the understanding of learning about environmental issues. Based on the UI Green Metric, universities in Indonesia that have implemented the green campus concept as the primary goal of educational institutions are mostly public universities, and very few private universities take part (University of Indonesia, 2021). University of Indonesia Green Metric is a ranking of the best universities based on campus environmental management. They measure the sustainability practices in Indonesian universities, such as infrastructure for open spaces, applying renewable energy (solar panels, smart building), implementing paperless, and specific waste treatment (University of Indonesia Sustainability Report 2018, 2018).

6. Conclusions

The majority of accounting students agree with the importance of accountants' role in IT sustainability practices by utilizing information systems. In practical implication, there is a high perception in accounting students that accountants should directly contribute to IT sustainability practice. Students agreed on the importance for accountants to have specific knowledge and skills, such as IT asset management, energy efficiency, and management control systems of IT strategy, in support of accountants' IT responsibility and IT competence. Differences in perceptions are found in the senior and junior student groups, as well as groups of students from public and private universities, while in the gender group, there is no difference in perception. This study can be useful for accounting education providers and teachers in supporting students to understand the practical implementation in accounting professions regarding their role in sustainability through the utilization of information system technology. They may consider brainstorming more effective IT-related course delivery methods to help motivate senior students which they will soon graduate and become professional accountants. This study shows that students in both private and public universities have already seen the importance of their profession's contribution to sustainability issues. Therefore, management in private universities must emphasize more regarding the awareness of environmental issues. The current study is conducted on students to measure the perception of their future profession's role in IT sustainability. Future research could approach from another perspective regarding the perception of professional accountants from different positions and lengths of work on their role in IT sustainability issues.

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