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Chapter 4

Artificial Intelligence and Attestation of Sustainability Reports. How Can Artificial Intelligence Tools be Used for the Assurance Process of Sustainability Reports?

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Climate change is a global challenge that significantly impacts our society and has increased pressure on firms to report on environmental, social and governance (ESG) factors (Bui et al., 2021). The reporting on ESG factors is a valuable source of information for stakeholders because it deals with legitimacy and institutional pressures (Maroun, 2022). Therefore, to satisfy stakeholders, the firms buy ESG assurance to represent the high quality of their reporting practices. Moreover, ESG assurance is used to enhance the reliability of sustainability and integrated

reporting to increase the quality of disclosures (Maroun, 2019). However, to draft such reports per standard-setting bodies' norms, adopting some key performance indicators and artificial intelligence (AI) tools is required (Di Vaio et al., 2020a; Polignano et al., 2022). The increasing awareness of ESG issues, shortage of natural resources, and climate change have transformed the activities of firms in innovative ways (Kolk and Van Tulder, 2010). This innovation makes the firms responsible for clear and transparent communication with their stakeholders. The literature also argues that sustainability reports significantly impact stakeholders' decision--making (Barrett, 2005). The Global Reporting Initiative (GRI) is commonly used as a standard-setting body to provide firms with specific reporting standards (Borglund et al., 2010; Brown et al., 2009).

Regardless of the importance of sustainability reports, the stakeholders are more concerned and raise questions about the integrity and transparency of the provided information. In literature, the concept of sustainability reporting depends upon two concepts: first, a methodology to focus on environmental and social issues and second, the non-financial disclosures (NFD) based on an agenda of socio-environmental choices (Di Vaio et al., 2020b). To provide transparent disclosures, the firms started to use external assurance services to improve their reliability (Kang and Kim, 2022). The external independent assurance of sustainability reporting started in 1997--1998 (O'Dwyer and Owen, 2005). There are two renowned frameworks for assurance services, i.e. in March 2003, the AA1000 Assurance Standard (AA1000AS) that was hurled by AccountAbility (Accountability, 2011) and the International Audit Assurance Standards Board (IAASB) 's International Standard on Assurance Engagements (ISAE 3000) (Junior et al., 2014). It is assumed that the assurance based on combining both frameworks provides improved results (KPMG Global Sustainability Services and AccountAbility, 2005).

The IAASB (2011, p. 19) states that it is a task where a practitioner seeks enough relevant data to draw a conclusion that will increase the confidence that users aside from the responsible party have in measuring or evaluating a subject matter against criteria. At the same time, AA1000AS defined it as an engagement wherein an assurance provider assesses and renders a judgment regarding an organisation's performance disclosures to the public, as well as its underlying systems, data, and processes, using appropriate standards and criteria to raise the information's credibility for the target audience (AccountAbility, 2008, p. 23).

Nevertheless, today, AI tools are very helpful in improving reporting efficiency, i.e. real-time accounting and reporting, continuous auditing, and attestation of reporting (Han et al., 2022). The AI tools increase the credibility of firms in terms of reporting and also enable them to play a positive role in agility (Wamba et al., 2023). Moreover, in December 2022, the Corporate Sustainability Reporting Directive (CSRD) implied a critical development regarding sustainability reporting. This Directive extends the scope of EU 2020 and demands the disclosure related to ESG indicators (Fohr et al., 2023).

This chapter aims to explore the linkage between sustainability and integrated reporting and their assurance process by analysing the existing literature. Furthermore, the chapter explores the role of AI tools in decarbonisation practices through innovation, institutional, legitimacy and stakeholder theories. More in detail, this chapter investigates how the assurance process and its tools, i.e. attestation, can guarantee the content of reports. The focus of this chapter is on a specific AI tool, ChatGPT. This chapter is more focused on AI tools regarding sustainability transition to justify institutional pressures by answering the following research questions:

RQ1: How can AI tools guarantee the content of sustainability reports about decarbonisation practices?

RQ2: How is ChatGPT the best tool for assuring and attesting sustainability reports about decarbonisation processes?

The content of the chapter is divided into the following sections: section 4.1 conceptualises AI tools, i.e. ChatGPT, ChatReport, Natural Language Processing (NLP), Machine Learning (ML), Latent Dirichlet Allocation (LDA) and assurance for sustainability reports. Section 4.2 introduces the concept of the assurance process of sustainability reports regarding AI tools under the lens of innovation, institutional, legitimacy and stakeholder theories. Section 4.3 describes the link of AI to decarbonisation practices and attestation of sustainability and integrated reporting. Section 4.4 presents a conceptual framework of sustainability reports and decarbonisation practices from the perspective of AI tools. Finally, section 4.5 concludes the study with some limitations and directions for future research.

4.1. Artificial Intelligence Tools and Assurance for Sustainability Reports

GRI defines sustainability reporting as public reporting by an organisation on its effects on the economy, environment, and/or society and, consequently, its contributions, whether favourable or unfavourable, to the cause of sustainable development (Singhania and Chadha, 2023). Therefore, the firms produce annual sustainability reports to disclose their sustainability strategies and practices (Kang and Kim, 2022). However, the question is, do the firms appropriately express their actions? That is why the assurance of sustainability reports is required. In this regard, AI tools, specifically ChatGPT, can help regulators and other stakeholders analyse the content of sustainability reports more accurately (de Villiers, 2024; SDG Compass, 2015).

AI tools have been used to prepare sustainability reports, provide assurance, and analyse large volumes of data. On the one hand, where the need for sustainability reporting arises, the chance of greenwashing adoption is also increasing (de Villiers, 2024). Advanced AI technology can help firms manage reporting according to ESG frameworks to respond to these issues (Howard-Cooper, 2023).

Employees, investors, customers, and regulatory bodies, as the firms' stakeholders, are all concerned with the sustainability reporting of firms. They are keenly interested in firms' ESG performance (Semuninx et al., 2020). In 2005, the KPMG introduced a three-step method for transparent carbon disclosure, i.e. recognition of materiality and measures of data, carbon emissions disclosure and the demonstration of steps that they are taking to achieve climate goals (Tiwari and Khan, 2020). This detailed framework requires technology adoption and capabilities as they form evolving and innovative ways in a dynamic market (Wang and Xu, 2013).

ChatGPT and Assurance of Sustainability Reports

The AI tools, specifically ChatGPT, have influenced firms by advancing accounting, finance, and traditional reporting practices. It can help the firms by offering financial advice, investment strategies, fraud detection, data entry and report generation (Rane, 2023a). ChatGPT adoption must be aligned with firms' digitalisation capabilities and strategies to achieve better results (Eulerich and Wood, 2023). The ChatGPT showcases advanced capabilities in decarbonisation practices, i.e. sustainability reporting and renewable energy resources. It aids the firms in reporting assurance, revising strategies, and improving their performance, and the cycle continues (Rane, 2023b). Apart from its benefits, ChatGPT also faces reliability-related challenges in reporting analysis. Despite being sensitive, it may misinterpret financial statements that lead towards flawed conclusions (Zhao et al., 2023). Combined efforts from AI tool developers, regulatory bodies, and financial experts are required to address these challenges (Shen et al., 2023). Their collective efforts will accurately tackle these issues and improve firms' efficiency and performance (Rane, 2023a).

ChatReport and Assurance of Sustainability Reports

The AI launched a new tool called ChatReport, a generative source to interpret information by allowing users to access the quality of climate disclosure in sustainability reports (Human, 2023). Unlike ChatGPT, ChatReport is linked only with the information retrieved by the users. It automatically analyses the reports based on recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) (Ni et al., 2023). It works in four modules:

i. Report Embedding: It divides the sustainability report into informative textual parts and transforms it into a vector space representation.
ii. Report Summarisation: It summarises the report based on recommendations of TCFD by retrieving the relevant information from the report so that it can be read efficiently.
iii. TCFD Conformity Assessment: It analyses to what extent the report is based on TCFD recommendations.
iv. Customised Question Answering: It enables the users to pose specific questions.

Apart from the importance of ChatReport, its outputs must be used for references, not as evidence. As it wholly depends upon the information provided by the firms in their reports, that is its limitation (Ni et al., 2023).

Natural Language Processing and Assurance of Sustainability Reports

NLP deals with the interpretation of data in written or spoken language, as well as natural or human language. The scientists and programmers working in the field of NLP design such programs that can understand human language and, in response, can summarise it in a more elaborate form (Howard-Cooper, 2023). NLP is considered the best AI tool for generating insights from unstructured data sources regarding sustainability reports. It is assumed that up to 90% of the globally generated data is unstructured, and the most commonly unstandardised form of data is sustainable finance data. For transparent reporting, the unstructured sustainability data must be sorted for institutions and stakeholders; for this reason, NLP plays a target role in such issues. The NLP tool is used in meta-analysis and climate disclosure analysis to detect facts related to climate change (Webersinke et al., 2021). It helps the analysts retrieve helpful data for their future decision-making.

Machine Learning and Assurance of Sustainability Reports

ML is recognised for its potential impacts on greenwashing; a tactic companies often use to manipulate sustainability reporting. In recent years, ML has significantly advanced the accuracy and transparency of sustainability reporting, helping to mitigate deceptive practices (Goodell et al., 2021). The ML algorithms can analyse disclosures by measuring the readability of sustainability reports (Ning et al., 2021). It is easier to recognise different patterns that lead to effective managerial decisions (Goodell et al., 2021). The combination of ML and NLP can assess the complex information in sustainability reporting by proposing different methods to detect non--compliance to corporate social responsibility (CSR) (Kotzian, 2021).

Moreover, analysing text and data in large quantities is helpful faster than manual analysis and review (Yim et al., 2016). It encourages the stakeholders to consider the negative impact of greenwashing in disclosures (Moodaley and Telukdarie, 2022). ML is considered a comprehensive AI tool that has been perceived to have increased usefulness by researchers and scholars (Moodaley and Telukdarie, 2022).

Latent Dirichlet Allocation and Assurance of Sustainability Reports

Integrated reporting focuses on financial and governance details, while sustainability reporting emphasises environmental and social aspects (Sick, 2022). Firms disclose sustainability practices to engage stakeholders effectively, and it is crucial for these reports to represent sustainable practices authentically. To analyse voluntary sustainability disclosures, LDA is utilised to summarise the entire report's content (Ning et al., 2021). The reports can be identified using LDA as environmental

performance, social engagement and governance. By using these factors in sustainability reporting, the firms manage their social reputation to attain societal acceptance. In this regard, LDA enables stakeholders to check the efforts made by labourers in the category of social engagement (Ning et al., 2021). The application of LDA is tempting and requires little assistance, but users should specify the topics (Sick, 2022). In the literature, a few studies have used LDA as manual coding is needed to process documents (DiMaggio et al., 2013).

4.2. Contribution of Theories to the Assurance Process of Sustainability Reports Regarding Artificial Intelligence Tools

The ESG information presented in sustainability reports is a valuable source of information for stakeholders and regulatory bodies. These types of disclosures reduce the cost of capital by meeting investors' expectations (Maroun, 2022). Nowadays, when the concern of ESG reporting is growing, stakeholders also demand assurance. Therefore, to balance the legitimacy of institutions and stakeholders, the assurance acts as a monitoring tool to improve the quality of sustainability reports (Wang et al., 2019). Firms with good sustainability performance have greater chances to get sustainability assurance than firms with less sustainability performance (Rohani et al., 2023).

Moreover, the legitimacy theory posits that firms with a high level of legitimacy are more concerned about their actions (Datt et al., 2022), whereas the stakeholder theory makes the firms responsible for a broader range of stakeholders (Freeman, 1984). Furthermore, as per innovation theory, to deal with adopting innovative AI tools and decarbonisation practices, the institutional theory justifies that the regulatory norms design the firm's policies and practices (Datt et al., 2022). After meeting all the initial pressures of institutional and stakeholders, firms must go through the assurance process for their sustainability reports. It provides a complete picture of firms' behaviour and allows stakeholders to ensure the implementation of ESG standards in firms' reporting (SGS, 2023).

Assurance Process of Sustainability Reports regarding Artificial Intelligence Tools under Innovation Theory

In this era, where the world revolves around technology, the previous knowledge is obsolete, and innovation becomes the roadmap to success. Therefore, the firms are trying to support their strategies with innovative capacity (Bronzetti et al., 2023). The ability of firms to present the disclosure of innovation inspires stakeholders to decide in favour of firms (Bronzetti et al., 2023). Moreover, the firms that invest in innovative deeds have solid justification to disclose it in their reporting as sustainability practices to improve their relationship with stakeholders (Radu and Francoeur). Further, the reporting on ESG factors, including innovation, reduces the high uncertainty and encourages new investments in innovative activities (Dunbar et al., 2019).

The AI tools play a vital role in the assurance of sustainability reporting. The assurance tools encourage the stakeholders to discover new opportunities that can transform the firms' business models per standards-setting bodies (Van de Wetering et al., 2022).

Assurance Process of Sustainability Reports regarding Artificial Intelligence Tools under Institutional Theory

In literature, the firms' managerial capabilities regarding sustainability reporting and technology adoption always depend upon numerous regulative and normative drivers (Bebbington, 2007; Gray et al., 2010). In 2002, Adams explored that the corporate factors, i.e. profits and financial performance of firms, and contextual factors, i.e. political, legal, social, economic and stakeholders, as well as institutions, influence firms' decisions to report (Baldarelli et al., 2014). Therefore, sustainability reporting is a discretionary process from stakeholders and institutional pressures (Young and Marais, 2012). With the help of institutional theory, the firms are taking initiatives towards assurance of sustainability reporting to meet environmental concerns (Baldarelli et al., 2014). Moreover, the institutional theory posits that institutional pressures shape the corporate behaviour of firms (Matten and Moon, 2008).

The tendency is increasing daily to have voluntary assurance of sustainability reporting for the firms to achieve stakeholders' confidence (KPMG, 2013). However, due to the high costs of assurance services, many firms do not opt to ensure their sustainability practices (Hassan et al., 2020). However, to improve credibility and transparency, firms get assurance to keep their stakeholders aware of their actions on ESG issues (Clarkson et al., 2011). Meanwhile, with the development of technology, AI tools can aid in sustainable efforts by increasing security and transparency in reporting. Also, the regulators, employees, accounting professionals and users must be aware of technological skills (Hassan et al., 2020).

Assurance Process of Sustainability Reports regarding Artificial Intelligence Tools under Legitimacy Theory

Reporting ESG factors improves firms' strategies and routine practices committed to social and environmental impacts (Pitrakkos and Maroun, 2020). Due to the increasing concerns of stakeholders, not only for mandatory disclosures but for voluntary assurance to enhance the firms' legitimacy by reducing asymmetry information (Rohani et al., 2023). Moreover, to meet the institutional pressures and stakeholders' demands, NFD and its assurance worked as a legitimation strategy (Kuruppu and Milne, 2010). From a legitimacy perspective, the firms' practices and reporting must be aligned with the norms of the society in which they operate (Rohani et al., 2023).

The new institutionalism restructures the firms to adopt digitalisation towards sustainability transition (Schiavi et al., 2023). Firms initially adopt this perspective to reduce uncertainties in their actions (Greenwood et al., 2002). Then, on the next

level, the institutional pressures reform the firms to undergo technological change in their reporting practices (Hinings et al., 2018). This new perspective wholly depends on technological adoption in terms of choice to meet environmental pressures and ensure stakeholders' legitimacy (Currie, 2011).

Assurance Process of Sustainability Reports regarding Artificial Intelligence Tools under Stakeholder Theory

The stakeholder theory links a firm and its stakeholders (Freeman, 1984). Unlike the legitimacy theory, the stakeholder theory is a detailed managerial act to report on ESG factors (Singhania and Chadha, 2023). Applying this perspective in the firms regarding assurance of ESG factors creates a trustworthy relationship with stakeholders (Datt et al., 2022). The AI tools help verify that the firms meet the criteria of standards-setting bodies in their sustainability reporting. The assurance assessment supports the firms in the following ways:

- managing ESG factors,
- assuring ESG targets,
- managing internal controls,
- verifying NFD,
- recommending improvements in disclosures.

AI tools can provide accuracy in diversified languages. Therefore, adopting AI tools for the assurance process of sustainability reports is gaining increasing trustworthiness of stakeholders (Freeman et al., 2021).

4.3. Artificial Intelligence for the Decarbonisation Practices: Attestation, Sustainability Reporting and Integrated Reporting

The depletion of natural resources raises global issues, and decarbonisation practices with digitalisation are the best solution to these environmental problems. Through AI-advanced technologies, decarbonisation practices can support carbon neutrality goals for a sustainable transition (Kurniawan et al., 2023). AI can contribute towards sustainable development goals by addressing the issues, i.e. climate change, sustainability reporting, sustainable business models, and transparency in sustainability practices (Jelinek et al., 2023). Adopting AI for decarbonisation practices employed by firms can improve their environmental performance and transparency in sustainability reporting (Wamba et al., 2023). AI can also make significant changes to adopt decarbonisation practices as they can increase efficiency in routine activities (Noori et al., 2023).

Furthermore, the digital transformation of green technological innovation is the primary driver of decarbonisation (Kurniawan et al., 2023). Therefore, decarbonisation is the priority goal and a challenging global issue. The complete transformation of

existing technology with green energy resources is the distinctive feature on which firms are putting their efforts (Vorozheykina, 2022).

Moreover, to standardise the operations of firms, which also includes the assurance and attestation of sustainability practices in reporting, GRI guidelines are considered as best because do not only focus on the production of sustainability reports but also demand external independent auditors to evaluate the reports prepared by firms (TUV SÜD, n.d.). The report further explains that the firms can achieve multiple benefits from verification of reporting, i.e. accuracy and comparability of data, improvement, and trustworthy relations with stakeholders. Meanwhile, AI tools encourage firms to use a systematic approach and integrated management for decarbonisation practices to develop technological innovations towards sustainability transition (Vorozheykina, 2022). It is proposed that the contribution of AI to decarbonisation practices should be based on social norms. The cause-and-effect relationship of environmental development to achieve complete benefits from decarbonisation practices is still ongoing (Ragulina et al., 2022).

4.4. Conceptual Framework of Sustainability Reports and Decarbonisation Practices with Perspective of Artificial Intelligence Tools

Sustainability reporting and its assurance is an effort put forth by the firms to be accountable to their stakeholders. The number of firms producing sustainability reports has increased in the past decade (Junior et al., 2014). Furthermore, adopting AI tools with the engagement of accountants and experts regarding assurance and attestation of sustainability reports has emerged as a new practice. Therefore, ChatGPT is ultimately popular due to its capabilities regarding sustainability reports' assurance. The fact that ChatGPT is an emerging AI tool means that firms are using it to ensure the sustainability of their sustainability reports to sustain the legitimacy of stakeholders and regulatory bodies (Maroun, 2022). Sustainability reporting plays a crucial role in legitimising firms' relationships with stakeholders. Moreover, the legitimacy theory is vital in making the firm credible to stakeholders (Pitrakkos and Maroun, 2020).

The stakeholders are dependent on the information stated in firms' sustainability reports. The stakeholders and regulatory bodies are more concerned with ecological sustainability, which is only possible by adopting green technologies (Kurniawan et al., 2023). Therefore, the legitimacy theory restricts firms from operating in socially acceptable manners, whereas stakeholder theory gives preferences to specific groups that are directly linked with them. Unlike both, the institutional theory pursues sustainability disclosures as per regulatory norms (Singhania and Chadha, 2023). Collectively, all of them postulate to manage ESG reporting and its assurance. Therefore, the automatic analysis provided by AI tools empowers stakeholders to

check the firms' performance, ESG risks and opportunities to make more sustainable decisions (Ni et al., 2023). Based on these tools, the customers and employees can evaluate the performance of firms, whereas the regulatory bodies can monitor the practices of firms aligned with sustainability regulations. The conceptual framework of AI tools, specifically ChatGPT, for attestation of sustainability and integrated reports and their assurance for decarbonisation practices towards sustainability transition is shown in Figure 4.1.

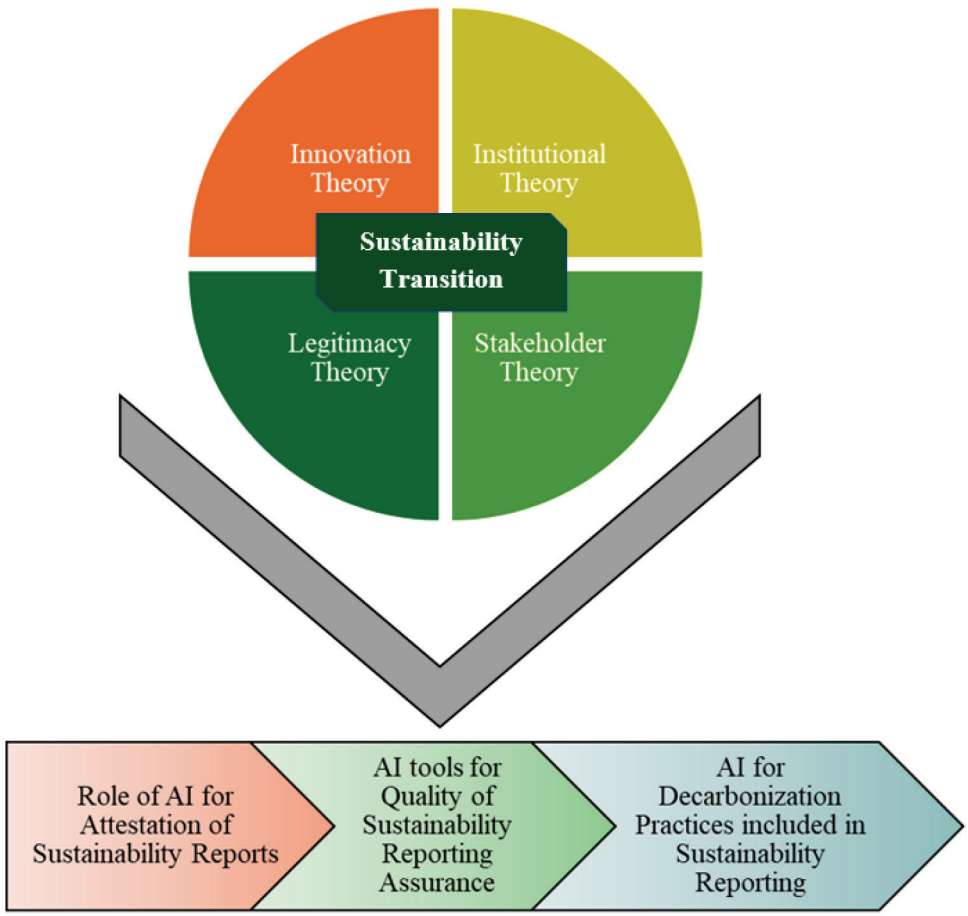

Figure 4.1. Conceptual framework "AI tools for attestation and assurance of sustainability reports and decarbonisation practices"

Source: own presentation.

4.5. Discussion and Conclusions

Concerning our RQ1, "How can AI tools guarantee the content of sustainability reports about decarbonisation practices?". By automating the processes of data collection, integration, and verification, AI tools improve the transparency and quality of sustainability reports on decarbonisation activities. In order to ensure data integrity, these tools employ advanced algorithms to collect data from a variety of sources, identify anomalies and cross-reference information with outside benchmarks (Nishant et al., 2020). The firms can report on the most recent data and simulate future scenarios thanks to real-time monitoring and predictive analytics, which offer continuous oversight and trend analysis (Floridi et al., 2020). Through interactive, real-time communication, ChatReport uses NLP to generate, analyse, and improve reports, making the reporting process more dynamic and approachable (Maibaum et al., 2024), while NLP guarantees clarity and adherence to regulatory norms (Tapscott and Tapscott, 2017). In addition, the quality and comprehensiveness of sustainability reports can be enhanced by ML algorithms' abilities to handle and analyse huge datasets, find patterns, spot anomalies, and forecast future trends in emissions reduction (Moodaley and Telukdarie, 2023). By introducing statistical noise to individual data points prior to analysis, LDA protects sensitive information while preserving the general usefulness of the data (Ning et al., 2021). By offering interactive data views and feedback channels, AI-driven dashboards engage stakeholders and promote openness and ongoing development (Wamba et al., 2015). Moreover, this integrated strategy promotes open and ongoing stakeholder participation while protecting data privacy and improving analytical precision.

With regard to RQ2, "How is ChatGPT the best tool for assuring and attesting sustainability reports about decarbonisation processes?". Reliable sustainability reporting depends on ChatGPT's capacity to process complex text data effectively, discover errors, validate facts, and assure adherence to reporting requirements (Sashida et al., 2023). As highlighted by Kolar in Chapter 5, ChatGPT enables firms to improve their planning and decision-making processes. Furthermore, it is consistent with the remarks of Cojocaru et al. in Chapter 6 that ChatGPT can analyse huge volumes of data to improve the dependability and accuracy of sustainability reports (Yonis Mousa, 2023) but to enhance reporting and offer insightful data, the uploaded databases need to be managed consistently, precisely, and thoroughly (De Villiers et al., 2024).

As climate change is gaining global attention, stakeholders demand a transparent view of sustainability practices. However, the average sustainability report comprises more than 70 pages, which makes it difficult for policymakers, investors, and other stakeholders to analyse it (Ni et al., 2023). Meanwhile, depending on a third party is expensive and might cause a lack of transparency. Therefore, AI tools are considered the most appropriate and transparent technique for analysing sustainability reports. AI tools can be used to generate and analyse text related to sustainability

engagements in firms. In 2020, Lee and Tajudeen (2020) explored that AI-based accounting software can increase the output and effectiveness of firms' governance.

Moreover, Lombardi and Secundo (2021) highlighted the significance of digital revolution and reporting processes. The assurance process of sustainability reports helps the stakeholders by improving organisational efficiency. AI provides an integrated solution to combine finance and NFD to increase the reliability of reports among managers and promote sustainable goals internally. However, regarding sustainability reporting, using AI tools raises some key concerns. The sustainability reporting assurance should focus on ChatGPT to support the assurance process, i.e., it helps technology streamline the analysis process and evaluate the reliability of reports.

One of the significant issues is ensuring the reliability of AI-generated reports, specifically ESG factors (de Villiers et al., 2024). Therefore, the firms are required to improve the efficiency and accuracy of information presented in reports. Meanwhile, the users must be aware of AI technology and evaluation strategies. Furthermore, the firms must have five competencies for transparent sustainability reporting and assurance systems: systems thinking, interpersonal skills, critical thinking and problem-solving, adaptability and flexibility, and technological capabilities.

Limitations of the Study

This chapter focuses on the transition to sustainability with the help of innovation, institutional, legitimacy and stakeholder theories. Regardless of the increasing concerns of stakeholders and institutional pressures regarding adopting AI tools for attestation of sustainability reports and quality of sustainability reporting assurance with the help of decarbonisation practices, it is rarely touched in the literature related to actions taken by the firms. Therefore, firms are adopting greenwashing to manipulate the picture of their performance in their reporting. To mitigate the risk of greenwashing, the firms must adopt assurance and attestation of their sustainability reports, which is quite challenging. Furthermore, adopting AI tools is not affordable for all firms because of their enormous costs. Meanwhile, firms need financial experts for such services to meet all the reporting standards. Therefore, the regulatory bodies should formulate flexible strategies that make this adoption possible for all firms in this competitive era.

Directions for Future Research

This chapter provides new innovative directions for scholars to focus on different AI tools and firms' performance regarding agency and resource-based view theories. Further research can be more precise on implementing AI tools to help firms reduce the risk of greenwashing and stakeholders get a clear picture of sustainability reporting and firms' performance. Furthermore, scholars should focus on training and awareness about using ChatGPT and other models to enable the users to understand technology. Also, decarbonisation practices regarding the adoption of renewable

energy resources should be considered from economic, technological, and social perspectives to ensure firms' reporting quality.

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