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Sustainability Reporting Ecosystem and IFRS S1 and S2: How Accounting Research Can Assist its Implementation

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Abstract

This paper describes how the accounting research agenda is affected by the issuance and implementation of the International Financial Reporting Sustainability Disclosure Standards (IFRS S1 and IFRS S2). The new IFRS S1 and S2 were launched on June 26, 2023, and are effective from January 1, 2024. The implementation of IFRS S1 and S2 will be particularly interesting as this is the first time that financial and sustainability reporting will be integrated into a company's corporate reporting. Given the relatively short timeframe since its introduction, there may be limitations in assessing the full impact or implications of these standards. Hence, this study analyzes various research opportunities related to the implementation of IFRS S1 and S2. Due to the limited literature that discusses the implementation of IFRS S1 and S2, this study applies the review method, i.e., it conducts a review based on existing research on IFRS S1 and S2, as well as research examining existing sustainability accounting and reporting aspects. This study analyzes research opportunities in the areas of (1) financial accounting, (2) management accounting, (3) auditing, and (4) accounting information systems. This study contributes to the research area of the sustainability reporting ecosystem to facilitate the smooth implementation of IFRS S1 and S2 in practice.

Keywords: *IFRS S1, IFRS S2, ESG, Research, Corporate Reporting.*

Introduction

Corporate reporting is an area of research in the accounting and business management fields. Corporate reporting research offers various perspectives(Prodanova et al., 2018; Rupley et al., 2017). The first relates to corporate reporting content. Corporate reporting is a form of company accountability for investors and creditors(Stolowy & Paugam, 2018). The understanding of investors and creditors also affects how the content of a corporate report is translated into their actions of investors and creditors(Abraham & Shrives, 2014). The second perspective is related to compliance with the reporting standards. Corporate reporting is standardized (Schroeder et al., 2022). Currently, there are many corporate reporting standards, ranging from financial accounting standards to standards related to aspects that are not related to accounting, but related to non-financial performance, such as issues of gender equality, cultural equality, achievement of Sustainable Development Goals (SDG), and aspects of the natural and social environment(Comoli et al., 2023; Lang & Stice-Lawrence, 2015). Corporate reporting can take the form of mandatory or voluntary. Research on mandatory reporting standards aims to determine the extent of company compliance and factors that prevent companies from complying with these obligations(X. Li & Yang, 2016). Research on voluntary reporting standards aims to determine whether voluntary compliance has a positive effect on a company's value or reputation(Doni et al., 2020). Companies report based on the cost-benefit concept. In mandatory reporting, it is irrelevant to analyze the cost-benefit of reporting in the context of compliance; however, in voluntary reporting, it would be commonplace for companies not to report something due to high reporting costs(Carungu et al., 2021; Friedman et al., 2022). Corporate reporting research is generally related to financial accounting, but it has many variations, such as Islamic accounting, sustainability accounting, management accounting, and auditing(Comoli et al., 2023; Leuz & Wysocki, 2016).

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Corporate reporting research on accounting and sustainability is generally separate. This is because within companies, financial reporting and sustainability reporting are conducted separately, have different audiences, and operationally have different reporting procedures(Al Amosh & Mansor, 2018; Hsiao et al., 2022). Financial and sustainability reporting also differ because of their very different theoretical developments. Financial reporting dates back to ancient times and has developed rapidly, especially in the Middle Ages, culminating in the Industrial Revolution and emergence of the world's first capital markets(Frias-Aceituno et al., 2014). Sustainability reporting practices emerged in the 21st century with the advent of ethical decision making and concerns for the natural and social environment(Lehner & Harrer, 2019). However, corporate reporting cannot be separated from investors' desire to understand a company's comprehensive performance. Previous studies have shown that (1) financial reporting cannot provide a comprehensive picture related to aspects of business opportunities and risks, innovation, and sustainable change in the company (Leuz & Wysocki, 2016; Martínez-Ferrero et al., 2015)and (2) sustainability reporting cannot provide a picture that focuses on the needs of investors because the audience in sustainability reporting is a multi-stakeholder with various interests(Comoli et al., 2023; Noh et al., 2019).

Financial reporting is traditional reporting that is mandatory in most jurisdictions. Financial reporting is commonly analyzed by investors and creditors to determine business performance and make business decisions(Palepu et al., 2020). Financial reporting transactions are a manifestation of business events. Business events have financial, environmental, social, and government consequences(Martínez-Ferrero et al., 2015; Vallišová et al., 2018). In addition, business events are linked to a company's interactions with its value chain, such as with customers, suppliers, or even with the government(Lodhia & Sharma, 2019). Therefore, sustainability reporting is integrated with financial reporting, as financial reporting already has a conceptual framework capable of producing relevant and reliable information for investors(Zyznarska-Dworczak, 2020).

Existing sustainability reporting lacks a conceptual framework that can produce information that is relevant and consistent with the business world(Hahn & Lülfs, 2014). The broad aspects of sustainability have led to the emergence of various sustainability standards, but they only focus on one aspect of sustainability, namely the natural environment, so that they cannot comprehensively describe aspects of sustainability performance to investors(Braam et al., 2016; Malik et al., 2021).

This led to the idea of disclosing sustainability information in corporate financial reporting. IFRS S1 and S2 were issued in response to the issues raised in previous paragraphs. However, IFRS S1 and S2, despite their status as financial reporting standards, do not only have an impact on the development of financial accounting science(Zaid & Issa, 2023). Sustainability is a multi-disciplinary science, so sustainability practices are not only related to one field, but also to various other fields. Disclosure refers to how companies conduct sustainability practices in the business sector(Al Amosh & Mansor, 2018). Sustainability practices have high cost consequences in various types of companies; therefore, an analysis needs to be conducted to calculate the impact of sustainable business practices in terms of strategic costs and overall cost management(Frias-Aceituno et al., 2014; Huang & Watson, 2015; Leuz & Wysocki, 2016). Another example is that any disclosures in financial statements are management assertions subject to financial statement audits and compliance audits(Fernandez-Feijoo et al., 2018). Current developments also show that there is still a gap between auditing standards and auditor competence in sustainability(Fernandez-Feijoo et al., 2016; Rossi & Tarquinio, 2017). Sustainability disclosure is also related to the availability of quantitative and qualitative data that accountants need to analyze further(Indyk, 2022). The availability of quantitative and qualitative data must be supported by sophisticated corporate management information systems(Siew, 2015). Essentially, all aspects and areas of accounting practice are significantly affected by the emergence of IFRS S1 and S2 standards.

IFRS S1 and S2 standards were published in mid-2023 and became effective on January 1, 2024. Some countries have decided not to rush implementation(Grajales Gaviria et al., 2023). Various reasons have been expressed, one of which is the complexity of applying these standards to companies(Kampanje, 2023). The complexity of applying this standard can be reduced by conducting studies in various accounting science fields. Previous research has proven that the analysis of corporate bias towards new standards can be aided

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by comprehensive academic research on the impact of standards in various fields(Gözde & İrem, 2023; Pratama et al., 2022).

This paper aims to conduct a study examines the impact of IFRS S1 and S2 on various fields of accounting science. This study intends to provide various inputs for the future research agenda related to the application of IFRS S1 and S2. This study contributes to accounting researchers in various research areas related to corporate reporting, particularly IFRS S1 and S2. This study also contributes to the development of accounting knowledge, especially regarding the concept of IFRS S1 and S2, which is integrated reporting between financial aspects and sustainability aspects that focuses on the needs of investors, where research in this area is still minimal. Owing to the lack of empirical data on the implementation of IFRS S1 and S2, this study uses a review technique based on the quality scientific literature related to the themes of corporate reporting, financial reporting, accounting, and sustainability science to provide input on the future research agenda.

This paper is divided into five sections. The first section discusses the issues and motivations for this study. The second section discusses the relevant literature on corporate reporting, accounting integration, and sustainability. In the third section, the research method, i.e., the review method, is explained.. The fourth section discusses the research findings explaining the research opportunities in the areas of financial accounting, management accounting, auditing and accounting information systems and the fifth section concludes the paper.

Literature Review

Contemporary Corporate Reporting Trends

A corporation has a combination of various business interests. Corporations have various characteristics including the separation of owners and managers(Bendickson et al., 2016). Agency theory reflects the running mechanism of a corporation. Agency theory posits that corporations experience agency problems. Research shows that agency problems can have a negative impact on corporate performance and reputation(Panda & Leepsa, 2017; Wolk et al., 2016).

Corporate reporting is used to address agency problems. Corporate reporting offers two perspectives. The first aspect is accountability. Corporate reporting is a form of agent accountability to company owners. The owner of the company will traditionally try to protect his capital, so the focus of information to the owner is financial information and how the capital has grown from the beginning to the presen(Albu et al., 2017)t. This is the focus of historical cost-accounting research(Schroeder et al., 2022). The second perspective pertains to performance. Corporate reporting is a form of evaluating a company's performance. Corporate performance can be divided into financial and non-financial performance. Financial performance has become part of financial accounting standards, and financial accounting standards have accommodated present value/fair value-based valuation for a more precise measurement of financial performance(Rupley et al., 2017). Issues in financial reporting today focus more on disclosure and how a reporting medium can communicate relevant information to users(Christensen et al., 2015; De George et al., 2016). Non-financial performance is a challenge because of the absence of universal governing standards and a method to integrate financial and non-financial performance(Afanasiev & Shash, 2023).

Some jurisdictions have attempted to integrate financial and nonfinancial information by preparing integrated annual reports(Morioka et al., 2016). However, integrated annual reports have several limitations. The first drawback is that the absence of integrated reporting standards leads to differences in the content of company reports between jurisdictions, thus reducing the comparability of the reports(Lakshan et al., 2022). The second weakness is the blurred definition of non-financial performance. Before the concept of sustainability emerged, there was no single concept of non-financial performance. Some indicators of nonfinancial performance at the time were (1) HR Performance, (2) Operational Performance, and (3) Sales and Marketing Performance(Galant & Cadez, 2017; Lakshan et al., 2022). Research shows that the development of nonfinancial reporting advanced rapidly after the concept of sustainability emerged in corporate reporting. Sustainability is considered a balanced concept because it integrates financial aspects

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with CSR aspects of corporate social responsibility(Junior et al., 2014; Morioka et al., 2016). According to previous research, the CSR aspect is a concept related to how a business process is carried out, and can describe the input-process-output in business. Environmental, social, and governance (ESG) concepts can be linked to financial performance, resulting in information that can fulfil two corporate reporting perspectives: accountability and performance(Velte, 2017; Zaid & Issa, 2023).

The concept of sustainability itself is a new concept that was applied and implemented in early 2010 and only found momentum with the emergence of the Sustainable Development Goals (SDG) in 2015(Rosati & Faria, 2019). Many companies have implemented sustainability reporting because of pressure from the SDG program and demands from stakeholders and investors(Calabrese et al., 2021; Dienes et al., 2016). Sustainability reporting has emerged on the basis of various standards. However, sustainability reporting standards are fragmented, leading to user confusion due to various sustainability perspectives(Tschopp & Nastanski, 2014).

Contemporary corporate reporting is corporate reporting integrates the financial and sustainability aspects. The greatest challenge in contemporary reporting is integrating financial and sustainability information(Frias-Aceituno et al., 2014; Rupley et al., 2017). Another challenge is improving the awareness and infrastructure of sustainability reporting, which is still voluntary in many jurisdictions(Stolowy & Paugam, 2018). The answer to both challenges lies in the financial reporting standards. The accounting standards are mature and mandatory. Therefore, accounting standards can accommodate sustainability aspects through the recognition of sustainability-related accounts, the measurement of monetary values for sustainability costs and benefits, and disclosures related to sustainability(Rupley et al., 2017; Tschopp & Nastanski, 2014). Recognition and measurement, of course, require considerable research and development, especially in quantifying measurement tools that can be in accordance with accounting assumptions and principles; therefore(Roychowdhury et al., 2019), the greatest possibility is the integration of sustainability in accounting disclosures. This objective is good because it is in line with the concept that the current focus of accounting standards development is how to improve communication in financial reporting(Chua et al., 2022; Tóth et al., 2022). Therefore, IFRS established the International Sustainability Standards Board (ISSB) and issued IFRS S1 and S2.

IFRS S1 and S2: Integration of Accounting and Sustainability

The integration of accounting with sustainability is based on International Financial Reporting Sustainability Disclosure Standards (IFRS S). Prior to the issuance of these sustainability disclosure standards, consultation was conducted regarding the demand for sustainability reporting and whether the accounting profession should play a role in sustainability disclosure in corporate reporting(Zaid & Issa, 2023). The results of the consultation paper provide full support for the accounting profession to play a role in the preparation of sustainability disclosures integrated with accounting(Kulik & Dobler, 2023).

The impact of IFRS S formation is tremendous. Almost all sustainability standard setters, such as the Sustainability Accounting Standards Board (SASB), International Integrated Reporting Framework (IIRC), and Climate Disclosure Standards Board (CDSB) have been merged or acquired by the ISSB. Only the Global Reporting Initiative (GRI) remains a sustainability standard setter. All sustainability standards that joined the ISSB had the same focus on investor information(Afolabi et al., 2023). This finding confirms previous research that investor-focused information can be achieved only through integration with accounting standards(GBADEBO, 2023). Sustainability-based financial disclosures are a major challenge in IFRS applications. Sustainability-based financial disclosure is a concept in which sustainability disclosures remain based on the information available in financial statements(Chua et al., 2022). Information in financial statements has potential for matters related to sustainability. If, in accounting standards, disclosure focuses more on how a transaction will have an impact on performance and financial position that will ultimately underlie decision-making, then sustainability disclosures provide additional information about aspects of sustainability that are relevant to the transaction that occurred(Sabauri & Kvatashidze, 2023; Wagenhofer, 2024).

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However, IFRS S not only provides additional information. Sustainability information still needs to be presented in a structured manner to provide a context. IFRS S adopts the framework created by the Task Force on Climate Financial Disclosure (TCFD)(Wang et al., 2023). There are four TCFD frameworks namely: (1) Governance (2) Strategy (3) Risk Management (4) Metrics and Targets. Corporate governance is an integrated matter, as it is burdened by the goal of achieving financial and sustainability performance. Research has shown a strong relationship between financial performance and sustainability performance in several environmentally and socially sensitive industries(Galant & Cadez, 2017; Tóth et al., 2022; Velte, 2017). One reinforcement of the relationship between financial and sustainability performance is the structure and process of governance. Strategy is a business that achieves long-term goals. A company's long-term goals can also be achieved from financial and sustainability perspectives. When referring to the Triple Bottom Line concept, the company's profit will survive in the long term if it is able to achieve goals related to the planet and people(Deegan, 2014; Wolk et al., 2016). Risk management is a key component of governance. Research has also shown that sustainability risk is related to financial risk. In the context of Enterprise Risk Management, sustainability risk is one of the risks that can impact the company's operations and finances(Abraham & Shrives, 2014). Disclosure of sustainability risk management is also a part of general corporate risk management; therefore, disclosure of sustainability risk management can help disclose risk management in accordance with the Enterprise Risk Management framework(Grajales Gaviria et al., 2023). Metrics and Targets are quantitative performance measures related to sustainability performance. Metrics and Targets set out the indicators that a company must achieve and assist investors in analyzing sustainability performance independently(Indyk, 2022; Setiawan et al., 2023).

IFRS S1 is a sustainability disclosure standard that provides general treatment for disclosures related to sustainability. IFRS S1 has several challenges in its application, including the following.

- The framework that follows the TCFD pattern has been described above. The main problem is that not all jurisdictions have followed the TCFD pattern in their sustainability disclosures. Therefore, some countries may find it difficult to adopt them in their frameworks(Auzepy et al., 2023). TCFD is widely used in European countries, whereas countries such as Asia use GRI(Giner, 2022).

- The focus was on disclosures related to sustainability themes, particularly those related to risks and opportunities. This poses a challenge because not all jurisdictions require disclosure of certain sustainability themes(Arbidane et al., 2023). While IFRS S1 allows the adoption of the CDSB and SASB frameworks to determine sustainability risks and opportunities, there are risks associated with country bias, requirements that may be too high for developing countries, and incompatibility with existing jurisdictional requirements(Vigneau et al., 2015; Wang et al., 2023).

- The disclosures have the same reporting timeline as the financial reporting. This is a challenge, as in some jurisdictions, sustainability reporting has a different time dimension from annual reporting, and also sustainability reporting is generally published several months after financial reporting. (Tolkach, 2023) Financial and sustainability reports generally consist of separate teams and sections. IFRS S1 implicitly states that a team preparing for sustainability disclosures is an integral part of the accounting team(Kurbanova & Çalıyurt, 2024).

- The disclosures have the same scope as reporting entities for financial reporting. Challenges exist in this aspect, especially for multibusiness companies. Parents and subsidiaries of different businesses may have different sustainability information materialities(Moya, 2024). This makes it difficult to determine a subsidiary's sustainability disclosure material that can be consolidated with the parent company.

In addition to these four points, IFRS S1 is complex because companies must determine the materiality of sustainability disclosures(Reinstein et al., 2023). Materiality limitations in IFRS S1 are associated with financial materiality; however, in the future, there is the possibility of implementing dual materiality in the implementation of IFRS S1, especially to adjust for jurisdiction(Nielsen, 2023). Sustainability and financial

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information also need to be linked in a broader context, namely, information connectivity. The implementation of information connectivity also faces challenges, especially if the accountant or team does not comprehensively understand the sustainability and financial aspects(Cheng et al., 2014; Frias-Aceituno et al., 2014).

IFRS S2 is a sustainability disclosure standard that discusses climate change. IFRS S2 also uses the TCFD concept for sustainability disclosure. IFRS S1 implementation issues are also IFRS S2 implementation issues. However, IFRS S2 has several limitations.

- There are disclosure obligations for climate change risks, namely physical and transition risks. Physical risk disclosures are generally easy to make, as the data can be found and measured by the entity, but transition risk is not easy, as it relates to government policy, which may or may not be clear depending on jurisdiction(Eccles & Krzus, 2019).

- Disclosure obligations are related to climate resilience. Climate resilience must be disclosed in the form of scenario analyses. Scenario analysis will be challenging, as it needs to be adapted to the framework established by jurisdiction(Dey et al., 2024). Currently, not all jurisdictions agree on a climate resilience framework that provides a means for international comparison(Gözde & İrem, 2023).

- There are disclosure obligations related to metrics and targets related to GHG emissions in accordance with scopes 1–3. Some jurisdictions exclude Scope 3 disclosures and some even exclude Scope 2 disclosures. Difficulties in obtaining data, as well as cost-benefit issues related to disclosure, are the reasons for scope exclusion for Scope 2 and Scope 3(Baboukardos et al., 2022; Setiawan et al., 2023).

Based on the analysis of IFRS S1 and S2, the factors that determine the success of implementation in companies are their maturity. Several studies have shown that extractive industries and those that are sensitive to natural environmental issues have better readiness than other industries(Pratama et al., 2022). In addition, various studies have shown that several factors determine the success of implementation, including infrastructure, human resources, information technology, and data availability(Tettamanzi et al., 2022; Vallišová et al., 2018).

Sustainability and Accounting Science and Research

Sustainability science discusses the efforts of humanity to maintain a harmonious and balanced life in the long term. Sustainability involves the use of a multidisciplinary approach(Purvis et al., 2019). Sustainability science is based on natural science because it focuses more on things that occur in the natural environment, such as weather, soil, water, plants, and environmental habitats(Miller et al., 2014). Sustainability science is applied in the social field, especially in the fields of business and management, such as sustainable government and tourism(Olawumi & Chan, 2018). Sustainability science is evolving rapidly and the development of information technology has made the collection of data and information related to sustainability an interesting field for further analysis in education and research. (Moore et al., 2017)

The application of sustainability science in economics, business management, and accounting can focus on both macro and micro issues. Applications of sustainability in economics can be seen in the theory or practice of natural resources and environmental economics, which calculates the costs associated with pollution, pollution, and environmental damage and their impact on macroeconomic growth(Kristensen & Mosgaard, 2020; Sauvé et al., 2016). Sustainability in business and management can be applied to sustainability strategies and management areas, such as sustainable finance, sustainable marketing, and sustainable operations(Rezaee, 2016; Williams et al., 2017). The application of sustainability science in accounting can be seen from the implementation of sustainability principles in accounting practices, such as cost and strategic management, to corporate reporting(Bebbington & Larrinaga, 2014).

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Accounting is a science born into practice(Schroeder et al., 2022). The development of sustainability practices certainly affects accounting science and practices. Accounting is also a science that adopts multidisciplinary development(Deegan, 2014), so that the development of sustainability is not only in the aspect of financial reporting but can also be integrated with business processes. Sustainability accounting research focuses on implementing sustainability in business from perspectives related to accountability and performance measurements(Bebbington et al., 2017; Grubnic, 2014; Huang & Watson, 2015). Several objectives are related to sustainability accounting research in the traditional field of accounting research.

- *Sustainability Financial Accounting Research*

  This study focuses on the integration of sustainability information in financial reporting and the disclosure of sustainability reporting. This study aimed to determine the impact of sustainability information on external report users(Huang & Watson, 2015; Sahakyan, 2023; Wagenhofer, 2024; Zaid & Issa, 2023).

- *Sustainability Management Accounting Research.*

  This study focuses on the impact of sustainability strategies on business processes and the consequences of the resulting costs. The purpose of this research is to understand and analyze the achievement of sustainability strategies, including business processes, namely, production costs(Maas et al., 2016).

- *Sustainability Audit Research.*

  This study focuses on examiners' efforts to audit sustainability information. This study aims to determine the risk impact of sustainability information and how sustainability auditing techniques can be applied(Fernandez-Feijoo et al., 2018).

- *Sustainability Information System Research.*

  This research focuses on the definition of sustainability data and the modelling of sustainability processes and data. The aim of this study is to build a modelling information system that can provide quality sustainability information(Al-Htaybat & von Alberti-Alhtaybat, 2017).

Methods

This is an exploratory study. An exploratory paper discusses a new issue where little research has been conducted in the chosen area (Sekaran & Bougie, 2016). Sustainability accounting is worthy of exploratory research because of the monotony of the research model in sustainability accounting (Bebbington & Larrinaga, 2014). In this study, we adopt a review method. A review article is defined as one whose content provides a broad review of a problem or phenomenon, which is then discussed to produce a conceptual solution(Palmatier et al., 2018; Post et al., 2020). The implementation of IFRS S1 and S2 will still occur in the next two to three years, so empirical research will only be possible in the next two or three years. Exploratory research can be conducted, but the problems that exist in practice must be addressed in relation to the implementation of IFRS S1 and S2 in various accounting fields(Wee & Banister, 2016).

In view of the above problems, this review is conducted in four areas of accounting science: Financial Accounting, Management Accounting, Auditing, and Accounting Information System(Beattie, 2014). These four areas are the traditional accounting teaching and research areas that form the core of accounting science and practice. To conduct the review, the authors will use various scientific publications available in the following order.

- Specific publications on IFRS S1 or IFRS S2

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- General publications on sustainability
- General publications related to accounting and financial reporting

This article not only considers specific publications on IFRS S1 and S2 because of the limited number of publications caused by the short time of the emergence of IFRS S1 and S2.

To ensure the quality of the review, this study will only include scientific publications in journals. The journals included were those available in reputable journal databases. To ensure the accuracy and relevance of the contents of this article, only journals published within the last 10 years were selected(Paul & Criado, 2020).

After conducting a specific review of the four existing accounting research areas, an overall discussion related to data needs, research methodology, and possible publications or research outputs that are possible in general from sustainability accounting research is presented.

The remainder of this paper is organized as follows.

- Discuss the definition of accounting as a field of research. Discuss the current direction of accounting research and identify weaknesses in the research that can be improved through sustainability research/topics.
- Highlight various relevant topics in sustainability research. In this discussion, more than one topic can be chosen by future researchers.
- Indicate the expected theoretical and practical contributions to the sustainability research topics. The theoretical and practical contributions are useful in determining the research that may be published or receive grants or support.

Discussions

Financial Accounting Research Area

Financial accounting research is principally information-based research on financial statements, and examines the impact of the information content of financial statements on investor decision-making(Barth, 2015). Investor decision-making is conducted within the framework of the capital market and financial accounting research is known as capital market-based accounting research. Some examples of popular financial accounting research relate to the themes of (1) value relevance, (2) information disclosure, (3) earnings persistence, (4) earnings management, and (5) conservatism(Brown & Jones, 2015).

The integration of financial accounting research into the sustainability aspects of IFRS S1 and S2 covers several areas. The first area is related to the extent and/or quality of disclosures under S1 and S2(Putri & Pratama, 2023). This research can be explored in a limited way, given that financial statements adopting IFRS S1 and S2 may appear only in 2026 or 2027. Limited exploration can be done by analyzing the gap between annual reporting or corporate sustainability reporting and disclosure requirements in IFRS S1 and S2. The disclosure requirements refer to the four core aspects of IFRS S1 and S2: governance, strategy, risk management, metrics, and targets(Pratama et al., 2022; Tolkach, 2023). The second area is related to the deepening disclosure requirements of IFRS S1 and S2. Some sub-themes can be explored further, such as (1) determining the materiality of information in IFRS S1 and S2, (2) determining the method of connectivity of financial information with sustainability, and (3) analyzing the compatibility of CDSB and SASB standards with a country's jurisdictional regulations(Lakshan et al., 2022; Tschopp & Nastanski, 2014; Zaid & Issa, 2023). The third area of further research is related to greenwashing. Several previous studies have explained the potential of IFRS S1 and S2 as tools for improving sustainability performance(Moodaley & Telukdarie, 2023). Previous studies prove that companies that engage in earnings management also

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perform greenwashing(W. Li et al., 2023). The difficulty is that there is no agreed greenwashing indicator in subsequent studies; therefore, it is also very important for greenwashing-related research to be able to determine indicators related to greenwashing(Chen & Dagestani, 2023; Moodaley & Telukdarie, 2023).

Table 1 presents the potential of financial accounting research related to IFRS S1 and S2.

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Table 1. IFRS-Related Undergraduate and Postgraduate Financial Accounting Research

No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
1	Extent/quality of disclosure	Analyse current disclosure gaps with requirements under IFRS S1 and S2	The study aims to analyse disclosure items that have not or that still have low disclosure quality.	Provide an overview to the company regarding disclosure items that are still a problem	Quantitative / qualitative descriptive
		Extent or Quality of IFRS S1 and S2 disclosure with firm value	The study aims to analyse whether the extent or quality of disclosures as in IFRS S1 and S2 affect firm value.	Test whether IFRS S1 and S2 disclosures match investor expectations, and increase the relevance of financial reporting	Explanatory quantitative
		Antecedent factors related to the extent or quality of IFRS disclosure S1 and S2	The study aims to analyse the factors that influence the extent or quality of IFRS S1 and S2 disclosures. Antecedent factors may take the perspective of company characteristics, corporate governance, industry type, entity maturity, or stakeholder pressure.	Test whether the various antecedent factors affect the extent or quality of disclosure under IFRS S1 and S2, and see what areas within the antecedent factors can be improved before IFRS S1 and S2 are implemented.	Explanatory quantitative
2	Deepening the regulatory aspects in IFRS S1 and S2	Determination of materiality of information in IFRS S1 and S2	The research aims to determine how companies determine the materiality aspects of sustainability information. Research can look at different industry perspectives in determining	Describe the challenges in determining the materiality of sustainability information, and provide guidance for determining materiality, so that there are techniques that can be referred to for determining the	Exploratory qualitative

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
			materiality, and also the possibility of implementing dual materiality in determining sustainability information disclosed in financial reporting.	materiality of information, especially in each industry that may differ.	
		Determination of the method of connectivity of financial information with sustainability	The study aims to determine the connectivity pattern of financial information with sustainability, especially regarding the location and positioning of information related to the core contents of IFRS S1 and S2.	Describe the position and location of possible sustainability information in the financial statements, so that readers comprehensively understand financial and sustainability performance.	Exploratory qualitative/quantitative
		Analyse the compatibility of CDSB and SASB standards with a country's jurisdictional regulations	The research aims to analyse the possible application of CDSB and SASB standards in mapping issues related to sustainability risks and opportunities in various jurisdictions, especially looking between developed and developing countries, agricultural and industrialised countries, or between industrial sectors within a country.	Describe the suitability of CDSB and SASB standards in identifying sustainability risks and opportunities, especially in certain countries that may have different sustainability issues or maturity.	Exploratory qualitative/quantitative
3	Greenwashing	Determination of	The study aims to establish an	Create a greenwashing	Exploratory qualitative

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
		greenwashing indicators in IFRS S1 and S2	indicator of sustainability disclosure that contains elements of greenwashing. Indicator setting can be quantitative, for example by comparing the quality of disclosures with ESG risks, or based on a qualitative indicator.	indicator that can be used by regulators or auditors to see whether sustainability disclosures have set out balanced and relevant information.	
		Analyse the relationship between earnings management and greenwashing	The study aims to see if there is a relationship between companies that carry out earnings management and greenwashing, due to the concept of agency theory which states that agents will try to beautify performance reporting by utilising existing information asymmetry.	Create an initial indicator of manipulative reporting, and test the implementation of agency theory in sustainability reporting.	Explanatory quantitative
		Antecedent factors of greenwashing	The study aims to look at the factors that cause companies to do greenwashing. Antecedent factors may take the perspective of company characteristics, corporate sustainability governance,	Test whether the antecedent factors do indeed cause greenwashing practices and provide a signpost for regulators to be able to determine a governance ecosystem that	Explanatory quantitative

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
			industry type, entity maturity, or stakeholder pressure.	prevents greenwashing.	

Management Accounting Research Area

Management accounting research focuses on various types of information related to costs, and the extent to which these costs are related to internal decision-making and business processes in the company(Bromwich & Scapens, 2016). Management accounting research can also touch on behavioral perspectives in organizations and the management control systems that exist within them, including budgets, performance measurements, and compensation management(Hopper & Bui, 2016).

Sustainability accounting closely relates to management accounting. Management accounting addresses the internal business processes through which sustainability policies and strategies are implemented(Maas et al., 2016). Research topics can be divided into (1) operational, or related to measuring and determining costs related to sustainability implementation; (2) managerial, or related to sustainability cost management; or accounting and sustainability-based managerial decision-making; and (3) strategic, which is related to establishing a sustainability-based budget system, measuring sustainability-based company and manager performance, and setting sustainability-based compensation(Alsharari et al., 2015; Ascani et al., 2021; Jansen, 2018).

For more specific aspects of IFRS S1 and S2, analyses can be conducted on these three topics. In the operational area, for example, IFRS S1 and S2-based sustainability accounting research may be conducted to determine the extent to which sustainability or climate change risks and opportunities incur costs for companies, including mapping the costs of physical and transition risks that are still difficult to measure to date(Abraham & Shrives, 2014; O'Dwyer & Unerman, 2020; Zhang, 2022). In the managerial area, IFRS S1- and S2-based sustainability accounting research can be directed, for example, to areas related to climate resilience, which is one of the disclosure requirements. Climate resilience has cost consequences and necessary actions; therefore, it can be analyzed regarding data needs or accountant competency needs to conduct scenario analysis to disclose climate resilience(Al-Htaybat & von Alberti-Alhtaybat, 2017; Huiskamp et al., 2022; Tingey-Holyoak et al., 2023). In the strategic aspect, research based on IFRS S1 and S2 can analyse budget projections and strategic budget disclosures to answer strategic programs in the framework of IFRS S1 and S2 disclosure(Henri et al., 2016), besides that research can also be carried out related to corporate risk management programs in the context of sustainability, or performance measurement and also the determination of sustainability metrics and targets which of course must be integrated between the company's business processes and the stipulations set by regulators(Beusch et al., 2022; Schaltegger et al., 2022; Soderstrom et al., 2017; Williams et al., 2017). Research can also take the perspective of organizational behavior towards the implementation of IFRS S1 and S2, for example, related to leadership and work patterns of sustainability governance to deal with IFRS S1 and S2(Baboukardos et al., 2022; Kampanje, 2023).

Table 2. Management Accounting Research Related to IFRS Undergraduate and Graduate Programmes

No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
1	Operational management accounting	Risk and opportunity cost analysis of sustainability	This study aims to see the determination of sustainability risk and opportunity	mapping to the costs associated with sustainability or climate	Quantitative descriptive

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
		and/or climate resilience	costs in accordance with the framework in IFRS S1 and IFRS S2, after which the research can also determine how to report risk and opportunity costs in management and financial reports. For climate resilience costs, it specifically aims to quantify how much costs are associated with physical risks and transition risks in climate resilience, and how both kinds of costs are reflected in the above report.	resilience risks and opportunities, and also looking at what financial statement accounts are likely to record the costs of those risks and opportunities.	
		Implementation of sustainability process costs and their implications on product costs	This research aims to map quality costs related to sustainability, as well as variable or fixed costs related to sustainability and their impact on product costs, as well as derivatives such as pricing of products or services.	identify and quantify quality costs associated with sustainability, and be able to fill in the literature related to how the financial impact of sustainability costs, related to information connectivity under IFRS S1, is related to the financial impact of sustainability costs.	Quantitative descriptive
2	Midstream management accounting	Analyse the cost of sustainability in relation to the company's value chain	This research aims to identify the risk and opportunity costs of sustainability	identify the monetary value of corporate value chain sustainability	Quantitative descriptive

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
			and/or climate resilience associated with company interactions with customers and suppliers. This research can also assess the extent to which customers and suppliers have implemented a sustainability mindset or business pattern, and to what extent the sustainability maturity of customers and suppliers affects the value chain in the company.	costs that are a requirement of IFRS S1 and S2	
		Analyse the challenges of implementing climate resilience and analyse climate resilience scenarios	This research aims to explore the issue of implementing climate resilience, as well as how the issue of implementing climate resilience impacts the company's cost management and cost analysis. Another objective of this research is to develop a scenario analysis framework based on the cost-benefit perspective of the company's business processes.	Identify how the cost framework can be integrated with sustainability performance in accordance with the principle requirements in IFRS S1, as well as fulfil the disclosure core contents in IFRS S2.	Exploratory qualitative
3	Strategic management accounting	Analysis of sustainability-	This study aims to explore the extent to which	Identify how the budgeting process, as part	Exploratory qualitative

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
		based budgeting	sustainability costs are reflected in the operating budgets made in companies. Another goal is to provide an overview of how sustainability aspects in determining capital budgeting decisions, which previously only used financial indicators such as payback period (PP), Net Present Value (NPV), and Internal Rate of Return (IRR).	of the financial process, is affected by the implementation of sustainability performance, and come up with the concept of sustainable budgeting disclosure as one of the fulfilment of governance elements in IFRS S1 and S2.	
		Analysis of the company's sustainability performance measurement programme and climate resilience performance	This research aims to explore the issues of measuring the performance of units and/or unit leaders with sustainability issues, and provide a framework of sustainability indicators that can be used as performance indicators for units or unit leaders.	Identify what are the quantitative and qualitative indicators to be the unit's performance indicators in the aspect of sustainability. In terms of disclosure, disclosures related to sustainability performance indicators are very relevant to the disclosure requirements in IFRS S1.	Exploratory quantitative/qualitative.
		ESG performance-based compensation management analysis	This research aims to identify sustainability indicators that can determine ESG performance-based compensation management.	Identify what are the quantitative and qualitative indicators that make up sustainability-based compensation	Exploratory quantitative.

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
			Another objective is to identify how ESG-based compensation management structures are formed and whether this has an impact on programme effectiveness as well as sustainable products/services .	management. In terms of IFRS S1, compensation management disclosures can be linked to financial disclosures, especially about employee benefit transactions or related party disclosures on key management compensation disclosures.	
		Analyse patterns of leadership and governance based on sustainability	This study aims to assess the effectiveness of leadership, whether it is the board of directors, sustainability committee or sustainability-related departments in implementing sustainability programmes. In particular, this research can also assess the extent to which governance organs, processes and structures have taken sustainability into account, and develop a framework for assessing sustainability-based governance.	Identify the extent to which governance organs, processes and structures need to change in line with the sustainability strategy set by the organisation. From the point of view of IFRS S1 and S2, this research can provide an overview of how companies should disclose related to the core contents of governance.	Exploratory quantitative

Table 2 presents the potential for management accounting research on IFRS S1 and S2.

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Auditing Research Area

Auditing research has focused on the extent to which audits add quality to financial reporting, information systems, and business processes(Hay, 2015). There are two main branches of audit research: external and internal. External audit research generally focuses on financial reporting and various procedures performed by public accountants or public accounting firms. Internal audit research generally focuses on the efficiency and effectiveness of a company's operational management(Eulerich & Kalinichenko, 2018; Hay, 2017).

Auditing research related to sustainability is still underresearched(DeFond & Zhang, 2014). Sustainability reporting is initially voluntary and does not require auditing(Junior et al., 2014). In addition, sustainability reporting is not considered an accounting and finance product and, therefore, is not within the scope of internal audits day-to-day work(Alsahali & Malagueño, 2022). However, with the integration of accounting and sustainability information through the implementation of IFRS S1 and S2, an audit of financial statements also includes an audit of sustainability disclosures(Gözde & İrem, 2023; Tolkach, 2023). Currently, no international auditing standards can be used to conduct sustainability audits(Alsahali & Malagueño, 2022).

At the time of writing, there was International Standards on Sustainability Assurance (ISSA) Number 5500, but it is still in draft form and is not yet effective. The only auditing standard that addresses sustainability issues is International Standards on Assurance Engagement (ISAE) Number 3410 related to Assurance Engagements on Greenhouse Gas Statements(Hay et al., 2023, 2024). Research can focus on the impact of this standard on sustainability disclosure audits. Another interesting audit issue that could be researched is related to the audit infrastructure and auditor competence in relation to sustainability(Boiral et al., 2020; Föhr et al., 2023; Kalsoom, 2019). Previous research shows a positive correlation between reporting complexity and audit competence; therefore, it needs to be analyzed in relation to the readiness of public accounting firm at various business scales to conduct audits of sustainability disclosures in the context of IFRS S1 and S2(Föhr et al., 2023).

In internal audit activities, research that might be conducted related to IFRS S1 and S2 aspects is on how internal audit efforts are carried out in relation to sustainability information in financial reporting, how the competence and infrastructure of internal audits in conducting audits and consultancies relate to sustainability disclosures, and the extent to which internal audit maturity determines the quality of audits on sustainability disclosures(Al-Shaer & Zaman, 2018; Jona & Guxholli, 2018; Nacera, n.d.; Soh & Martinov-Bennie, 2015; Trotman & Trotman, 2015).

In addition to the research context of internal and external audits, other research approaches could be taken, such as information technology audits of sustainability reporting infrastructure(Bai et al., 2020; Khuntia et al., 2018). In addition to information technology audits, research could also be conducted on how internal and external audits perform environmental audit services or climate change audits, and to what extent these audit requests will support the implementation of IFRS S1 and S2(Farooq & De Villiers, 2017; Fernandez-Feijoo et al., 2016; Martínez-Ferrero et al., 2018).

Table 3 presents the potential for auditing research on IFRS S1 and S2.

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Table 3. Undergraduate and Graduate Ifrs-Related Auditing Research

No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
1.	External audit	Implementation of ISSA 5500 and ISAE 3410 in audit procedures and their gap analysis	This study aims to analyse the critical arrangements in ISSA 5500 and ISAE 3410 and what arrangements need to be prepared by public accounting firm so that it can conduct sustainability audits that meet the standards. Another objective could also be to identify evidence, risk areas and audit programmes that could be undertaken in relation to sustainability, tailored to other jurisdictions.	Know the challenges of conducting sustainability audits based on international standards, and be able to see what are the gaps between national audit standards and international standards. Another contribution would be to develop an audit programme template for sustainability audits in the context of IFRS S1 and S2.	Exploratory qualitative
		Maturity analysis of public accounting firm infrastructure and resources for sustainability audits	This research aims to analyse more deeply the audit infrastructure, especially information technology, as well as human resources, both in terms of competence and the team structure that needs to be created to conduct audits in accordance with IFRS S1 and S2.	Identify and set quality standards for infrastructure and human resources that can audit sustainability disclosures, in accordance with the disclosure requirements in IFRS S1 and S2.	Exploratory qualitative
		Audit expectation gap in sustainability issues	This study aims to determine user expectations of the results of sustainability disclosure audits in accordance with IFRS S1 and S2, as well as how auditors' expectations of sustainability disclosure audits in accordance with IFRS S1 and S2, and analyse the existing gaps.	Establish a standard related to the benefits of disclosing sustainability information in accordance with IFRS S1 and S2, and improve auditors' understanding of the areas or matters that need attention when	Exploratory qualitative

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
				auditing sustainability disclosures	
2	Internal audit	Readiness of internal audit of sustainability-related operations and compliance	This study aims to design an operational and compliance audit programme that can support increased disclosure of sustainability information under IFRS S1 and S2. Sustainability disclosures depend on how business processes have implemented sustainability aspects. Internal audit can be asked to ensure that sustainability aspects have been applied consistently in business processes.	Establish an operational and compliance audit programme that supports the information needs of investors, in accordance with IFRS S1 and S2 frameworks.	Exploratory qualitative
		Maturity analysis of internal audit infrastructure and resources in sustainability audit	This research aims to analyse in more depth the internal audit infrastructure, especially information technology, as well as human resources, both in terms of competence and the team structure that needs to be created to conduct audits in accordance with IFRS S1 and S2.	Identify and set quality standards for infrastructure and human resources that can audit sustainability disclosures, in accordance with the disclosure requirements in IFRS S1 and S2.	Exploratory qualitative
3	Specialised audits	Information technology audit for ESG data	This study aims to explore what are the risks of ESG-related data, and how to audit ESG data, and how ESG auditing will affect the audit of continuing disclosure in accordance with IFRS S1 and S2.	Know about how information technology audits are conducted on a company's technology infrastructure, and identify ESG-related information technology audit risks and procedures.	Exploratory qualitative
		Environmental audit and climate change audit requests	This study aims to examine the extent of demand for environmental and/or climate change audits, and how these audits relate to	Know about how ESG-related audits can support sustainability disclosure audits in the context of IFRS-	Exploratory qualitative

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
			sustainability disclosures in accordance with IFRS S1 and S2.	compliant financial statement audits S1 and S2.	

Accounting Information System Research Area

Research in accounting information systems generally focuses on aspects of information technology infrastructure readiness and its impact on the quality of information from accounting(Mignerat & Rivard, 2015). Traditionally, research on accounting information systems has not been associated with accounting or reporting standards. However, today, the implementation of various accounting or reporting standards has major technological infrastructure consequences;(Abbasi et al., 2016; Benbya et al., 2020) for example, the implementation of IFRS 9 or IFRS 15. Contemporary research on accounting information systems with financial accounting focuses on the extent to which data needs can be supported by accounting information systems and the constraints that generally occur in fulfilling these needs(Appelbaum et al., 2017; Bhimani & Willcocks, 2014).

The IFRS S1 and S2 have considerable data requirements. Sustainability performance data are generally unstructured and require a good algorithm program for integration into financial reporting(Mulligan et al., 2023). Another problem is that sustainability data are generally not included in financial reporting systems, even those based on Enterprise Resource Planning (ERP)(Indyk, 2022; Kampanje, 2023). Many previous studies have reported that many workpapers for preparing sustainability data and reporting still use manual data based on spreadsheets(Gözde & İrem, 2023; Tolkach, 2023). This could be an interesting research theme for the application of IFRS S1 and S2 and its information technology aspects.

Some of the IFRS S1 and S2 requirements also provide opportunities to open up various renewable technologies, such as programs to calculate greenhouse gas emissions, especially those based on Scope 2 and Scope 3, which are currently difficult to measure(Gu et al., 2023). Another aspect that can be supported by accounting information systems research is related to data needs related to climate resilience analysis, which also require good information technology support(Tingey-Holyoak et al., 2023). In addition, in accordance with the ISSB work program related to sustainability taxonomy, accounting information systems research can be directed to the extent to which information systems can be developed to accommodate the needs of sustainability taxonomy in accordance with IFRS S1 and S2(Esposito & Cecchin, 2022; Suta et al., 2023).

Table 4 presents the potential for research on accounting information systems related to IFRS S1 and S2.

Table 4. Accounting Information System Research Related to IFRS S1 And S2

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No.	Research area	Research sub-theme	Explanation	Research contribution	Possible research methods
1	Accounting information system	Preparation of financial integrated sustainability working paper based on accounting information system	This study aims to develop sustainability data working papers that are integrated with financial data, to fulfil the disclosure principles in IFRS S1 and S2. This research has the potential to produce appropriate technology outputs that can be used by various entities in preparing financial statements with sustainability disclosures.	Produce appropriate platform that supports the implementation of IFRS S1 and S2, especially to support the automation of sustainability reporting.	Exploratory qualitative/quantitative
		Development of information technology tools for IFRS data preparation S1 and S2	This research aims to develop information technology-based software that can calculate several metrics and targets in IFRS S1 and S2, such as greenhouse gas emissions, or scenario analysis in climate resilience. This research also has the potential to produce software that can be used by various entities in preparing financial statements with sustainability disclosures.		

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		Development of IFRS compliant sustainability taxonomy S1 and S2	This research aims to develop an information system programme that is able to accommodate the taxonomy of sustainability in accordance with IFRS S1 and S2, and also accommodate various other requirements in accordance with the rules set by each jurisdiction.		

Overall Implications

Based on the above discussion, it is possible that research on IFRS S1 and S2 can intersect with various research themes in accounting science. The application of current accounting standards can be viewed not only in one aspect but also in a more holistic manner. To prepare quality reporting, it is necessary to improve various aspects of the business process, so research on IFRS S1 and S2 can also be associated with other fields of accounting science.

Of the various possible research themes, it is possible that empirical research on the quality of disclosures in IFRS S1 and S2 will only be conducted after the implementation of IFRS S1 and S2 in each country. The results obtained in the beginning are predicted to be unable to generalize the conditions between industries and countries. Various countries already have different IFRS effective dates; some countries also adjust the application of IFRS S1 and S2 to their jurisdictions, and some countries also apply a phase system where not all companies are immediately required to apply IFRS S1 and S2 at the same time. Finally, empirical research can probably be conducted as early as 2026 or 2027, with various limitations; only five or ten years later can more general results be obtained after the implementation of IFRS S1 and S2 is evenly distributed across all countries.

In terms of methods, at the beginning of the research, it will be exploratory because of the limited empirical data of previous research specifically based on IFRS S1 and S2. Exploratory research using a qualitative approach is more appropriate. However, in the future, if empirical data are available and some companies have entered the final preparation stage of IFRS S1 and S2 implementation, descriptive or explanatory quantitative-based research can be conducted. In the initial phase, research may be limited to an industry in a country; however, over time, it is possible to conduct research on multiple industries and make comparisons between countries. The implication is that sustainability-based research also opens up various accounting research paradigms, in addition to the positive paradigm, it is also possible to conduct preliminary research on the implementation of IFRS S1 and S2 in other paradigms, such as the interpretive paradigm or the critical paradigm.

In terms of outputs, it is also possible for IFRS S1 and S2-based sustainability accounting research to produce outputs in the form of appropriate technology, apart from journal articles. Technology is a sustainability reporting ecosystem that determines the success of IFRS S1 and S2. Of course, studies to enter the appropriate technology will take a long time and process, so research in this field is expected to be carried out early. Thus, when IFRS S1 and S2 are implemented, the technology for obtaining sustainability data and information is available.

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Conclusions

The research opportunities presented in this study contains a variety of ideas to encourage researchers to conduct research on IFRS S1 and S2. There is certainly much potential for research on IFRS S1 and S2 in the medium and long term. It describes a range of potential research that could be conducted on IFRS S1 and S2 in the future. In the short term, the focus is on building a mature sustainability reporting ecosystem that is able to overcome a variety of constraints in business processes and sustainability reporting processes. However, this paper study does not suggest a standardized research method. It can can be adapted to researchers' preferences and the situations at hand. This research also focuses on accounting, but accounting and reporting standards generally have various multidimensional implications. It is also expected that future research will discuss IFRS S1 and S2 from an interdisciplinary or multidisciplinary perspective, such as legal studies that focus on the legal provision of IFRS S1 and S2, or studies that focus on the implications of of sustainability reporting from the perspective of macroeconomic performance indicators, such as the SDGs or science-based targets and other macro sustainability performance indicators. Finally, this study also implies that research on IFRS S1 and S2 needs to be conducted by academics, companies, and regulators to ensure successful implementation.

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