MASTER'S THESIS
IND590

GREEN ACCOUNTING IN NORWEGIAN CONSTRUCTION

A CASE-STUDY OF THE NORWEGIAN CONSTRUCTION INDUSTRY

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We want to acknowledge the relevance of our thesis topic, which focuses on green accounting within the Norwegian Construction Industry. The subject matter holds importance within the present-day shift towards environmental sustainability reporting, and can hopefully help future reporting practices. We aimed to investigate the readiness of five organizations within the construction industry to implement the new directives and standards on sustainability reporting from the European Union (EU) in 2024/25.

We express our gratitude to our thesis supervisor, Rafael Heinzelmann, for his excellent guidance and support throughout the entire process. Finally, we would like to thank our families, friends, and fellow students for their encouragement and support during our thesis semester.

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SUMMARY

This master's thesis aims to explore the application of Environmental Management Accounting (EMA) in the Norwegian construction industry. EMA is an accounting method that assists companies in identifying, measuring, and managing their environmental impacts, costs, and benefits. With the introduction of the Corporate Sustainable Reporting Directive (CSRD) in the EU, more actors in the industry will be required to report in accordance with the European Sustainability Reporting Standards (ESRS), which include Environmental, Social & Governance (ESG) reporting requirements.

To achieve the objectives of the thesis, a qualitative multi-case study has been conducted, involving five selected actors in the construction industry who will fall under the scope of CSRD in 2024/25. The study maps out how these companies use EMA for reporting purposes and how their control systems facilitate effective reporting.

The findings reveal significant variation in the level of EMA use and associated tools among the companies in the industry studied. Companies with a longer history of sustainability reporting demonstrate greater sophistication in their use of EMA. These companies possess more advanced tools and have automated reporting processes to a greater extent. However, the implementation of EMA faces several challenges in the industry, including the complexity of the CSRD, underdeveloped data collection tools, and the management of substantial amounts of data.

The insights generated from this master's thesis provide a systematic overview of EMA practices in the Norwegian construction industry while also identifying challenges that need to be addressed to achieve more efficient and comprehensive reporting in line with CSRD and ESRS.

Keywords: Environmental Management Accounting; Corporate Sustainability Reporting Directive; European Sustainability Reporting Standards; Control Systems; Management Accounting; Sustainability reporting

SAMMENDRAG

Denne masteroppgaven tar sikte på å utforske anvendelsen av Environmental Management Accounting (EMA) i den norske byggindustrien. EMA er en regnskapsmetode som bidrar til identifisering, måling og styring av miljømessige påvirkninger, kostnader og fordeler i virksomheter. Med innføringen av Coroporate Sustainability Reporting Directive (CSRD) i EU, vil flere aktører innen byggsektoren være pålagt å rapportere i henhold til European Sustainability Reporting Standards (ESRS), som omfatter miljømessige, sosiale og styringsrelaterte (ESG) rapporteringskrav.

For å oppnå formålet med oppgaven, har en kvalitativ multicase-studie blitt utført med fem utvalgte aktører innen byggsektoren som vil være underlagt CSRD i løpet av 2024/25. Studien kartlegger hvordan disse selskapene benytter seg av EMA for rapportering, samt hvordan deres kontrollsystemer legger til rette for effektiv rapportering.

Resultatene av analysen avdekker en betydelig variasjon i graden av EMA utvikling og tilhørende verktøy blant selskapene i bransjen. Selskaper med lengre erfaring innen bærekraftsrapportering viser seg å være mer avanserte i sin anvendelse av EMA. Disse selskapene har bedre utviklede verktøy og automatiserte rapporteringsprosesser. Likevel står bransjen overfor flere utfordringer ved implementeringen av EMA, inkludert kompleksiteten i direktivet, utilstrekkelige verktøy for datainnsamling og behandling av store datamengder.

Gjennom funnene i denne masteroppgaven blir det skapt en systematisk oversikt over EMA praksis i den norske byggindustrien, samtidig som det identifiseres utfordringer som må takles for å oppnå mer effektiv og omfattende rapportering i tråd med CSRD og ESRS.

Nøkkelord: Miljøstyringsregnskap (EMA); Rapporteringsdirektiv for bedrifter (CSRD); Europeisk bærekraft rapporteringsstandarder (ESRS); Konstrollsystemer (CS); Styringsregnskap (MA); Bærekraftsrapportering (SR)

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LIST OF ABBREVIATIONS

API Application Programming Interface. 50, 51, 63, 68

CDP Carbon Disclosure Project. 49
CE Circular Economy. 29
CO2 Carbon Dioxide. 57
CS Control Systems. 1
CSRD Corporate Sustainable Reporting Directive. 2–4, 6, 11, 12, 22, 29–32, 35–37, 41, 43, 44, 47, 50, 54–58, 60, 61, 63, 67, 68, 72–75, IV, V, VII, IX, X

EEA European Economic Area. 8
EFRAG The European Financial Reporting Advisory Group. 35, 43
EGD European Green Deal. 9–11, 30, 43
EMA Environmental Management Accounting. 1–7, 12–18, 20–25, 43, 44, 46, 51, 52, 58, 63–75, IV–VI, IX
EMACS Environmental Management Accounting & Control Systems. 43
EMCS Environmental Management Control Systems. 1
ESG Environmental, Social & Governance. 10, 22, 28, 31, 32, 36, 48, 50, 59, 62, 72, 74, IV, V
ESRS European Sustainability Reporting Standards. 2, 4, 22, 31, 32, 35, 36, 41, 43, 44, 47, 54–57, 60, 61, 63, 72, 73, IV, V, VII, IX
EU European Union. 2–4, 7–10, 28–32, 44, 55, 59, 62, 63, 73, III–V

FA Financial Accounting. 11, 13

GHG Greenhouse gas emission. 7, 8, 10, 34, 49, 51, 59–63, 72
GRI Global Reporting Initiative. 27, 28, 36, 43, 49, 51, 62, 63, 72, 73, X

HSE Health, Safety, and Environment. 50

ISO International Organization for Standardization. 48, 49, 62

KPI Key Performance Indicators. 32, 50–52, 62, 63, 69, 73, IX

LULUCF Land use and forestry regulations. 8

MA Management Accounting. 1, 11, 13, 19, 20, 24, 25, 65, VI
MAC Management Accounting & Control. 11, 43
MACS Management Accounting & Control Systems. 12, 72
MC Management Control. 12
MCS Management Control Systems. 12, 13, 22, 43
MEMA Monetary Environment Management Accounting. 15–17, 19

NDC Nationally Determined Contributions. 8
NFRD Non-Financial Reporting Directive. 2, 3, 28–30, 43, 72
NSD Norwegian Centre for Research Data. 42

PEMA Physical Environmental Management Accounting. 15–17, 19

R&D Research & Development. 10

SDG The Sustainable Development Goals. 9
SFAP The Sustainable Finance Action Plan. 10, 11
SFDR The Sustainable Finance Disclosure Regulation. 29, 31
SMA Corporate Sustainability Management Accounting. 1
SR Sustainability Reporting. 27, 34, 35, X

UiA University of Agder. 42
UN United Nations. 10

1 INTRODUCTION

The aim of this thesis is to study Environmental Management Accounting (EMA) in the Norwegian construction industry. EMA is a specialized form of conventional Management Accounting (MA) (Burritt et al., 2002, pg. 40). EMA focuses on the identification, collection, and reporting on an organization's environmental performance, while conventional MA focuses on financial and operational performance (Burritt et al., 2002, pg. 40-41; Burritt et al., 2019, pg. 480). Control Systems (CS) is another relevant theory that warrants consideration when examining EMA (Amir et al., 2020, pg. 135-136). CS are split into formal and informal control: Formal controls are deliberate practices, regulations, and procedures with feedback loops to achieve desired outcomes (Laguir et al., 2018, pg. 532; Chenhall, 2003, pg. 129). Informal controls are shared values, beliefs, and traditions that shape behavior (ibid.). CS can be applied to EMA in the concept Environmental Management Control Systems (EMCS) (Amir et al., 2020, pg. 135-136). EMCS are defined as "internal structures and systems", and is meant to supply data that is "beneficial for social control, higher cognitive process, planning, monitoring, and analysis of structure activities to vary worker behavior" (ibid.). Due to a certain ambiguity in literature, only the term EMA will be used, and all control systems will be referred to as EMA tools (Arjaliès and Mundy, 2013, pg. 286-287; Burritt et al., 2002, pg. 39-40; Burritt et al., 2019, pg. 480; Schaltegger et al., 2022, pg. 1-2; Amir et al., 2020, pg. 135-136). The information gathered through EMA tools is meant to reduce environmental and operational costs, thus providing an opportunity to integrate the environmental dimension into decision-making (Burritt et al., 2002, pg. 41).

The Environmental Management Accounting (EMA) framework serves as the foundational basis for this thesis (Burritt et al., 2002). Corporate Sustainability Management Accounting (SMA) is an alternative to EMA, but the EMA framework is much more extensive and the theories are very similar (Schaltegger et al., 2022; Burritt et al., 2002). Therefore, SMA has not been chosen as EMA is a more comprehensive framework. EMA and sustainability reporting are closely

intertwined and can sometimes be used interchangeably. However, there is a distinction between the two. EMA encompasses a broader range of processes, including data identification, collection, and reporting, whereas sustainability reporting specifically refers to the communication of sustainability-related information (Burritt et al., 2002, pg. 40-41; Burritt et al., 2019, pg. 480). While sustainability reporting is a crucial aspect of EMA, it represents only one facet of the broader EMA framework (Burritt et al., 2002, pg. 40-41).

The background for our choice of theme stems from the upcoming implementation of the Corporate Sustainable Reporting Directive (CSRD) and the corresponding European Sustainability Reporting Standards (ESRS) set to be enforced by both the European Commission and the Norwegian government in 2024 (European Commission, 2023; EFRAG, 2022, pg. 3; Tilleggsmandat 21/4280, 2021, pg. 1-3; Prop. 208 LS (2020–2021), 2020, pg. 27; Prop. 66 LS, 2020, pg. 35). The CSRD will replace the Non-Financial Reporting Directive (NFRD), which today comprises social and environmental reporting (COM/2021/189 final, 2021).

It is essential to have knowledge of previous legislation and directives as they form the basis for the CSRD and the ESRS (COM/2021/189 final, 2021; PwC a, 2023). In 2019, the European Union (EU) established a comprehensive framework for promoting sustainable practices by implementing the EU Taxonomy Regulation, which is part of the European Green Deal and Paris Agreement (European Commission, 2020). This regulation serves as a guide for identifying environmentally sustainable economic activities and facilitates the transition towards a low-carbon economy (Prop. 208 LS (2020–2021), 2020, pg. 8; PwC a, 2023). Generally, the taxonomy and laws that are implemented are sector-specific, intending to address the unique challenges and considerations of individual industries (European Commission, 2020; PwC, 2023). EMA will play a central role in making companies able to comply with the CSRD and ESRS regulations since it facilitates the retrieval of the necessary background data on operations and processes needed for compliance (Burritt et al., 2002, pg. 40-41; Burritt et al., 2019, pg. 480).

This thesis is exploratory and explanatory, designed to comprehend the underlying reasons for applying Environmental Management Accounting (EMA), the associated tools, and the necessity of EMA adoption in companies in the construction industry

to improve their sustainability reporting. The objective is to systematically analyze the EMA tools employed and compare them with the frameworks suggested in the literature (Burritt et al., 2002, pg. 41-44). This will be achieved by conducting a multi-case study in which we interview various industry stakeholders to obtain information regarding their current and past use of EMA. The analysis of the interview data will be done by comparing the observed practices with the existing EMA framework to evaluate the level of alignment. Adopting a qualitative approach enhances our understanding of the EMA tools employed in the construction industry, thereby shedding light on a topic that has yet to receive much attention to the best of our knowledge.

In order to better understand the potential impact of new regulations on the industry, EMA in combination with the CSRD presents a good research opportunity. CSRD evaluates the sustainability performance of larger organizations for the benefit of investors, consumers, financial institutions, stakeholders, and others (PwC, 2022; Næringslivets Hovedorganisasjon, 2022; Whetman, 2017, pg. 2; Opferkuch et al., 2021, pg. 4016). This initiative promotes the adoption of a responsible business approach among these companies (Opferkuch et al., 2021, pg. 4016; Næringslivets Hovedorganisasjon, 2022; Burritt et al., 2019, pg. 479). It is widely believed within the business community and by legislators that financial institutions increasingly place emphasis on sustainability reporting, especially CSRD reporting, and may offer favorable loan terms if standards are met (Global Reporting Initiative, 2018, pg. 20-23; Global Sustainable Investment Alliance, 2021, pg. 15; Nordea, 2022; PwC b, 2023). Furthermore, the Norwegian government will likely adopt the same regulations as those developed by the EU, due to factors such as alignment with international standards and compatibility with EU regulations for trade and economic activities, and the Norwegian government has previously implemented the NFRD (EU/2022/2464, 2022; European Union, 2013; Prop. 66 LS, 2020, pg. 35).

Our working hypothesis is that the various actors in the construction industry are likely to have implemented EMA to a certain extent, given the previous legislation aimed at reducing emissions (Plan- og bygningsloven, 2021).

Our preliminary literature review shows that there is some research regarding EMA. However, much research on the topic is from the mid 2000's, with new empirical

studies published in the last 3-4 years. To the best of our knowledge, there are no previous studies on EMA in the construction industry. On the other hand, there is much information on CSRD, EU's taxonomy, the green deal, and green bonds from the regulation and legislation side (EU/2022/2464, 2022; European Commission f, 2023; European Commission d, 2019; European Commission a, 2023).

It is essential for businesses to comply with regulations to maintain operations, as non-compliance may result in fines and unfavorable terms from third parties (Apiday, 2023). The motivation for this research is to acquire a deeper understanding of how EMA and EMA tools are used in the construction industry. By the means of conducting a multi-case study in the respective industry, a practical understanding of how businesses make use of EMA can be established. Additionally, this research aims to explore the theoretical aspects of the subject and compare them to the practices of businesses. Our thesis responds to the following research question:

How are Environmental Management Accounting (EMA) and associated tools used in the Norwegian construction industry?

In conclusion, this master's thesis aims to provide a comprehensive understanding of the use of EMA and associated tools in the Norwegian construction industry and their impact on environmental performance. The anticipated outcome is to elaborate on the Norwegian construction industry's proficiency in sustainability reporting and preparedness for the forthcoming adoption of the CSRD and ESRS.

1.1 THESIS STRUCTURE

The thesis is structured into the six following chapters:

Chapter 1 introduces the research topic, provides an overview of existing literature related to the subject, and identifies the research gap the thesis seeks to fill. It also outlines the thesis research question.

Chapter 2 provides the conceptual framework for the thesis, being split into three main sections introducing relevant theoretical concepts that set up the research. Finally, it explores the policy-driven development of sustainable reporting initiatives

and directives.

Chapter 3 outlines the research design, approach, and process used in the study. The chapter aims to explain how these methods were used to collect and analyze data, and how different techniques were used to strengthen the thesis' authenticity, plausibility, and criticality.

Chapter 4 presents the thesis analysis of the collected data and is split into five sections, to present the findings clearly and concisely.

Chapter 5 outlines a detailed discussion of the results presented in chapter 4, where it explores the empirical findings and relate up against the theoretical concepts, and identifies new findings. The authors also reflects on the significance of the findings and their implications on existing theory.

Chapter 6 aims to present a comprehensive conclusion of the research by summarizing the key findings as they relate to the research questions. Additionally, this chapter will discuss the limitations of the study and opportunities for future research based on the identified findings.

1.2 LITERATURE OVERVIEW

Previous literature has discussed the use of EMA in different types of organizations. Most of the research focuses on what EMA is and the framework, while others seek to look at specific tools for environmental reporting, the gathering of data, and how EMA is used by organizations (Burritt et al., 2019; Burritt et al., 2002; Arjaliès and Mundy, 2013). Other research investigates how stakeholders and other third-party organizations value environmental reporting (Schaltegger et al., 2015; Burritt et al., 2019; Gray and Bebbington, 2001; Global Reporting Initiative, 2018). Some researchers have raised concerns regarding the mandatory implementation of EMA, and the implementation and diffusion of EMA tools (Rogers, 2003; Thakur et al., 2012; Ettlie et al., 1984, Qian et al., 2018).

Burritt et al. (2002) introduces a comprehensive EMA framework, comprising two versions - a fundamental two-dimensional model and a five-dimensional model

that builds upon the former. According to Burritt et al. (2002), the framework is applicable to all EMA tools. The presented framework is the basis of the thesis and is used as the definition of EMA and associated tools. The framework created by Burritt et al. (2002) was chosen due to its prominence in EMA literature and its robustness, as well as its alignment with regulatory standards like CSRD and taxonomy (Burritt, 2004; Burritt et al., 2019; Schaltegger et al., 2015; Schaltegger et al., 2022; Arjaliès and Mundy, 2013; Opferkuch et al., 2021; Lai and Stacchezzini, 2021; Laguir et al., 2018). Additionally, the framework covers potential research areas, further strengthening its suitability for this study (Burritt, 2004, pg. 29). The article explains in depth how the framework applies and how to utilize it (Burritt et al., 2002, pg. 41-44). Furthermore, Burritt et al. (2002) emphasize that EMA surpasses traditional management accounting due to its holistic approach, encompassing financial and non-financial reporting aspects.

The present thesis undertakes an investigation into the dual dimensions of introducing and propagating novel methods/techniques within organizational settings. Against the background of our empirical study, a gradual approach of incremental adoption of EMA tools is essential to enable experimentation and enhance comprehension of the new tools/methods/techniques. This process ensures that the tools are adequately customized to the specific operational dynamics of the organization (Burritt et al., 2019, pg. 481-482; Qian et al., 2018, pg. 1616-1617). Furthermore, the article also deliberates on the complications associated with radical innovation.

This thesis looks at EMA implementation from two perspectives; outside-in (how the government imposes regulations on Norwegian construction organizations) and inside-out (how the construction organizations respond internally in order to adhere to the reporting regulations).

2 CONCEPTUAL BACKGROUND

This chapter presents the theoretical scope of this thesis, focusing on key concepts within the field of EMA. Section 2.1 provides an understanding of the key sustainable initiatives, while section 2.2 presents an overview of conceptual developments the thesis is based around. Lastly, section 2.3 offers insight into policy-driven developments related to green accounting.

2.1 KEY SUSTAINABILITY INITIATIVES

2.1.1 The Paris Agreement

The Paris Agreement is an international commitment by nations worldwide with the aim of reducing Greenhouse Gas Emmisions (GHG) (European Commission a, 2023; Arnslett, 2015). The agreement's overall goal is to limit the rise of the earth's temperature to below 2 degrees Celsius, with a further ambition to limit the temperature rise to 1,5 degrees Celsius (ibid.). The agreement was first embraced on December 12, 2015, at the Conference of the United Nations Climate Change, also recognized at the COP21 conference (ibid.). 197 countries have entered the agreement with the intention to minimize the carbon footprint (Lee et al., 2023, pg. 1-2; Liu et al., 2020, pg. 1). In order to achieve these goals, a reduction of fossil fuel usage, and extensive investments in renewable energy and technology are crucial in order to achieve the intentions of the agreement (ibid.). The original target for GHG emission reduction by 2030 has been set at 40%; however, in December 2015, the EU and its member states presented a revised target, which aimed to elevate the net domestic reduction to a minimum of 55% in GHG emissions relative to the 1990 GHG emissions (European Commission a, 2023).

The contractual framework established for the member states committed to the Paris

Agreement requires participants to report on the development of their own Nationally Determined Contributions (NDC), which serve as an outline and means of conveying their climate actions implemented post-2020 (United Nations Framework Convention on Climate Change (UNFCCC a), 2023; European Commission a, 2023). The Paris Agreement, Article 4 - paragraph 2, describes how each country is expected to prepare, communicate, and update their NDCs at least every five years, with the ultimate objective of achieving both their individual targets and the shared objectives outlined in the agreement (ibid.).

One of the primary objectives of the Paris Agreement is to combat the adverse effects of climate change, with a particular emphasis on supporting vulnerable nations and communities (United Nations Framework Convention on Climate Change (UNFCCC b), 2023). To this end, the Adaptation Fund, which was initially created in 2001, has been set up to facilitate the provision of support, including financial assistance, technology transfer, and subsidies for adaptation efforts, among others (ibid.).

As for Norway, significant commitments to follow the Paris Agreement have been decided, in order to reduce its GHG emissions (Norwegian Industry of Climate and Environment, 2019). Norway has set a national target of reducing GHG and general emissions by at least 40% within 2030 compared to set 1990 levels, and become a low-emission state by 2050 (ibid.). To make this happen, Norway is working together with Iceland and the EU to reach its targets under the Paris Agreement (ibid.). Further, the Norwegian Parliament has formalized the Climate Change Act, which is the establishment for 2030 and 2050 targets (ibid.). This was extended by the EU and Iceland at the Land use and forestry regulations (LULUCF-regulation) into Protocol 31 of the European Economic Area (EEA) agreement in 2019 (ibid.). Additionally, Norway is committed to supporting research, development and innovation of technologies directed towards climate change and finding both zero- and low-emissions solutions. Overall it shows that Norway is fully committed to fulfilling their agreed emission targets in the Paris Agreement (ibid.).

2.1.2 The UN's Sustainable Development Goals (SDG)

The Sustainable Development Goals (SDG) is a set of 17 goals (Figure 2.1) established by the United Nations in 2015 to end poverty, protect the environment, and ensure peace and prosperity for all (United Nations Development Programme, 2023). Among the issues covered by these goals are poverty, hunger, health, education, gender equality, clean water, and access to energy (ibid.). The SDGs are designed as a blueprint for achieving a sustainable future for all (ibid.). They are intended to be integrated and indivisible, meaning progress in one area will depend on progress in another (ibid.). Additionally, the SDGs are meant to be inclusive so everyone can benefit, regardless of where they reside or their economic status (ibid.).

Figure 2.1. The United Nations Sustainable Development Goals. Obtained from Norwegian Government (2016).

2.1.3 European Green Deal (EGD)

The European Green Deal (EGD) is a plan and growth strategy implemented by the EU to achieve the transition to a sustainable economy by turning the climate and environmental degradation into an opportunity for economic growth and social progress (European Commission d, 2019). The strategy is long-term and aims to

reduce the world's GHG emissions and increase the use of renewable energy sources, while also phasing out unclean energy sources such as fossil fuels (ibid.).

Its target and aim is to achieve a transformation of the EU in order to become a carbon-neutral continent by 2050 (European Commission d, 2019). To achieve these measures, EU must invest heavily in Research & Development (R&D), give substantial financial support to businesses, and create new jobs in the clean energy and general environmental sectors (ibid.). A wide range of areas are covered within EGD, such as transport, energy, circular economy, and agriculture (ibid.).

2.1.4 Sustainable Finance Action Plan

In March 2018, the European Commission introduced The Sustainable Finance Action Plan (SFAP) (COM/2018/097_final, 2018, pg. 1; D. Busch et al., 2021, pg. 3). This initiative is considered an ambitious policy initiative with the objective of reorienting the financial system toward more sustainable and responsible practices (ibid.). A strong focus on climate change is emphasized in the Paris Agreement and the United Nations (UN) 2030 agenda for sustainable development (COM/2018/097_final, 2018, pg. 1). Given the central role played by the financial system in this regard, the action plan was developed to provide context for future solutions toward establishing a green and sustainable economy (ibid.). A number of areas of sustainable finance were discussed in the report, including: (1) improving our contribution to sustainable and inclusive growth for societies in need of long-term financing; and (2) strengthening the financial position and stability by incorporating Environmental, Social & Governance (ESG) into general decision-making processes (COM/2018/097_final, 2018, pg. 1; D. Busch et al., 2021, pg. 20-21). In order to achieve benefits for the planet and society as a whole, the overall action plan for sustainable finance addresses the specific needs of both the European and global economies. In particular, the action plan's main target is to make (1) a re-direction of capital flows towards sustainable investments to achieve sustainable and inclusive growth; (2) maintain a management system for financial risks associated with climate change, resource depletion, environmental degradation, and social issues and; (3) make sure that all financial and economic activities are transparent and long-term oriented (COM/2018/097_final, 2018, pg. 2; D. Busch

et al., 2021, pg. 21-22).

The goals of EGD will only be achieved with increased investment (European Commission d, 2019). It was estimated in 2019 that to achieve the 2030 climate and energy targets, the annual investment needs to be increased by €260 billion (ibid.). The SFAP further strengthens the need for the CSRD in regards to the need for more information to ensure transparency and comparability to strengthen the bond between corporations and the general society (COM/2021/189 final, 2021). This is done by holding companies accountable for their impact on the world around them (ibid.).

2.2 CONCEPTUAL DEVELOPMENT

2.2.1 Management Accounting & Control Systems (MACS)

MA is a field of study that focuses on the measurement and reporting of financial and non-financial information that is intended to assist managers in achieving the strategic goals of the organization (Bhimani et al., 2019, pg. 3-5). The primary objective of MA is to enhance the process of value creation within organizations in both the public and private sectors (ibid., pg. 5-6). Unlike Financial Accounting (FA), MA has a holistic- and strategic approach by integrating both financial and non-financial information to provide a more comprehensive understanding of the organization's performance. Thus, giving decision-makers more information to make the best decisions (ibid., pg. 3-7).

Management Accounting & Control (MAC) encompasses a range of methodologies and techniques, such as budgeting, performance measurement, and strategic management control, among others (Bhimani et al., 2019, pg. 3-15). These techniques can be used to plan, evaluate and control the performance of different activities, processes, products, and services (ibid., pg. 8-13). Management accountants have an increasingly significant impact on the production processes and examination of strategic financial management information, and on the formulation and execution of strategic management actions (ibid., pg. 6).

Management Accounting & Control Systems (MACS) is closely related to the concepts of Management Control (MC) and Management Control Systems (MCS). MC encompasses a broad range of systems and techniques utilized by managers to ensure that the actions and choices of their subordinates align with the overarching objectives and strategies of the organization (Anthony et al., 2014, pg.4). MCS refer to a set of formal and informal processes and structures used by managers to plan, evaluate and control their operations (Laguir et al., 2018, pg. 532; Chenhall, 2003, pg. 130-132). MCS can be defined as "systems, rules, practices, values and other activities management put in place in order to direct employee behavior" (Malmi and Brown, 2008, pg. 290)

MCSs are divided into formal and informal controls (Laguir et al., 2018, pg. 532; Chenhall, 2003, pg. 129). Formal controls refer to the systematic and deliberate implementation of practices, regulations, and procedures, accompanied by performance assessment mechanisms, reward systems, and budgeting processes, aimed at regulating and achieving desired outcomes through the use of feedback and feed-forward loops (ibid.). Informal controls refer to the systems that cultivate an organizational culture through shared values, beliefs, and traditions that guide the behavior of group members (ibid.). While informal control systems may not be as visibly apparent, they can be perceived to be equally effective as formal control systems (Laguir et al., 2018, pg. 532; Chenhall, 2003, pg. 131). It is widely acknowledged that organizations play a crucial role in promoting socially responsible behavior (Laguir et al., 2018, pg. 532). As such, the manner in which managers utilizes MCS can be a significant factor in facilitating the alignment of corporate practices with the CSRD policies (ibid.). It is generally understood that both informal and formal MCSs serve the purpose of exerting pressure on employees to align their actions with the organization's strategic objectives (Laguir et al., 2018, pg. 535; Malmi and Brown, 2008, pg. 290). Additionally, these systems assist in efficiently allocating and utilizing organizational resources (Laguir et al., 2018, pg. 535). It was found that MCSs raises the overall awareness of EMA and unites employees around shared values and goals (Arjaliès and Mundy, 2013, pg. 290). MCSs are essential for the selection, organizational practice, and management of EMA indicators (ibid., pg. 297). The interactive use of MCS enhances the perception of potential opportunities by providing increased visibility into

organizational processes and performance. This can aid in identifying areas for improvement and potential growth (ibid., pg. 298).

Companies have also begun integrating risk management with EMA and MCSs in order to mitigate potential legal action and fines (Arjaliès and Mundy, 2013, pg. 297). The integration is also prompted by risks related to customer health and safety (ibid.). It is crucial for organizations to prevent quality issues, which can result in additional expenses or the need for product recalls, thereby endangering their brand image (ibid.). Managers who are engaged in addressing environmental issues can utilize risk management strategies as a means to initiate changes that promote sustainability (ibid.). This approach allows for the identification and assessment of potential environmental risks, as well as the implementation of mitigation measures to address these risks and contribute to the overall sustainable development of the organization (ibid.).

The utilization of MA and the associated reports generated are primarily intended for internal use and are not subject to external regulatory oversight regarding their preparation (Bhimani et al., 2019, pg. 3-6). Frequency of production of MA reports may vary, with intervals ranging from hourly to weekly (ibid.). The determination of the reporting interval is contingent upon the specific requirements for control and the needs of the decision-makers (ibid). Unlike FA reports, MA reports include information about both past and future performance (ibid.).

2.2.2 Environmental Management Accounting (EMA)

Environmental Management Accounting (EMA) is an approach to accounting that helps organizations identify, measure, and manage their environmental impacts, costs, and benefits (Burritt et al., 2019, pg. 480). EMA consists of a variety of accounting tools and practices designed to enhance economic performance and reduce environmental impact (Burritt et al., 2019, pg. 480; International Federation of Accountants, 2005). International Federation of Accountants (2005) defines EMA as "The management of environmental and economic performance through the development and implementation of appropriate environmental-related accounting systems and practices". As opposed to conventional accounting, environmental

accounting provides information about the environmental impact of a company's activities (Burritt et al., 2019, pg. 480).

There are two fundamentally different definitions of EMA in literature (Burritt et al., 2002, pg.39). The first approach is to represent EMA through internal environmental accounting based on a monetary scale (ibid.). A second approach to EMA is that it incorporates both monetary and non-monetary approaches to internal accounting, reflecting a broader definition (ibid.). The environmental impacts of company activities can be divided into two types: Environmentally related impacts on the economic situation of companies, and company-related impacts on environmental systems, also referred to as double materiality (See Subsection 2.3.4) (Burritt et al., 2002, pg. 41; EU/2022/2464, 2022; COM/2021/189 final, 2021)

This information is further classified into monetary and physical environmental information to further separate these two activities (Burritt et al., 2002, pg. 41). The monetary environmental information reflects the environmental impact on economic systems and addresses all corporation-related impacts on the current and future financial stocks and flows of that corporation (ibid). The information is expressed in monetary units (e.g., expenditures on improving production, and fines for violating environmental laws) (ibid.). Physical environmental information is related to corporate activities on the environment (ibid.). All past, present, and future material and energy amounts affecting ecological systems are included in the information (ibid.). This information is expressed in physical units such as kilograms, kilowatt hours, and cubic meters (ibid.).

Another significant aspect of EMA is the examination of the value-chain, specifically scope 1,2 and 3 (see 2.3.4). The level of examination varies depending on the specific activities of a company; therefore there are variations in the extent to which organizations will investigate it. This analysis is conducted to ensure sustainability throughout the value-chain, and to ensure that e.g. suppliers are also aligned with the organization's goals (Arjaliès and Mundy, 2013, pg. 293-297). In their study, Arjaliès and Mundy (2013) discovered that most of the companies investigated suppliers using questionnaires, with some supplementing this method with additional audits.

EMA framework

When monetary and physical environmental accounting are combined, they constitute both environmental accounting and the basis for environmental management accounting (Burritt et al., 2002, pg. 41). It suggests EMA consists of both Monetary Environment Management Accounting (MEMA) and Physical Environmental Management Accounting (PEMA) (ibid.). A two-dimensional framework is presented for these EMA systems: the external and the internal, and the monetary and the physical (Fig. 2.2) (ibid.).

Because EMA is a relatively new and unexplored field and is not widely used, the framework aims to standardize the terms used to describe EMA (Burritt et al., 2002, pg. 41-42; Burritt et al., 2019, pg. 480). The framework was created for three reasons (Burritt et al., 2002, pg. 41-42):

- Creating a common understanding and facilitating communication.
- In order to meet the needs of management and other stakeholders, internal accounting and external accounting differ in the levels of detail and aggregation of information.
- In addition, different types of managers rely on and are assessed on a variety of information, whether it's physical, monetary, or both.

In order to make a comprehensive framework, Burritt et al. (2002) propose three additional dimensions in addition to MEMA and PEMA: (1) Time frame (past, present, future); (2) length of time frame (the duration of the period being addressed by the tool) and; (3) routines of information (ad hoc vs routine gathering of information). The classification scheme within the five dimensions can be used to assign any specific EMA accounting tool (Fig 2.3) (Burritt et al., 2002, pg. 43).

Time frame

In order to attach meaning to the data produced by accounting tools, accounting systems and the associated tools of analysis can be arranged into systems that look to the past and systems that look to the future (Burritt et al., 2002, pg. 43). The

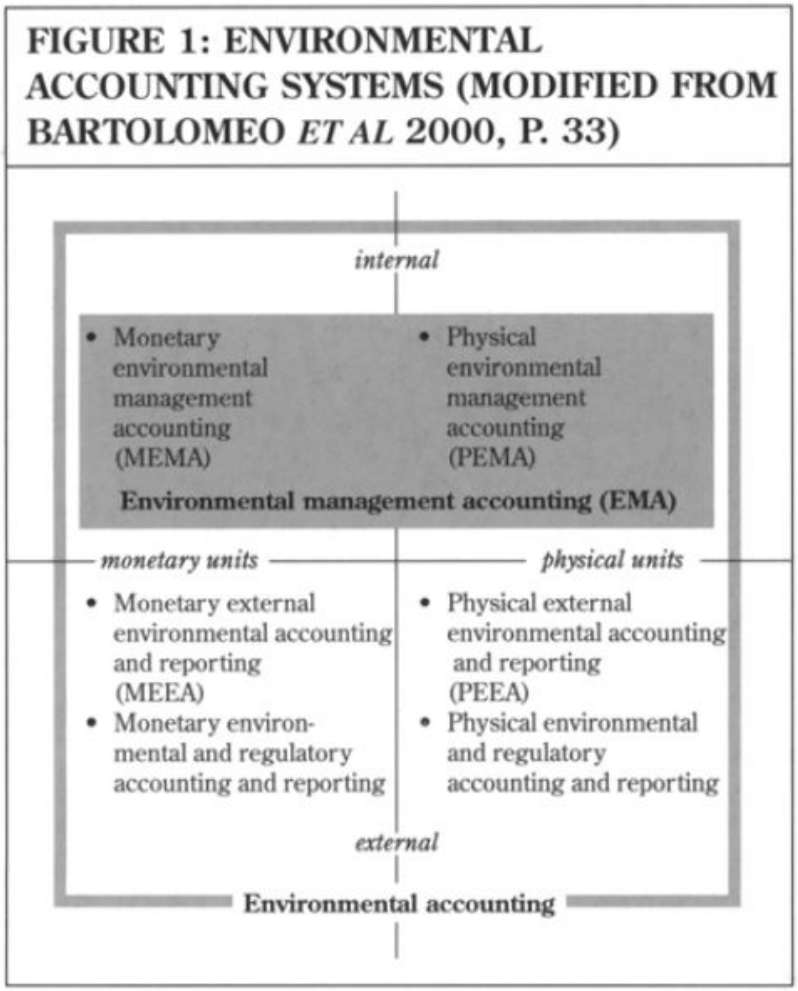

Figure 2.2. 2D EMA framework - External vs. Internal & Monetary vs. Physical (Burritt et al., 2002, pg. 41).

distinction between MEMA and PEMA tools used by management to tackle environmental issues is presented in Figure 2.3 through the heading rows of "Past Oriented" and "Future Oriented." These tools concentrate on either measuring the historical transactions, transformations, or events concerning the environment or predicting the potential impact of future transactions, transformations, or events (ibid.). For instance, Environmental Cost Accounting (Box 1), provides regular, short-term information on the monetary environmental impact of activities, products, divisions, departments, and the overall economic entity, while Monetary Environmental Operating Budgeting (Box 5), projects this information into the near

future for planing and control purposes (ibid.).

Length of time frame

Management is often criticized for putting financial markets and shareholders' interests first, which is short-term; whereas environmental issues are generally considered long term (Burritt et al., 2002, pg. 43-44). The MEMA and PEMA tools available to management for addressing environmental concerns are differentiated in Figure 2.3 through the columns labeled "Short-Term Focus" and "Long-Term Focus." The duration of the time frame relevant to the discretion available to different management levels is emphasized through the distinction between the length of planning periods and the extent of control over physical actions (ibid.). For instance, the short-run operational budgeting expressed in monetary terms (box 5) contrasts with the long-run financial planning (box 6) in terms of the duration of planning periods (ibid.). Similarly, the brief span of control over tactical operational decisions in Physical Environmental Budgeting (box 13) is contrasted with the extended span of control over strategic situations involving long-term physical environmental planning (box 14) (ibid.).

Routineness of information gathering

There are two types of information, routinely generated and ad hoc, both of which can be considered as part of internal management decision-making and internal accountability (Burritt et al., 2002, pg. 44). The distinction between the available MEMA and PEMA tools utilized by management to address environmental concerns on a recurring or non-recurring basis is presented in Figure 2.3 through the heading rows of "Ad Hoc Information" and "Routinely Generated Information." For instance, PEMA information on Life Cycle Inventories (box 12) is procured only when required for performing life cycle assessments of new products (ibid.). On the other hand, the PEMA tool of Environmental Capital Impact Accounting (box 10) provides regularly generated information on the corporate impacts on natural capital, such as the maintenance, improvement, or depletion of critical and non-critical environmental capital (ibid.).

As a result of the EMA framework, various EMA tools are classified according to the decision-making situation associated with each tool (Burritt et al., 2002, pg. 44-49). Examples of these EMA tools include environmental investment appraisal,

FIGURE 2: PROPOSED COMPREHENSIVE FRAMEWORK OF ENVIRONMENTAL MANAGEMENT ACCOUNTING (ACCORDING TO SCHALTEGGER, HAHN AND BURRITT 2000)

		Environmental Management Accounting (EMA)			
		Monetary Environmental Management Accounting (MEMA)		Physical Environmental Management Accounting (PEMA)	
		Short Term Focus	Long Term Focus	Short Term Focus	Long Term Focus
Past Oriented	Routinely generated information	1. Environmental cost accounting (eg. variable costing, absorption costing, and activity based costing)	2. Environmentally induced capital expenditure and revenues	9. Material and energy flow accounting (short term impacts on the environment – product, site, division and company levels)	10. Environmental (or natural) capital impact accounting
	Ad hoc information	3. Ex post assessment of relevant environmental costing decisions	4. Environmental life cycle (and target) costing Post investment assessment of individual projects	11. Ex post assessment of short term environmental impacts (eg. of a site product)	12. Life cycle inventories Post investment assessment of physical environmental investment appraisal
Future Oriented	Routinely generated information	5. Monetary environmental operational budgeting (flows) Monetary environmental capital budgeting (stocks)	6. Environmental long term financial planning	13. Physical environmental budgeting (flows and stocks) (eg. material and energy flow activity based budgeting)	14. Long term physical environmental planning
	Ad hoc information	7. Relevant environmental costing (eg. special orders, product mix with capacity contraint)	8. Monetary environmental project investment appraisal Environmental life cycle budgeting and target pricing	15. Relevant environmental impacts (eg given short run constraints on activities)	16. Physical environmental investment appraisal Life cycle analysis of specific project

Figure 2.3. 5D EMA framework - External vs. Internal, Monetary vs. Physical, Past vs. Future, Short- vs. Long-term, & Routinely generated vs. Ad hoc (Burritt et al., 2002, pg. 43).

environmental cost accounting, and life cycle costing (ibid.). When managers and other decision-makers adapt the framework to their concerns and goals, they are able to choose the most effective tool (ibid.).

Monetary Environmental Management Accounting (MEMA)

The purpose of monetary environmental management accounting is to generate information for internal management purposes related to the environmental impacts of corporate activities expressed in monetary units (Burritt et al., 2002, pg. 41). Methodologically, MEMA is an expansion and variation of traditional MA for environmental aspects of company activities (ibid.). In addition to providing the basis for most internal management decisions, it addresses the issue of tracking, tracing, and handling the costs and revenues arising from a company's environmental impact (ibid.). MEMA facilitates strategic and operational planning, which is also an important tool for setting targets and achieving desired goals, as well as acting as a control and accountability device (ibid.).

Physical Environmental Management Accounting (PEMA)

Similarly, the role of Physical Environmental Management Accounting is also to provide valuable information for internal decision-making (Burritt et al., 2002, pg. 41). Contrary to MEMA, PEMA concentrates on the ecological impact of a company and is expressed in physical units, such as kilograms or cubic meters (ibid.). The primary objective of PEMA tools is to gather environmental impact data in physical units for internal management purposes (ibid.). Burritt et al. (2002) state that "PEMA as an internal environmental accounting approach serves as:"

- An analytical tool designed to detect ecological strengths and weaknesses.
- A decision-support technique concerned with highlighting relative environmental quality.
- A measurement tool that is an integral part of other environmental measures such as eco-efficiency.
- A tool for detect and indirect control of environmental consequences.
- An accountability tool providing a neutral and transparent base for internal and, indirectly, external communication.

- A tool with a close and complementary fit to the set of tools being developed to help promote ecologically sustainable development.

Implementation and diffusion of EMA

Burritt et al. (2019) argues that EMA could be classified as an innovation. Innovating can be defined as bringing a new idea to the organization (Bolton, 1993, pg. 57). Furthermore, EMA can be classified as a form of MA that combines the concepts and methods of conventional MA with the objective of improving resource efficiency ((Burritt et al., 2019, pg. 479). Since it is associated with brand-new administrative procedures and organizational policies and structures, EMA is considered an innovative concept (ibid., pg. 481). A successful adoption and implementation of innovations are likely to depend on five factors (Rogers, 2003, pg. 15-16):

- Relative advantage over existing practice.
- Compatability with existing values, experience and needs of the potential adopter.
- Overall complexity.
- Observability, or the degree to which the results can be observed and communicated.
- Triability, meaning the extent to which potential adopters can experiment with the innovation on a basic level.

According to Thakur et al. (2012), one should begin by implementing innovations in a single department or area of operations before expanding the implementation to other departments. It suggests that managers should start with a few EMA tools in order to gain knowledge before implementing other tools (Burritt et al., 2019, pg. 486). Empirical studies indicate that different types of sustainability information are important to different business functions and managers (Schaltegger et al., 2015, pg. 328-329 ; Burritt et al., 2019, pg. 486). While some managers prefer to receive regular updates, while others rely on EMA-tools to make ad-hoc decisions (Burritt

et al., 2019, pg. 486). Thus, Burritt et al. (2019), argue that in order to establish EMA in an organization, conceptual aspects and management functions may need to be improved. In the event that a company is serious about its environmental impact, it is critical that environmental issues are incorporated into its financial systems, performance evaluation system, incentive program, and reward system (Burritt, 2004, pg. 26, Gray and Bebbington, 2001, pg. 59). Diffusion occurs as a result of experimentation by different managers over a period of time, as they gain experience, build confidence, and manage risks (Burritt et al., 2019, pg. 481).

Benefits and challenges of implementation and diffusion

The benefits of embracing innovation can increase over time through experimentation (Thomke, 2001; Qian et al., 2018, pg. 1616-1617). This approach allows for the exploration of trial situations in which compatibility with existing systems can be evaluated, and the relative advantages of new tools can be assessed (Burritt et al., 2019, pg. 482). Empirical research shows that if an organization has some form of EMA already implemented, further implementation is perceived as predictable and manageable (ibid., pg. 483). As a result of competitive pressure from larger corporations wanting to reduce potential environmental risks, third parties perceive voluntary disclosure of sustainability information as desirable (ibid., pg. 484). As a result of EMA implementation and the associated tools, cost reduction can also be achieved in order to obtain economic benefits (ibid., pg. 485). The diffusion of EMA has been found to provide organizational advantages over existing accounting, and the implementation is cost-effective, allows for early savings, and requires little initial investment (ibid., pg. 487). However, these advantages were only observed in hierarchically structured companies in which the owners or top management were responsible for strategic decisions (ibid., pg. 487)

EMA applications are highly case-specific, making it difficult to set up a "standardized" implementation approach (Burritt et al., 2019, pg. 489). Companies encounter various environmental challenges specific to their location, industry, and field of operation, and can change over time (ibid., pg. 481). Because managers and owners have limited cognitive capacity, it is necessary to break down EMA and the tools into small, convenient, experimentational steps in order to avoid overwhelming problems such as implementation (Weick, 1984, pg. 45; Burritt et al., 2019, pg. 482). The need for established standardized reporting principles and procedures for

publishing progress makes implementation of EMA tools problematic (Opferkuch et al., 2021, pg. 4015).

Benefits and Challenges with EMA

It has become increasingly evident in EMA literature that the usefulness of EMA and the tools goes beyond approaches to managing eco-efficiency (Burritt et al., 2019, pg. 481). Research has recognized the potential utility of various tools and the potential benefits of utilizing combinations of these EMA tools (ibid.). Performance can be improved in the future by improving the management of environmental information internally (ibid., pg. 482). EMA aims to enhance management's understanding of the impact of environmental factors on economic performance, whether it is positive or negative (Burritt et al., 2002, pg. 42). According to one study, firms that disclose information about their social performance received higher returns than firms that do not disclose information (Anderson and Frankle, 1980).

Another study observed a substantial temporary increase in stock prices for companies listed on stock exchanges following the release of pollution control expenditures reports (Belkaoui, 1976, pg. 30). In addition, companies that participate in EMA and ESG were less likely to face agency issues (Ferrell et al., 2016, pg. 585). EMA provides a vital competitive edge because EMA and MCSs are essential to drive internal change and direct attention to innovation and communication (Arjaliès and Mundy, 2013, pg. 290). The combination of EMA and MCS is key to uniting employees around a common goal and helping drive the company in the direction they want (ibid.). In addition to facilitating internal change, the implementation of EMA and MCSs also assists organizations in adhering to statutory and legal frameworks, and satisfying stakeholders' expectations (ibid.). Furthermore, the use of EMA can provide the opportunity to enhance the organization's image in the eyes of stakeholders and external parties (ibid.). The impending implementation of CSRD and ESRS highlights the significance of EMA as a fundamental requirement for conducting business with other organizations. Therefore, regardless of the initial motivations that drive organizations to engage in EMA practices, facilitating the transformation of business processes and strategic renewal is crucial to meet the reporting standards (Arjaliès and Mundy, 2013, pg. 297).

Although EMA is considered a helpful tool, several challenges exist associated with its usage (Burritt, 2004, pg. 19-26; Burritt et al., 2019, pg. 481). A thorough analysis of the paths through which EMA tools have evolved over time has not been conducted previously, and a familiarity with these dynamics needs to be improved (Burritt et al., 2019, pg. 481). Another issue that has been addressed is the characterization of EMA as a voluntary management tool intended to aid decision-makers, or as a means of implementing government policy (Burritt, 2004, pg. 26). Sustainability reporting has not been directly linked to higher financial performance in firms that engage in it (Whetman, 2017, pg. 7).

There are also some challenges associated with EMA and costing (Burritt, 2004, pg. 27). A single input cannot be divided into two outputs based on theoretical justification (e.g. The calculation of transportation cost per unit of output can only be approximated through the application of an arbitrary rule of thumb) (ibid.). It has been proposed that cost allocations can serve as a surrogate for the difficult-to-measure opportunity costs, in order to incentivize managers (Zimmerman, 1979, pg. 519). Accurately identifying indirect and traceable environmental costs is problematic and could lead to confusion unless the management objective is clear and transparent (Burritt, 2004, pg. 27). It has been observed that when environmental costs are substantial, the practice of allocating these costs through a general absorption rate across all production processes leads to an underestimation and cross-subsidization of production processes that have a relatively higher environmental impact (ibid.). To reduce this effect and thereby reduce the sale of polluted goods, a possible solution is to revise cost allocation procedures (ibid.).

There is also the possibility of misalignment between management and shareholders (Whetman, 2017, pg. 5). In order to maximize shareholder value, managers are expected to act in accordance with shareholder interests (e.g., to increase share value), which may make it difficult for them to act environmentally and socially responsible (ibid.).

Stakeholders

The stakeholders of corporations are exerting growing pressure on companies to mitigate the environmental impact of their operations (Burritt et al., 2002, pg. 39).

This pressure is driven by the rising costs associated with environmental degradation, which can manifest in the form of penalties imposed by newly enacted legislation and the increased expenses incurred through investments in environmentally sustainable processes and products as a result of stricter regulatory measures (ibid.). Environmental issues are widely recognized as having long-term implications, yet corporate management is often criticized for prioritizing short-term financial gains over long-term sustainability (ibid., pg. 43-44). This approach is primarily driven by the need to appease financial markets and a specific group of stakeholders - shareholders - rather than considering the long-term ramifications of corporate actions on the environment (ibid., pg. 43-44). External stakeholders (eg. suppliers and clients) which might also need internal information (Burritt, 2004, pg. 25).

There is a need to distinguish between EMA and environmental cost accounting, since the differentiation often leads to the emergence of issues related to internal and external stakeholders that must be considered and addressed (Burritt, 2004, pg. 25). The definition of EMA is found in chapter 2.2.2, while environmental cost accounting is defined as "routinely generated short-term information about the past environmental monetary impacts of activities, products, divisions, departments, and the total economic entity" (Burritt et al., 2002, pg. 43). Thus, it is essential that stakeholders goals align to achieve socially beneficial results (Burritt, 2004, pg. 26). Stakeholders can often be financial institutions which obtain shares in order to influence the organization (Whetman, 2017, pg. 6). They have the potential to exert extreme pressure on management and other stakeholders by threatening with e.g., disposing of shares (ibid.). This can make it hard for management to ensure enough sustainable actions are being taken (ibid.). On the other hand, they can also force organizations into engaging in even more EMA activities (ibid.).

2.2.3 Similarities and differences between MA & EMA

Research has demonstrated that the gathering of both environmental and monetary information is necessary either simultaneously or subsequently during the initial data collection process (Burritt et al., 2019, pg. 489). Additionally, it has been revealed that no companies solely require either monetary or physical information within their EMA implementation strategies (ibid.). This emphasizes the practical

significance of incorporating concepts such as eco-efficiency and resource efficiency into management practices (ibid.). Furthermore, it highlights a potential limitation of conventional MA, which often relies solely on monetary information, and environmental management, which typically focuses only on physical metrics (ibid.). According to Burritt et al. (2002), conventional MA typically does not provide distinct, separate recognition of the environmental impacts of a company. Its primary purpose is to fulfill the information needs of managers for economic decision-making (ibid., pg. 40). However, from a practical perspective, the effectiveness of any accounting system should be evaluated based on its ability to produce valuable information to stakeholders, such as managers, for assessing their objectives (ibid., pg. 40). In this sense, environmental information should be considered an important aspect of this evaluation (ibid., pg. 40). Sustainable development is a normative societal vision that necessitates an expanded scope of EMA to contribute to its realization, unlike MA (Schaltegger et al., 2022, pg. 13). This enlarged scope must consider the influences from and on the external environment, as well as the impacts of the organization within its boundaries (ibid.). This proposition agrees with the transformational requirements identified by the sustainability transition literature (ibid.). The internal scope assumption of conventional MA has been observed to have adverse consequences in relation to sustainability relevant issues (ibid.). In particular, this assumption leads to a lack of adequate information among managers, thus impeding the potential for conventional MA to facilitate broader transformational change, unlike EMA (ibid.). In the context of external communication, MA and EMA reporting primarily emphasizes historical data without necessarily leading to action (ibid., pg. 16). In contrast, while EMA does incorporate historical data, one of its primary objectives is to enable managerial decision-making that facilitates transformative change, while enabling anticipating future data (ibi, pg. 16).

The fundamental distinction between conventional- and environmental accounting systems lies in their approach to identifying, measuring, analyzing, and interpreting information pertaining to the environmental aspects of a company's operations, especially environmental costs (Burritt et al., 2002, pg. 40; Burritt, 2004, pg. 14). While the conventional approach does not clearly differentiate between these elements, the environmental accounting system emphasizes their separate

consideration (Burritt et al., 2002, pg. 40). It is argued that environmental information is crucial and therefore, variations in units of measurement, data quality, and sources of information must be considered when providing purpose-specific information for various managers (ibid.).

There are also various criticisms of the conventional accounting approach (Burritt, 2004, pg. 15-19):

- It is often assumed that potential environmental costs are insignificant in decision-making, despite potential long-term impacts.
- Indirect environmental costs are often grouped with general business overheads, resulting in a lack of transparency and underestimation of overall environmental impact.
- Performance appraisal techniques are often criticized for being overly narrow and short-term, neglecting long-term implications and potential impact, resulting in a lack of alignment with organizational goals and accountability for long-term outcomes.
- Investment appraisal methods commonly exclude environmental considerations, resulting in a lack of transparency in costs and benefits and potential failure to account for long-term sustainability and societal implications in decision-making.
- Lack of attention to the articulation of stocks and flows in decision-making contexts leads to a lack of understanding of underlying dynamics and potential implications, resulting in sub-optimal decision-making and failure to account for long-term sustainability.
- The narrow focus on manufacturing processes neglects important aspects and results in sub-optimal decision-making and a lack of alignment with organizational and societal goals.
- Dominant financial accounting rules often do not capture the full range of costs and benefits, particularly environmental and social considerations.
- Motivational effects.

- Inadequate accounting for externalities.

2.3 POLICY DRIVEN DEVELOPMENT

2.3.1 Global Reporting Initiative (GRI)

The Global Reporting Initiative (GRI), founded in Boston USA 1997, now located in The Netherlands, has developed a seminal system of Sustainability Reporting Guidelines that integrate sustainability considerations within the reporting framework (Bill, 2014, pg. 23; Safdie, 2023b). The GRI is a vast multi-stakeholder network comprising thousands of experts from various countries, who actively participate in the organization's working groups, governance bodies, and contribute to the development of the Reporting Framework (ibid.).

Sustainability Reporting (SR) aims to measure, disclose, and assume accountability to internal and external stakeholders for an organization's performance in achieving sustainable development (Bill, 2014, pg. 23; Ellefsen, 2019). A sustainability report should provide a fair and impartial representation of the reporting organization's sustainability performance, including both positive and negative contributions (ibid.). Such reporting aims to benefit all stakeholders, including the community, suppliers, employees, and other parties with a reasonable interest in the organization's activities (ibid.).

The GRI framework is designed to serve as a widely accepted framework for reporting on an organization's economic, environmental, and social performance (Bill, 2014, pg. 23). It is intended for use by organizations of all sizes, sectors, and locations, and is designed to allow for the practical considerations faced by a diversified selection of organizations, from small enterprises to those with comprehensive and geographically distributed operations (ibid.). The GRI Sustainability Reporting Guidelines provide Reporting Principles, Standard Disclosures, and an Implementation Manual to aid organizations in the preparation of sustainability reports (ibid., pg. 23-24). Bill (2014) defines the GRI principles and guidelines as the following:

Table 2.1. GRI principles and guidelines by (Bill, 2014, pg. 24-25).

Objective	Description
Materiality	Sustainability reports should include topics and indicators reflecting significant impacts and influencing stakeholders' decisions. Materiality, the threshold of importance, should be considered in determining the relevance of information included in the report, taking into account both internal and external factors.
Stakeholder inclusiveness	The reporting organization should identify and understand its stakeholders, engage in stakeholder engagement processes, and document them in the sustainability report to make it more credible.
Sustainability context	The report should analyze the organization's performance in relation to sustainability, including its impact on economic, environmental, and social conditions and trends. It should also consider the organization's own sustainability and business strategy policies and the relationship between sustainability and organizational strategy.
Completeness	The report should include comprehensive coverage of material topics and indicators, and a clear definition of the report boundary to allow for assessment of the reporting organization's performance in economic, environmental, and social impacts. The completeness of the report should cover the scope of topics, the range of entities, and the time-period of the report.

2.3.2 Non-Financial Reporting Directive (NFRD)

Non-Financial Reporting Directive (NFRD) was introduced by the EU in 2014 as a result of the implementation of directive 2014/95/EU (European Union, 2014, pg. 1). This directive is intended to make certain sized companies report information regarding their Environmental, Social, and Governance (ESG) practices as part of their annual reports (ibid., pg. 5-7). Reporting factors apply to companies with more than 500 employees and a balance sheet of at least €20 million or a net turnover of at least €40 million (ibid., pg. 3). Nearly 12 000 companies throughout the European Union are subject to the NFRD (Safdie, 2023a). The document is intended to serve as a guide with specific criteria that will be published, such as information on the impact, development, performance, and positioning of businesses, and a list of non-financial

disclosures (ibid.). In addition, the report discusses the company's production of carbon dioxide, its impact on the environment and its impact on their employees, their efforts to uphold equality, their commitment to human rights, including their policy and strategies to promote diversity (ibid.). In addition to being non-binding, NFRD guidelines allow companies to decide whether they wish to report (COM/2021/189 final, 2021). Several of these guidelines have been incorporated into the EU's action plan in relation to future financing and sustainable growth in general, as well as the process for reporting these results (European Commission e, 2023).

2.3.3 European Taxonomy

The EU taxonomy is a system for identifying the extent to which a company's activities align with the EU's six climate objectives (European Commission f, 2023). As part of the initiative, it was created with the intention of providing a common language and a standardized method for assessing the environmental sustainability of investments, commodities, and services (ibid.). The taxonomy is an essential component of the EU's Sustainable Finance Action Plan and the CSRD, including The Sustainable Finance Disclosure Regulation (SFDR) (Tanskanen, 2021; European Commission f, 2023). The SFDR, which took effect in 2021, requires that financial institutions determine whether the projects they fund are taxonomy eligible (ibid.). It is anticipated that it will have a broader impact on companies' financing activities (ibid.). Currently, the taxonomy system only covers two of the EU's climate targets, which is a novel approach to classifying economic activities (ibid.). For the remaining objectives, the EU intends to establish technical criteria (ibid.). The taxonomy regulation currently applies only to large, publicly traded companies (ibid.). However, it is expected to affect all business activities in the future in conjunction with the implementation of the CSRD (ibid.). EU Taxonomy identifies the proportion of a company's activities that are aligned with the EU's environmental objectives, which are (1) Climate change mitigation; (2) Climate change adaptation; (3) The sustainable use and protection of water and marine resources; (4) The transition to a Circular Economy (CE); (5) Pollution prevention and control, and; (6) The protection and restoration of biodiversity and ecosystems (ibid.).

By utilizing a taxonomy classification system, a company can enhance its

transparency as stakeholders increasingly demand sustainable business practices (Tanskanen, 2021; European Commission f, 2023). In particular, investors and financiers may be interested in this information since a company's alignment with taxonomy will likely influence its funding decisions (ibid.). In the future, the ability of a company to secure funding and continue operations may be dependent on its compliance with taxonomy eligibility (ibid.).

2.3.4 Corporate Sustainability Reporting Directive (CSRD)

In November 2022, the EU Commission adopted the Corporate Sustainability Reporting Directive (CSRD) as part of its commitment to the European Green Deal (EGD) (EFRAG, 2022, pg. 3; KPMG, 2023; PwC b, 2023). The CSRD will rectify the current NFRD and considerably increase the reporting requirements for companies within its purview, with the goal of increasing the availability of sustainability information for stakeholders (EFRAG, 2022, pg. 11; EU/2022/2464, 2022; KPMG, 2023; PwC, 2022). The directive has established regulations regarding the entities that are obligated to report, the timing of the reporting requirement, and the entities authorized to certify sustainability information (EU/2022/2464, 2022; PwC, 2022). In light of the political indications that have been observed thus far, it is reasonable to anticipate that Norway will align with the EU directive in terms of the entities obligated to report, as well as the implementation schedule (Tilleggsmandat 21/4280, 2021, pg. 1-3; Prop. 208 LS (2020–2021), 2020, pg. 27; Prop. 66 LS, 2020, pg. 35; PwC, 2022). The implementation of the CSRD necessitates an expansion of the existing §3-3c of the Norwegian Accounting Act (Prop. 66 LS, 2020, pg. 31-38; Prop. 208 LS (2020–2021), 2020, pg. 33; PwC, 2022). However, in compliance with the CSRD, the sustainability information must be included in the annual report (ibid.).

In addition, the proposed directive will significantly broaden the number of companies subject to EU sustainability reporting requirements (Prop. 208 LS (2020–2021), 2020, pg. 17; KPMG, 2023). Presently, the NFRD, which governs the reporting of sustainability information, applies to approximately 11,700 companies and groups across the EU (Prop. 208 LS (2020–2021), 2020, pg. 17; KPMG, 2023, PwC b, 2023). The implementation of the CSRD is expected to expand this number

to approximately 49,000 companies (ibid.).

The CSRD adheres closely to the SFDR regulations and incorporates the use of the EU Taxonomy (EFRAG, 2022, pg. 11; KPMG, 2023). In addition to the CSRD, the implementation of ESRS is also being undertaken (EFRAG, 2022, pg. 3; PwC, 2022). The ESRS are comprehensive in nature, and they are applicable to all organizations that fall within the scope of the CSRD (EFRAG, 2022, pg. 11; PwC, 2022). The objective of the ESRS is to enhance the CSRD by minimizing variations in the implementation of the framework and ensuring consistency in the attainment of its goals (EFRAG, 2022, pg. 8; PwC a, 2023). The initial set of standards comprises of two standards that provide general reporting principles (ESRS 1 and 2), as well as ten standards that establish standardized reporting requirements within the three ESG themes (PwC a, 2023). The CSRD requires all entities subject to it to make their reports and strategic plans available electronically (European Union, 2013, pg. 32; KPMG, 2023). Under the new directive, companies must take the following five actions in Table 2.2 (KPMG, 2023):

Table 2.2. CSRD actions (KPMG, 2023).

Actions	**Background**
1. Reporting based on the double materiality approach	The most noteworthy alteration concerning existing legislation is the implementation of the double materiality approach, requiring companies to report on both their impact on traditional materiality, such as their business' impact on sustainability issues, and the risks they face as a result of factors such as climate change or scarcity of raw materials.
2. Creating long-term goals and guidelines for ESG issues	The Corporate Sustainability Reporting Directive CSRD requires companies to set mandatory ESG targets, report progress and integrate sustainability into the companies' vision, strategy, and policies.
3. Due diligence for own operations and supply chain	Corporations are responsible for evaluating and documenting the ramifications of their operations and production methods, as well as those of their supply chain partners. This requirement eliminates companies' ability to conceal unethical practices or environmental degradation.

Table 2.2. CSRD actions (KPMG, 2023).

Actions	Background
4. Transparency on division of roles and responsibilities	The EU's recent directive mandates that corporations clearly identify the internal individuals and departments accountable for ESG objectives, and the progress made towards achieving these goals. Additionally, it is incumbent upon companies to identify any external parties that have a responsibility in the realization of these ESG efforts.
5. Integrated reporting and mandatory external assurance	In addition to adhering to the standards established by the European Commission, corporations are required to integrate their ESG reporting with their sustainable targets and the progress made towards those targets into their annual report. Furthermore, similar to the current procedure for financial performance, an independent auditor must conduct an audit of the data provided.

Challenges connected to the implementation of the CSRD and ESRS

In addition to the difficulties posed by the reporting requirements, several other challenges come with the new mandates (PwC b, 2023). These include challenges related to performance measurement, data collection, access to financing, communication, and the strengthened role of the audit committee in evaluating the effectiveness of internal control related to sustainability reporting (ibit.). Furthermore, there is a wide range of measurement- and reporting frameworks that have been developed globally, and industries are uncertain as to which of the already established Key Performance Indicators (KPI)s the CSRD is going to include (Lai and Stacchezzini, 2021, pg. 417; KPMG, 2023).

Double Materiality

The EU Commission introduced the concept of double materiality within the framework of sustainability reporting (Adams et al., 2021, pg. 5). The significance of this concept cannot be overstated, as it holds crucial implications for the evaluation of various sustainability initiatives and, in particular, the objectives and effects of the CSRD (ibid.). The concept of double materiality posits that materiality can be viewed from two different perspectives; the inside-out and outside-in perspectives (Figure 2.4), or impact materiality and financial materiality (COM/2021/189 final, 2021; Adams et al., 2021, pg. 5). "As corporations are

embedded in the social and natural environment, they are influenced by and have influence beyond organizational boundaries" (Schaltegger et al., 2022, pg. 2). In the context of sustainability reporting, this means that companies must report on both the internal impacts of their sustainability efforts as well as their external impact on society and the environment (EU/2022/2464, 2022; COM/2021/189 final, 2021).

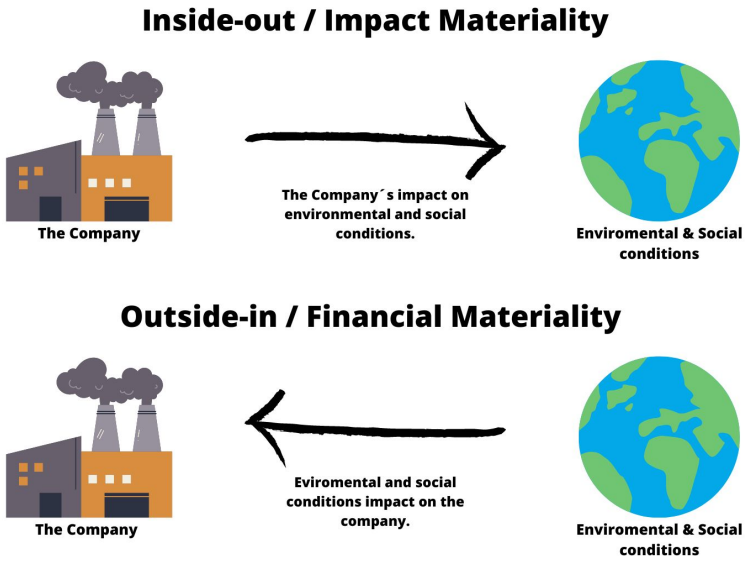

Figure 2.4. Inside-out / Impact Materiality - Impact on the outside world & Outside-in / Financial Materiality - Impact on the inside. Inspired by presentation from Andersen (2023).

The theory of legitimacy is closely related to and provides a basis for the importance of double materiality, since companies want to be perceived as "legitimate" (C. M. Deegan, 2019, pg. 2315). Legitimacy theory is based on political economy theory (ibid.). The theory recognizes that organizations are not isolated entities but exist within a broader social context, mutually affecting and being impacted by the society in which they operate (C. Deegan, 2006, abstract). Organizational legitimization is a critical resource that organizations depend on for survival (C. M. Deegan, 2019, pg. 2315). Legitimacy is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995 pg. 574).

Scope

The Sustainability Reporting (SR) standards have been developed to ensure the quality and credibility of sustainability reporting (EU/2022/2464, 2022). These standards prescribe that the reported information must be comprehensible, relevant, verifiable, comparable and accurately depicted (ibid.). The standards aim to minimize the administrative burden imposed on organizations while considering the efforts of global sustainability reporting initiatives (ibid.). This is done to promote the effective dissemination of sustainability information to stakeholders (ibid.).

The Sustainability Reporting (SR) standards are designed to ensure the provision of comprehensive and relevant information on environmental sustainability to stakeholders (EU/2022/2464, 2022). To achieve this goal, the standards consider the specific subject matter of each sustainability reporting standard (ibid.). According to these standards, organizations are required to disclose information on various environmental factors, such as their efforts to mitigate climate change (ibid.). This includes their emissions of greenhouse gases under scopes 1, 2, and where applicable, scope 3 (Table 2.3) (ibid.). The standards aim to provide a comprehensive and consistent approach to sustainability reporting and disclosure (ibid.).

Table 2.3. Scope within Sustainable Reporting (SR) (EU/2022/2464, 2022; (Ranganathan et al., n.d., pg. 25)).

Scope	Background
Scope 1: Direct GHG emissions	Emissions that come from sources controlled by a company, such as fuel combustion in boilers, vehicles, and production processes (EU/2022/2464, 2022; Ranganathan et al., n.d., pg. 25).
Scope 2: Indirect emissions from energy	Scope 2 emissions are GHG emissions from purchased electricity consumed by a company. The electricity must be purchased or brought within the company's boundaries and the emissions occur at the power generation facility (EU/2022/2464, 2022; Ranganathan et al., n.d., pg. 25).

Table 2.3. Scope within Sustainable Reporting (SR) (EU/2022/2464, 2022; (Ranganathan et al., n.d., pg. 25)).

Scope	Background
Scope 3: Other indirect emissions	Scope 3 is an optional category for reporting indirect emissions not owned or controlled by the company. This includes upstream emissions (purchased goods and services) and downstream emissions (sold goods and services). This includes emissions such as purchased materials, fuel transportation, and product/service use. Including these emissions in sustainability reporting provides a more complete understanding of a company's indirect environmental impact (EU/2022/2464, 2022; Ranganathan et al., n.d., pg. 25).

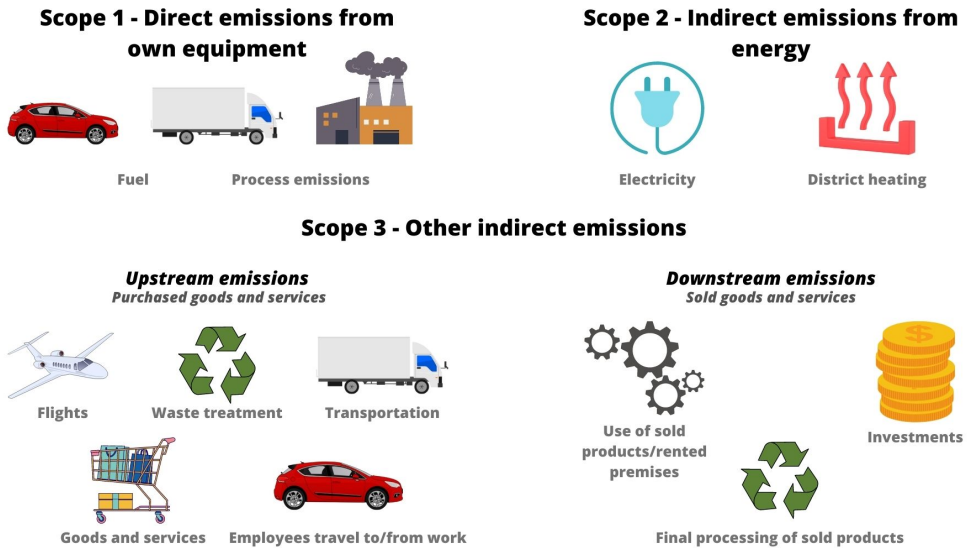

Figure 2.5. The visual representation of what is included in scope 1, 2, and 3. Inspired by presentation from Andersen (2023).

2.3.5 European Sustainability Reporting Standards (ESRS)

When the European Commission adopted the CSRD, they also presented a set of standards for CSRD reporting called the European Sustainability Reporting Standards (ESRS) (EFRAG, 2022, pg. 3). The European Commission appointed The European

Financial Reporting Advisory Group (EFRAG) as the technical advisor in developing the draft ESRS (ibid.). The proposal was approved by the European Parliament in November 2022 (ibid.).

ESRS is a set of guidelines for European companies to report on their sustainability performance (EFRAG, 2022, pg. 3-4). It provide a framework for companies to report on the sustainability aspects that are relevant to their business, including ESG issues (PwC, 2022). The standards are based on the GRI Standards and are designed to be consistent with international reporting standards (EFRAG, 2022, pg. 7; PwC a, 2023).

Moreover, the ESRS were instituted to ensure that corporations adhering to the CSRD provide precise and reliable disclosures (EFRAG, 2022, pg. 8). The CSRD outlines what companies should report on, while the ESRS specifies how it should be reported (ibid.).

The ESRS aim to increase the transparency and comparability of sustainability reporting in Europe, and to encourage companies to improve their sustainability performance (EFRAG, 2022, pg. 4). By reporting against these standards, companies can demonstrate their commitment to sustainability and provide stakeholders with a comprehensive understanding of their sustainability performance. (ibid.).

3 METHODOLOGY

The objective of this chapter is to provide a detailed explanation of the methodological framework adopted for this thesis. Section 3.1 and its subsections will clarify the research design, approach, and procedure, while section 3.2 elaborates on the data collection techniques, including interviews and literature reviews. Additionally, section 3.3 will explain the process of convincing the thesis's authenticity, plausibility, and criticality.

3.1 DESIGN

3.1.1 Intensive research design

In a study, the research design provides a framework that outlines the methodology and process utilized to collect and analyze data to answer set research questions (Yin, 2014). For this thesis, an intensive research design was chosen to enable in-depth analysis, which is necessary when studying a specific topic (ibid.). The research design is structured according to several guidelines and key elements, including a small sample size to obtain detailed information, in-depth data collection techniques such as interviews for primary data and document analysis/literature reviews for secondary data, retrieved online to create a comprehensive understanding (See Section 3.2), and detailed analysis utilizing methods such as coding and thematic analysis to identify patterns and themes with the gathered data (Creswell and Creswell, 2017). These methods offer several advantages, including a more profound understanding, rich data to analyze, and flexibility in adjusting the data collection (T. Busch, 2021, pg. 53).

In summary, the research design for this thesis involves interviewing five participants who have relevant knowledge and hold positions related to sustainability reporting in organizations that fulfill the CSRD requirements. This approach will enable the researcher to gain an in-depth understanding of the topic.

3.1.2 Qualitative research approach

In the context of conducting case-study research on green accounting in the Norwegian construction industry, a qualitative research approach was selected. In management accounting, qualitative field studies are not limited to one specific method (Heinzelmann, 2012, pg. 45). It instead incorporates a broader methodology that help guide the overall research process (Ahrens and Chapman, 2006, pg. 822). This methodology entails a comprehensive approach to studying our research topic around green accounting, acknowledging that the field itself is shaped by the theoretical interests of us the researchers. When it comes to the practice of qualitative studies, it involves an ongoing reflection on the gathered data and its alignment with the different related theories. This allows for the data to contribute and help further develop the research question for the thesis (ibid., pg. 822-823).

Further, using a qualitative approach is often described in methodological literature as naturalistic, holistic, interpretive, and phenomenological (Tomkins and Groves, 1983, pg. 366-368). Qualitative can be defined as an attribute within methodology, which further refers to the general direction taken in a study, independent of the specific methods employed, such as interviews, observations, or questionnaires (T. Busch, 2021, pg. 56-57; Messner et al., 2017; Heinzelmann, 2012, pg. 45-48). The main objective is to find and capture rich data that can navigate through a complex subject (Messner et al., 2017; Heinzelmann, 2012, pg. 45-48). More specifically, each source is viewed as highly holistic in order to achieve a comprehensive and thorough understanding of the entire subject (ibid.). All this aligns with the research within this thesis on green accounting in the Norwegian construction industry. It further emphasizes the importance of adopting a holistic and interpretive perspective when considering the intricate interplay of socio-economic and environmental factors (ibid.).

In summary, conducting a qualitative research approach for this thesis is well-suited due to its methodology-driven nature, the researcher´s theoretical interests, its emphasis on ongoing reflection of all data, and both the holistic and interpretive nature of this research topic.

3.1.3 Abductive research process

The research process can be described as the structure on how the study will be investigated and implemented (Yin, 2014). For this purpose, the concept of social science thinking and its three methods for working around scientific reasoning – deduction, induction, and abduction – are crucial and relevant in determining the most suitable approach for the research process (Lukka and Modell, 2010, pg. 467). Deductive research is structured to begin with a hypothesis and follows a structured approach; inductive research takes the opposite approach, using data collection and analysis to generate conclusions (Dubois and Gadde, 2002, pg. 559). On the other hand, abductive is required to have a hypothesis to explain the study's phenomenon that has no set explanation (ibid.).

An abductive process was utilized considering the possible need for adjustments to the research question as new literature and viewpoints were discovered throughout the study. This process consists of a pragmatic approach using "systematic combining" to help direct or redirect academic research, as shown in figure 3.1 (Dubois and Gadde, 2002, pg. 555-559). An abductive process was considered advantageous for us as the subject of environmental management accounting is quite extensive, with many different approaches that can be pursued. Theoretical and empirical data were gathered from the literature review and research process, which assisted in constructing a comprehensive analysis of the chosen research phenomenon.

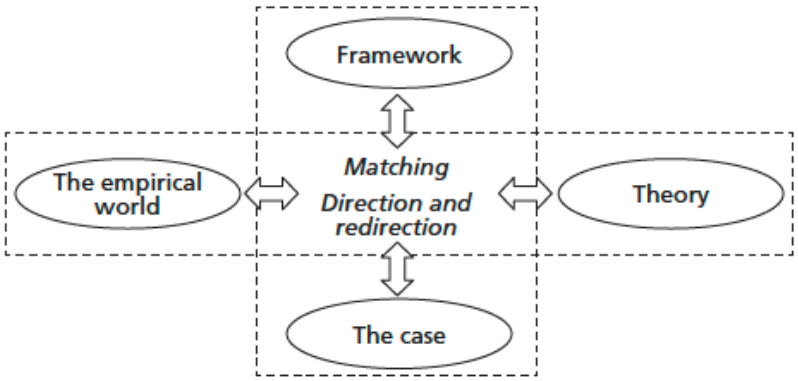

Figure 3.1. Systematic combining for abductive reasoning. (Dubois and Gadde, 2002, pg. 555.)

In addition, the case-study was constructed through interviews and secondary data (Section 3.2). Analytical procedures yielded output data, which was subsequently utilized as the input data for the discussion chapter. The output data, in turn, served as a reference point for the final analysis. Overall, the research process employed in this thesis showcases the importance of selecting the appropriate approach based on the set research question and available data resources. Moreover, it emphasizes the importance of being open to modifying the research question based on the data collection and analysis findings.

3.2 DATA GATHERING & ANALYSIS

Primary data - Interviews

Interviews were employed as our primary data-gathering method. Interviews are one of the most widely used methods for gathering qualitative data in accounting research (Mahama and Khalifa, 2017; Heinzelmann, 2012, pg. 46-48). Interviews are defined as a verbal exchange between one individual to another, where the researcher's interest is to understand and explore the world of the interviewees and their experiences (ibid.). For the literature, the interviews are the tool to extract information related to the selected accounting phenomenon by exploring the interview participants' thoughts, perceptions, attitudes, values, and experiences related to the particular theme in question (Mahama and Khalifa, 2017). It is a communicative practice that can be classified into three different categories: (1) structured interviews; (2) unstructured interviews and; (3) semi-structured interviews (Heinzelmann, 2012, pg. 45-48). Structured interviews are characterized as a pre-written standard questionnaire sheet which is used in a set order (ibid.). Unstructured interviews are more flexible and open, where the interviewer takes the lead through the use of stories and different narratives (ibid.). A combination of both approaches can be observed in semi-structured interviews, with a moderate level of predetermined order and interviewer flexibility in the questioning process (George, 2022). The questions asked are often based on a thematic framework, but only sometimes strictly formulated when asked (ibid.). It can be argued that the usage of semi-structured interviews gives the interviewer the opportunity to extract more detailed information with the option to ask follow-up questions that can be altered to each participants response (Heinzelmann, 2012, pg. 45-48; George, 2022).

In this study, semi-structured interviews were conducted using a prepared questionnaire sheet (Appendices A), which was there to help us, the interviewers, navigate through the interview efficiently and the structure varies due to follow-up questions. Kreiner and Mouritsen (2005), state that follow-up questions are essential in the interview process as they can provide valuable data that may otherwise be overlooked by strictly adhering to the established structure. By utilizing follow-up questions, researchers can initiate further dialogue and delve deeper into the topic of inquiry (ibid.). Adopting this approach enabled us to delve deeper into the responses provided by the participants, thereby facilitating a more comprehensive exploration and elaboration of their perspectives.

Five different participants within the construction industry were interviewed; all held positions related to sustainability reporting within organizations that fulfilled the criteria for CSRD (Subsection 2.3.4). All participants were approached by direct contact over email or phone. Before the interview took place, the questionnaire sheet was sent with 20 questions for the chance to prepare their answers. The questionnaire was divided into five topics: (1) Introductory questions; (2) familiarity with CSRD; (3) familiarity with ESRS; (4) internal reporting tools and; (5) concluding questions. The questionnaire sheet was set up to write answers beneath all questions for a structural and tidy setup for later transcription. All interviews were arranged to last approximately 30 minutes, with all questions being the same for each participant, but with intention to ask follow-up questions surrounding the participant's answers. The interviews were conducted in the period between March 1st and April 1st over Microsoft Teams. After every interview was completed, all relevant data was transcribed.

Through the interviewing process, it was important to sustain a structured approach of our participants. Therefore, table 4.2 were created, which lists our case participants, their organization's role within the industry, their official position within their respective organizations, and a reference code used for structural purposes for the discussion.

Table 3.1. Participants interviewed.

Info	Participant
Case A	Stakeholder´s role: General Contractors and Project Developers
Ref.code: R-1	Position: Head of Sustainability
Case B	Stakeholder´s role: Contractor and Property Developer
Ref.code: R-2	Position: Sustainability Manager
Case C	Stakeholder´s role: Real Estate and Construction
Ref.code: R-3	Position: Head of Sustainability
Case D	Stakeholder´s role: Contractor
Ref.code: R-4	Position: Sustainability Officer
Case E	Stakeholder´s role: Contractor Group
Ref.code: R-5	Position: Director for Sustainability and Environment

To strengthen the accuracy and solidity of the data collected from the interviews, additional questions were created if further elaboration was needed. These were sent out to our participants with the option to either answer them through a second interview or by answering the questions over email. This process gave us a more thorough understanding of our research topic and helped raise the quality of the collected primary data.

In relation to the processing of personal data at the University of Agder (UiA), it is required to apply to the Norwegian Centre for Research Data (NSD). The application should be processed and completed before the interviews are conducted. Our application got submitted February 15th 2023 and approved February 16th 2023. In order to to use the participants information, their informed consent was to be granted by signing a letter of consent and to potentially answer further questions. Due to how new the directives and reporting standards are, it was agreed to show their positions and keep the names of participants and their respective organizations anonymous in order to avoid leaking one's specific strategies and information.

Secondary data - Literature reviews

The secondary data utilized in this thesis consist primarily of literature reviews sourced from books and online journal articles. These sources proved to be indispensable in acquiring a theoretical understanding of the research topic, as well

as insight into prior researched topics that help provide a strong framework for our own research. The initial step of the process involved the identification of relevant research topics using specific keywords, those being:

- Corporate Sustainability Reporting Directive (CSRD)
- The European Financial Reporting Advisory Group (EFRAG)
- Environmental Management Accounting (EMA)
- Environmental Management Accounting Control Systems (Environmental Management Accounting & Control Systems (EMACS))
- European Green deal (EGD)
- European Sustainability Reporting Standards (ESRS)
- Global Reporting Initiative (GRI)
- Management Accounting & Control (MAC)
- Management Control Systems (MCS)
- Non-Financial Reporting Directive (NFRD)

To manage and organize the relevant data that were identified, a dedicated document was created to list all topics and sub-topics of interest. This document contained a bibliography source, including the respective page numbers, to facilitate quick and efficient retrieval of desired information. Furthermore, all document sources were retrieved and meticulously structured within the reference program, Mendeley, to ensure a well-organized and comprehensive overview of all relevant sources employed for this thesis. Such a meticulous and systematic approach to organizing sources facilitates adherence to academic standards and furthers the credibility of the research.

3.3 THE PROCESS OF CONVINCING

When it comes to research in general, it is normal to use the criteria of validity, reliability, and generalizability that have its origin from the perspective of normal science - criteria such as validity, reliability, and generalizability, and which is used to assess the quality of its research (Heinzelmann, 2012, pg.43-44). For management accounting, another approach using the "role of theory" is more common, which suggests an alternative criteria approach to assess the quality of research. This is within the field of social science when conducting qualitative field research (ibid.). Seale and Silverman (1997), states that when it comes to a qualitative-based social science study within management accounting, it usually rejects the concepts criteria of validity and reliability. Golden-Biddle and Locke (1993), have taken this a step further by seeing it as "The process of convincing" which consists of outlining the research (1) authenticity - encompassing "first-hand experience", (2) plausibility - connecting our viewpoint and aligning it up against prior research, and (3) criticality - the capacity to challenge ideas and undervalued ideas and beliefs.

For this thesis we sought to follow Golden-Biddle and Locke (1993)'s process to ensure the authenticity of our research, which was done through interviews (See section 3.2) to gather first-hand experience and insight from professionals working in the field of green accounting. It helped us capture a holistic view of today´s situation regarding the change in EMA tools, up against the coming CSRD and ESRS changes in an organizational context.

Furthermore, with plausibility, much time has gone into making sure all our empirical material and selected scholarly texts are related and useful to our thesis research, with an effort to connect all descriptive data gathered from interviews with the conceptual background of the thesis. This helped us to ensure that our findings from our qualitative research were established against the theories and concepts to make the thesis coherent and sensible.

Lastly, for the criticality, efforts have been made to seek out the challenges and beliefs related to today´s situation on green accounting and its future. The thesis aims to critically examine the stance of the construction industry in relation to the upcoming sustainability reporting requirements from the EU and to evaluate its

long-term implications. Additionally, the study seeks to investigate the strategies employed by the interviewed organizations to address this issue. This has allowed us to examine different perspectives, identify their positions, knowledge, and ideas, and present a well-rounded analysis of the current and future situation for green accounting.

4 | ANALYSIS RESULTS

This chapter presents the results of the analysis, which are divided into five sections. The first section, The Industry (4.1), provides an overview of the industry's commitment to sustainability and changes made to the participants' business models. The second section, Tools & Indicators (4.2), covers the tools and indicators used to assess their sustainable development practices, as well as opportunities for improvement. The Distribution of Information (4.3) section elaborates on how information related to these practices is shared within the organizations. The fourth section, CSRD & ESRS (4.4), explores the participants' knowledge of these concepts and their preparations for their implementation. Finally, in section Challenges (4.5), the obstacles related to EMA practices and implementation are highlighted. Together, these sections provide a comprehensive analysis of the research findings and shed light on important aspects of sustainable development, the development of EMA, and corporate social responsibility practices in the industry.

4.1 THE INDUSTRY

The companies' commitment to sustainability and their motivation.

The business landscape is characterized by industry-specific legal requirements, which necessitate companies to reposition themselves to ensure compliance with existing and forthcoming legislation. Additionally, customer demands on project delivery and performance are increasing, particularly regarding certifications and adherence to specific energy levels. Notably, all the interviewees reveal that customers' expectations greatly exceed current regulatory standards, and so according to prevailing views, the primary impetus behind reporting is to meet customer expectations and surpass them by striving to exceed the anticipated level of performance. Several participants also mention that they have a significant social responsibility they want to take, based on the fact that the construction industry

accounts for a relatively large share of greenhouse gas emissions in Norway. R-2 says "the motivation is twofold: first, we have a significant social responsibility that we want to take, and the other part is to keep up with the fear of falling behind. "The fear of falling behind is also mentioned by other participants. Another motivational factor is "the desire to be relevant to clients, both in the private and public sectors" (R-4). Additionally, some participants mentioned that stakeholder expectations serve as a motivation for their reporting practices. As stated by participant R-5, "We report on climate since that's what our stakeholders are mainly concerned about, i.e., how we work with climate, what goals we have, etc".

Figure 4.1. The participants motivations for sustainability reporting.

The CSRD and ESRS further require firms to adopt practical solutions across various activities, a trend already prevalent among present-day customers. In light of these developments, all interviewees deem sustainability reporting a key competitive advantage in the current market. Each interviewee expressed that compliance with this trend is crucial, as not doing so may result in their businesses becoming obsolete. According to 80% of the interviewees, the legislation and upcoming CSRD were among the primary reasons for their adoption of sustainability practices.

How is sustainability defined in the companies?

All the participants in the study reported a shift away from the conventional interpretation of sustainability, which primarily emphasizes energy consumption and greenhouse gas emissions, towards the new Environmental, Social, and Governance (ESG) framework, which encompasses a broader range of factors. Participant R-2, for instance, has divided the ESG framework into five distinct components, aiming to "facilitating comprehension of the concept among all stakeholders, as well as to enable easier categorization of activities". Similar to R-2, participant R-5 has categorized their ESG framework into five pillars for similar reasons. It is worth mentioning that participant R-4 has substituted the term 'sustainability' with 'corporate social responsibility' as "corporate social responsibility as an overarching term encompasses more of the ESG aspects."

Impacts on the business model

All the participants in this study emphasize their aspiration to undertake as many environmentally-friendly initiatives as possible. However, customer demands and contractual arrangements dictate their operations, with participant R-4 stating "We have not yet turned down a project because it is not green enough, but we will get there one day, but the decline in the market has meant that we are not in a position to make such a choice as of now. "Profitability is the primary driver, with sustainability aspirations considered a secondary priority. To this end, specific targets for reducing emissions by a predetermined percentage by a particular year have been set by 80% of the participants. Participants R-5 and R-4 have made additional significant changes, such as obtaining International Organization for Standardization (ISO) 14001 certification and establishing dedicated sustainability positions within their respective organizations, encompassing tasks such as sustainability reporting and energy consulting.

Two participants specifically state that sustainability is a core part of their business model, with participant R-5 saying "Sustainability has become a part of our business. It is part of our strategy work, part of our action plans; you will find it in our overall objectives, in our scorecards, it is anchored from top management to the sharp end in our projects. This is because we see competitiveness in our work."

The interviewees also reported making changes to company policies relating to employee travel, commuting, and other work-related activities to reduce their carbon footprint. Participant R-2, in particular, noted a significant shift in decision-making within the company, as the requirement to produce sustainability reports in combination with financial reports places greater emphasis on environmental considerations. Another interviewee indicated a desire to offer environmentally sustainable solutions to customers at the earliest stages of a project, with the aim of carrying these principles through to other aspects of the projects.

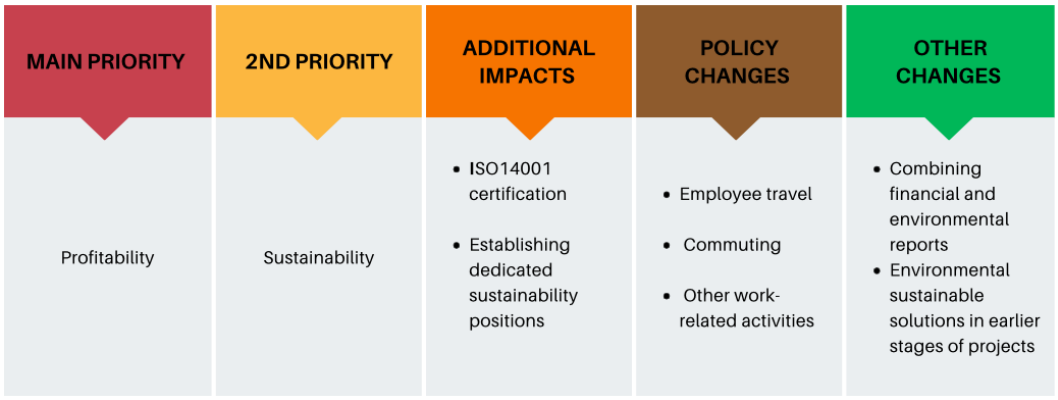

Figure 4.2. Priorities, impacts, and changes done to the participants' business models.

Current sustainability reporting practices among interview participants

All participants confirmed that they have implemented sustainable practices in their respective organizations and have recognized the importance of sustainability reporting. They have developed policies and procedures to ensure that their reporting is aligned with industry standards and regulatory requirements, such as GRI, GHG, Carbon Disclosure Project (CDP), and the taxonomy. Using recognized sustainability standards and certifications, such as ISO14001, has helped them to measure and track their sustainability performance effectively.

Specific sustainability goals

Only a small number of the interviewees have established specific sustainability targets apart from cutting emissions, but there are some shared objectives, such as

enhancing the proportion of female employees. In addition, individual organizations have established their own KPIs and Application Programming Interface (API)s to guide their sustainability goals. Significant variations exist in the number of KPIs utilized by the interviewees, as well as in the level of significance attributed to each KPI. 60% of respondents highlighted a focus on incorporating all aspects of ESG, along with Health, Safety, and Environment (HSE) considerations.

Are they ready to report on the CSRD?

40% (R-5 and R-1) reported being prepared, while the remainder indicated a lack of readiness, but expressed a commitment to achieving readiness in the future.

4.2 TOOLS AND INDICATORS

Which tools are used for reporting?

A diverse range of tools are utilized, with some interviewees reporting usage of multiple programs, while others using fewer. Among those surveyed, 60% (R-3, R-4, and R-5) have developed proprietary programs that facilitate the aggregation of data into a singular platform, enabling easy retrieval of desired information for decision-makers. However, all respondents acknowledged that data entry into these programs is predominantly manual and not yet fully automated, with only participant R-5 being close to a fully automatic system. One of the participants says: "We use a lot of programs and it's very comprehensive, and we spend a lot of time on it." The remaining 40% have procured or leased third-party software for reporting purposes. According to one participant who currently employs proprietary software, their organization intends to switch to third-party software, as their in-house program no longer satisfies their requirements (R-1). A particularly surprising observation among all interviewees was the ubiquitous employment of Microsoft Excel, with considerable information still being manually entered into the spreadsheet software.

Figure 4.3. Overview of the types of EMA tools employed.

How has the tools contributed?

40% of participants assert that the current tools utilized are inadequate and merely perform the minimum necessary functions (R-2 and R-3). An additional 40% of respondents indicated that while the existing tools are satisfactory, there is room for improvement (R-4 and R-5). The same respondents says that the software they use has helped them "get good dashboards, understand the development, it's easy to see why things are changing, what has happened, activity, the effect of the measures we implement, etc." Conversely, only one participant expresses satisfaction with the efficacy and performance of the tools (R-1).

Which indicators do they use?

According to the respondents, multiple KPIs and APIs are utilized in their reporting processes, although these are categorized into distinct sets. Most of the participants' KPIs have their roots in other international guidelines, including but not limited to GRI, GHG protocol, Science Based Targets, and taxonomy. The selection of KPIs among the participants can be attributed to various reasons; however, the underlying rationale for the choices is rooted in the fact that they are deemed "interesting for the customers since we compete on them, but also for ourselves to measure our own improvement every year." - R-2

One participant identified two primary KPI groups, accompanied by numerous underlying KPIs. In contrast, another participant prioritized distinct KPIs that

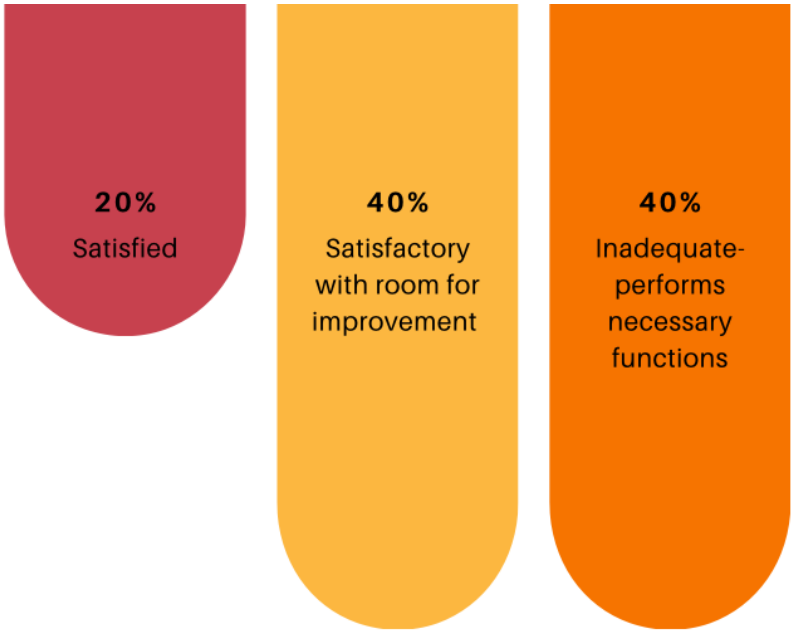

Figure 4.4. Percentage of participants' degree of satisfaction with their EMA tools.

require quarterly reporting, along with several underlying KPIs. The KPIs groups mentioned by the respondents include emissions, turnover, and H-numbers concerning sickness absence and workplace accidents, in addition to financial outcomes. Only one interviewee reported that their company does not have any particular primary KPIs (R-4).

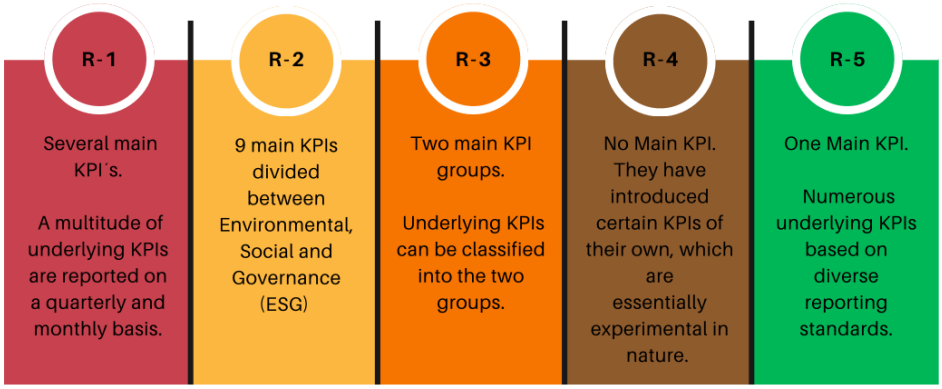

Figure 4.5. Indicators/KPI overview for the participants.

How did they arrive at the tools?

One participant initially adopted the current tools in 2019 to fulfill their requirements at that time, but presently feels constrained by the software due to the interdependence of their data (R-1). The decision to develop an in-house software was made in order to attain precise customization as per their specific requirements. Consequently, the participant is exploring alternative software solutions to replace the current one. In contrast, R-2 persisted with their previous programs and made the most of them, due to their long-standing dependence on them. R-4 sought to streamline their software portfolio by consolidating multiple programs into a unified platform, with the goal of reducing the total number of software applications in use and "wanted to gather them in one system." R-5 decided to use a software developed by their group, stating that "the previous program was incredibly poor" as the primary motivating factor. All respondents opted for Microsoft Excel as a tool in their reporting process since it has a low usage threshold and is familiar to most users.

Do they see any opportunities for improving or simplifying the tools?

60% of the participants state that the most significant impediment is the lack of synchronization between software and an automated system, causing significant, unnecessary time expenditure. The remaining participants lacked sufficient familiarity with the software, rendering them unable to provide specific suggestions for improvements.

4.3 DISTRIBUTION OF INFORMATION

Who utilize the information?

According to 80% of the respondents, the information is mainly employed by the upper-management to facilitate the decision-making process, which is then disseminated to lower-level managers. Conversely, 20% of the participants

acknowledged a lack of understanding regarding the flow of information and therefore refrained from providing any definitive remarks.

How is sustainability promoted internally in the company?

All participants reported that the concept of sustainability is persistently emphasized by upper-level management, featuring prominently in presentations, meetings, and other forums. However, 40% of the respondents stated that information regarding sustainability is only transmitted verbally, with limited access to relevant materials on the internal systems. They further suggested that no documents on the internal systems inform employees about the companies' stance and actions concerning sustainability. Meanwhile, the remaining 60% noted that they regularly disseminate sustainability-related information through internal programs and that all employees have access to documents detailing the organization's approach to sustainability. One of the participants acknowledges that "A weakness for us is knowledge transfer from different projects", leading to a significant amount of time spent extracting information from various sources so that it can be shared with others in the company. Additionally, one of the participants shared that their company has developed a sustainability course that every employee must complete, in order to elevate their knowledge of current sustainability practices.

4.4 CSRD & ESRS

Knowledge of CSRD & ESRS

All of the interviewees acknowledged having some familiarity with the CSRD and the ESRS; however, 80% of them lacked a comprehensive understanding of their specific contents. Only one participant claimed to possess extensive knowledge about the CSRD, but was unfamiliar with the ESRS. The reasons for their lack of in-depth understanding of the two are numerous, but the most frequently cited explanation is that they are too extensive and the amount of information presented is overwhelming.

"We find them [the CSRD and ESRS] difficult and comprehensive, and it seems challenging to get a grip on what it is." - R-2

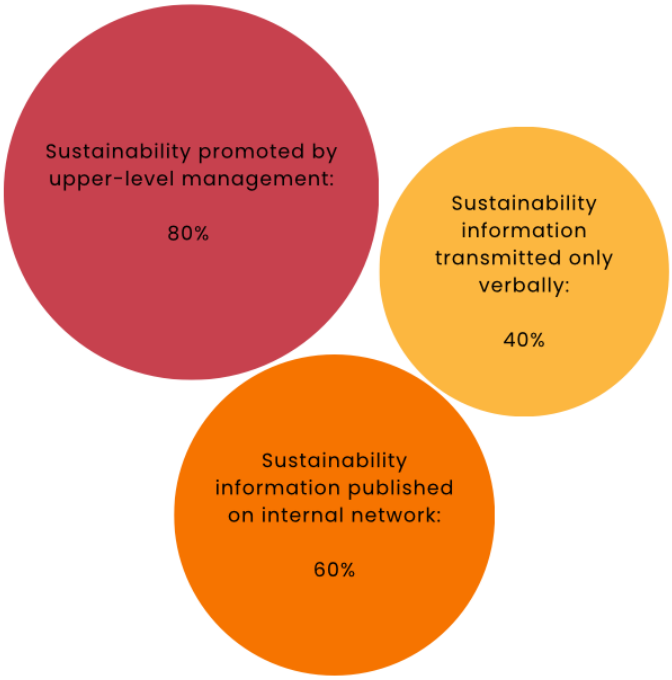

Figure 4.6. Ways of disseminating sustainability information among participants

Among the participating organizations, two belonged to a foreign group registered in an EU country and were therefore already subject to European reporting requirements. These respondents attributed their limited comprehension of the subject matter to the group's responsibility for obtaining an overview and conveying it to them through their internal systems.

How are they preparing for the implementation?

A majority of the participants (60%) indicated that they have undertaken various measures to satisfy the requirements outlined in the CSRD and the ESRS. These initiatives comprise enhancements to data collection tools, value-chain mapping, hiring third-party consultants to perform assessments and facilitate reporting, and certification of personnel with BREEAM. Only one participant claimed to have fully prepared and required no further improvements. In contrast, another respondent mentioned indecision regarding preparation efforts due to the absence of CSRD and ESRS legislation in Norway.

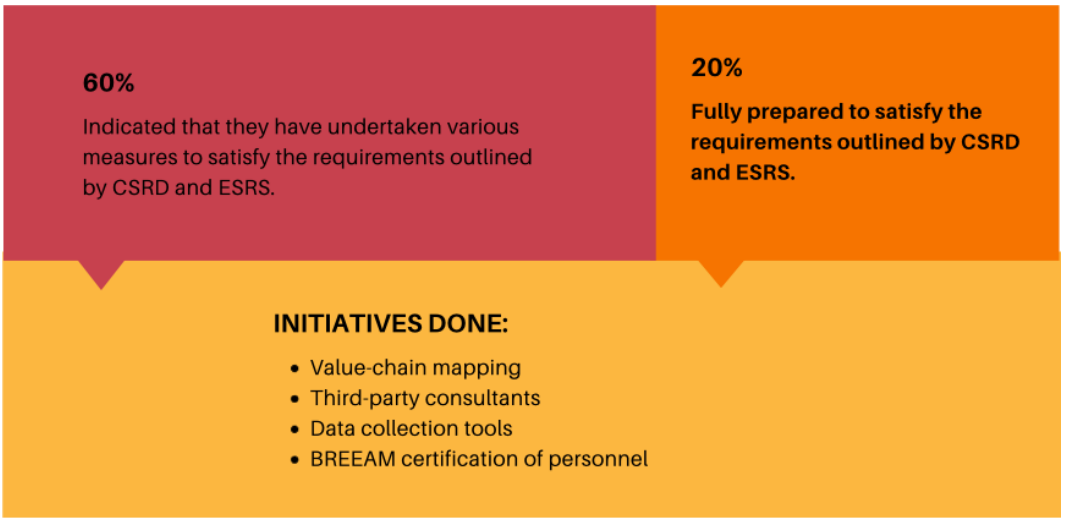

Figure 4.7. Preparations and initiatives completed for compliance with the CSRD and ESRS.

Several participants have stated that there have been efforts made in the industry to create a common platform for reporting, which hopefully everyone will use, resulting in a uniform reporting practice. Additionally, companies are cautious about investing a significant amount of money into programs that may or may not be adequate, and are thus waiting for someone to take the lead.

"We in the industry are waiting for each other, for someone to invent the "wheel".
- R-2

How will the industry change with mandatory reporting?

The consensus among all interviewees is that the introduction of mandatory reporting and its applicability to all medium to larger players will significantly transform the industry. Many respondents identified that the most substantial changes will likely affect their data collection and processing procedures. Overall, all participants expressed a positive view towards mandatory reporting, as it will create opportunities for more effective comparison and prevent greenwashing practices, making it more challenging to compete solely on price. Additionally, it is emphasized that having the reports verified by a third party provides a fair basis for evaluating the progress of their sustainability efforts. However, some respondents expressed apprehension that

smaller companies that are not immediately subject to reporting requirements may engage in greenwashing to win projects. Regarding the implementation of CSRD and ESRS, 80% of the participants are uncertain about the specific implications they will face, but they acknowledge that significant changes are anticipated. On the other hand, the remaining 20% express that the expected impact on their operations is minimal.

What kind of support is needed in order to implement?

According to the results, 80% of the participants require support in implementing reporting tools. Of those requiring support, 67% seek adequate data collection tools and an automated reporting process. Moreover, 40% of the participants confirm hiring consultants to aid in the implementation process. Only one participant asserts that their in-house expertise is adequate, rendering assistance unnecessary.

Some participants highlighted that certain parts of the value chain pose challenges to effectively gather sustainability information. One reason for the challenges is the absence of a standardized reporting format. For instance, transportation companies use different methods to measure Carbon Dioxide (CO2) emissions, and data sets received from power companies cannot be easily entered into their systems. As a result, companies need assistance from their subcontractors to facilitate reporting. Additionally, Standard Norway is also highlighted as a company that can help by translating and adapting the standards as quickly as possible.

4.5 CHALLENGES

What are the biggest challenges with sustainability reporting?

After conducting our interviews, it is clear that there are many challenges associated with implementing sustainability reporting, and that much needs to be done in an extremely short amount of time to ensure readiness. First, we look at the problems that all participants have mentioned:

1. One of the major challenges repeatedly mentioned by all participants is related to

data, specifically the amount of data, data collection processes, and data utilization. They emphasized that reporting requirements demand an enormous amount of data. Additionally, several participants mentioned receiving data they do not know how to utilize, leading to a significant amount of time spent processing potentially irrelevant data. Participant R-5 highlights this by stating that "it is a chaos of information".

The lack of integration between different EMA tools poses additional challenges to the collection and processing of data. Participants also reported that the data collection process relies on unsuitable systems or data from suppliers that do not meet reporting requirements.

2. All participants express concern about what is commonly referred to as "compliance-driven reporting." This refers to the practice of reporting data solely to meet legal requirements, without actually utilizing it to make meaningful changes towards sustainability. This approach may result in some competitors choosing not to invest in becoming more environmentally friendly and instead focusing on meeting minimum requirements to save costs and compete solely on price. According to the responses of all participants, avoiding compliance-driven reporting is their desired outcome, and they are exerting their best efforts to prevent this from occurring.

3. The implementation of reporting requirements and EMA tools demands significant time and resources. Despite the absence of larger legal sustainability reporting obligations, such as the CSRD, many companies are dedicating considerable efforts and financial investments to prepare for future compliance. Even those with prior experience with sustainability reporting need to devote significant time and resources to meet the changing requirements.

"Sustainability reporting requires a lot of time and resources, and is a very significant cost." - R-4

While the participants acknowledge the value of sustainability reporting, they do not directly perceive it as a direct source of revenue generation other than when competing on sustainability. Furthermore, it was stated that companies are hesitant

to spend the amount of time and resources that they are currently doing, since sustainability reporting "doesn't create added value for us or the customer" (R-3). Nonetheless, all interviewees state that they have not rejected any projects solely because they weren't "green" enough. Thus, the implementation of sustainability reporting is perceived as a cost center, draining resources without directly generating revenue.

Challenges mentioned by one or more of the participants:

1. Insufficient software and automation capabilities are major concerns for 80% of the participants. Specifically, they report a lack of suitable software to effectively collect, process, and present data. While some have automated certain parts of the data collection process, none have fully automated it. A common challenge mentioned is the lack of integration of diverse programs for data collection, making it difficult to consolidate the data into a single display. Participant R-2 underscores this challenge by emphasizing that "coordinating software is a significant problem and an enormous undertaking." Furthermore, participants emphasize the urgent need for improved software and automation capabilities to facilitate more efficient sustainability reporting.

2. The lack of uniformity in reporting directives is mentioned by 80% of the participants. The lack of uniformity refers to certain explanations in the directives that can be subject to different interpretations and lack a common definition. One participant exemplifies the lack of clarity by citing a specific case from the EU taxonomy wherein the directive prohibits the construction of buildings on "cultivated" land. However, Norway, Sweden, and Finland have distinct definitions of what constitutes "cultivated" land, which leads to variations in interpretation and compliance with the taxonomy, resulting in a lack of uniformity.

3. A few participants also mention that they struggle to get their employees to comprehend the true meaning and implications of sustainability. In the past, sustainability was primarily associated with the environment and GHG-emissions. However, the scope has now expanded to include ESG, posing a challenge to educate employees on this broader concept. They also note that a lack of

understanding among staff and management could result in departments focusing solely on the conventional environmental and emissions definition receiving unreasonable attention.

4. The CSRD and ESRS are extremely extensive. CSRD has numerous requirements and explanations, making it a significant amount of information to manage. One aspect mentioned as both positive and negative is the level of detail in CSRD. For instance, one participant gave an example of how many liters of water a toilet can use when flushed for it to be sustainable, and stated that this is the case for many things in the CSRD. This makes it exceedingly challenging to control all aspects of the construction process and requires a considerable amount of time to ensure compliance. Additionally, several topics in the CSRD are not relevant for Norwegian companies to report on, leading to unnecessary time and effort spent. Participant R-1 mentioned that companies must report on e.g. child labor, a requirement that is considered "entirely irrelevant in Norway".

5. The flow of information in the value chain poses a challenge in Scope 3 of sustainability reporting, as it encompasses a significant portion of the value chain. This necessitates obtaining data from other stakeholders in the value chain, who must be capable of reporting their emissions and providing this information to their customers. Coordination of systems and the flow of information are major obstacles in this regard. Without the necessary infrastructure, reporting on certain aspects of the value chain can become an almost insurmountable challenge. If this is not in place, the gap can then only be bridged by the customers themselves who are forced to carry out time-consuming and resource-intensive calculations.

6. Smaller companies may not be able to meet the reporting requirements. The comprehensive nature of the reporting and the level of knowledge required could present a barrier for smaller companies. Meeting the requirements may necessitate hiring dedicated resources or engaging a third party, which may entail additional costs without a direct return on investment.

7. A participant noted that they believe banks treat loans and GHG emissions differently, stating that there seems to be a low degree of uniformity in how they calculate or measure emissions when granting "green" loans. Additionally, they

pointed out that the differences between "brown" and "green" loans are not substantial, but obtaining the green loans requires much more effort for the companies requesting them, since the banks then require more data compared to "brown" loans.

Table 4.1. Sustainability reporting challenges.

Challenges	Description
Main Challenges	• Data - Amount of data, collection processes and utilization. • Compliance-driven reporting. • Time and resource usage.
Other Challenges	• Insufficient software and automation capabilities. • Lack of uniformity. • Comprehend meaning and implications of sustainability. • CSRD and ESRS are extremely exstensive. • The flow of information in the value chain. • Smaller companies may not be able to meet the reporting requirements. • Banks threatening loans and GHG emissions differently.

Table 4.2. Key findings from the analysis.

Theme	Key Findings
The Industry	• Businesses face legal requirements and customer demands for performance, leading to climate reporting motivated by the desire to exceed expectations, remain relevant to clients, meet stakeholder expectations, and take their social responsibility. • The definition of sustainability in the industry is changing from the conventional definition to a broader framework that incorporates ESG factors. • Participants prioritize profitability over sustainability aspirations, though 80% set specific targets for reducing emissions, only two participants consider sustainability a core part of their business model, with changes made to company policies to reduce carbon footprint.
Tools and indicators	• All participants have implemented sustainable practices and recognized the importance of sustainability reporting, aligning with industry standards and regulations such as GRI, GHG, EU's taxonomy and ISO14001. • Some participants has established specific sustainability goals. Each participant has their own KPIs connected to their sustainability work, with variations in their number and significance. • 60% of interviewees have proprietary software, while 40% use third-party software. • All participants agree that data entry is predominantly manual. • All participants use Microsoft Excel as a part of their reporting process. • 40% find current tools inadequate, 40% sees room for improvement, and 20% expresses satisfaction.

Table 4.2. Key findings from the analysis.

Theme	Key Findings
Distribution of information	• Participants use various KPIs and APIs in their reporting processes, mainly from international guidelines like GRI, EU's taxonomy and the GHG protocol. KPIs chosen are deemed important for stakeholders and for measuring yearly improvements. • 80% of respondents use the information for upper-management decision-making, which is then passed down to lower-level managers. • Sustainability is mostly promoted by upper management through either verbal information - in form of presentations and meetings, or through internal systems - in form of documents and social media posts.
CSRD & ESRS	• Most of the participants have familiarity with the CSRD and ESRS, but lack a comprehensive understanding. • The majority of the participants are preparing for the CSRD and ESRS by implementing changes to operations, processes, and EMA tools. • Mandatory reporting will significantly transform the industry and is perceived as a positive change, creating opportunities for more effective comparison and prevent green-washing practices. • Most of the participants require help in order to implement changes to their operations in order to comply with the CSRD and ESRS.

5 | DISCUSSION

The preceding analysis chapter has presented a comprehensive account and interpretation of the empirical data gathered during the course of this case-study. The discussion chapter aims to integrate these findings into the broader theoretical framework that guided the research, while also situating them within the context of the research question. The significance and implications of the findings will be evaluated. By doing so, we hope to provide a comprehensive understanding of the study's contribution to the field and highlight its potential impact on theory, practice, and policy.

5.1 DOUBLE MATERIALITY AND THE EMA FRAMEWORK

Double Materiality (2.3.4) and the Environmental Management Accounting (EMA) (2.2.2) framework introduced by Burritt et al. (2002), are two concepts that share similarities. The five-dimensional EMA framework focuses on internal vs. external, monetary vs. physical, future- vs. past-oriented, short- vs. long-term, and ad hoc vs. routine gathering of information (Figure 2.3) (ibid., pg. 41).

Double Materiality, on the other hand, refers to the idea that companies have a responsibility to report not only their financial performance, but also their impact on the environment and society. Double Materiality recognizes both the impact of a company on the environment and society, as well as the impact of the environment and society on the company (EU/2022/2464, 2022). By considering both aspects of materiality, companies can better understand and manage the risks and opportunities associated with sustainability, enabling them to provide a more complete picture of their operations and their contribution to sustainability (Adams et al., 2021, pg. 5-7). This concept is gaining increasing attention in the business world as more and more stakeholders are demanding greater transparency and accountability from companies (Tanskanen, 2021; European Commission f, 2023; Arjaliès and Mundy, 2013, pg. 290).

Despite their differences in focus, Double Materiality and the EMA framework share similarities in their approach to sustainability reporting. For example, both concepts emphasize the need to consider both financial and non-financial factors when evaluating a company's performance. In addition, both concepts recognize the importance of looking beyond the short-term to consider the long-term impact of a company's actions (Adams et al., 2021, pg. 5-8; COM/2021/189 final, 2021; Burritt et al., 2002, pg. 41-44).

Furthermore, the EMA framework's five dimensions are relevant to Double Materiality. For instance, the internal vs. external dimension is relevant to Double Materiality because companies must consider both their internal operations and their external impact on the environment and society (Adams et al., 2021, pg. 5-8; COM/2021/189 final, 2021; Burritt et al., 2002, pg. 41-44). The monetary vs. physical dimension is relevant because companies must consider both the financial implications of their actions and the physical impact on the environment. The future- vs. past-oriented dimension is relevant because companies must consider their historical impact and future sustainability plans. The short- vs. long-term dimension is relevant because companies must consider their actions' immediate and long-term impact. Finally, the ad hoc vs. routine gathering of information dimension is relevant because companies must collect and analyze data regularly to monitor their sustainability performance.

In conclusion, Double Materiality and the EMA framework have different focuses, but share similarities in their approach to sustainability reporting. The EMA framework can be a helpful tool for companies to better understand Double Materiality and implement sustainability practices that align with the concept.

5.2 DOWNSIDE OF MANDATORY SUSTAINABILITY REPORTING

One of the main challenges associated with mandatory environmental reporting is the fact that EMA is a relatively new concept, and as such, is still underdeveloped (Burritt et al., 2019, pg. 480). On the other hand, traditional Management Accounting (MA) has been around for decades and is much more established. This means that

forcing companies to implement EMA in a short time frame can introduce a number of challenges that require significant resources to address. The participants support this argument, with R-5 stating "Things are happening terribly fast, so things have to happen terribly fast." Considering the remarkably short time-frame companies must adopt and implement the new and nascent EMA innovations, one could argue that EMA represents a radical innovation. Innovations that are widely diffused and adopted rapidly are referred to as radical innovations (Ettlie et al., 1984, pg. 683). furthermore, due to the short time available for company implementation of EMA tools, several tools may have to be implemented simultaneously, resulting in a complex endeavor.

Forced implementation of EMA also requires companies to bear the costs associated with environmental reporting, which can be substantial. Some participants argue that these additional resources do not produce any income for the company and therefore do not create any value for the business. The participants' arguments are further strengthened in theory. It was found that sustainability reporting has not directly been linked to higher financial performance (Whetman, 2017, pg. 7). This can also lead to resistance to change from companies, as they are being asked to take on additional expenses without a clear understanding of the benefits.

"We spend too much time and we're not making money from this at the moment."
- R-3

Research suggests that introducing and diffusing new concepts and techniques are most effective when done in small, incremental steps. This allows companies to gradually adapt to changes and incorporate new practices into their existing workflows (Weick, 1984, pg. 45; Burritt et al., 2019, pg. 482). However, mandatory environmental reporting does not allow for this kind of incremental change, as companies must implement EMA all at once in order to fulfill reporting requirements. This can create resistance to change and make it more difficult for companies to adopt new practices effectively, which is highlighted by participant R-4:

"There is so extremely much to deal with that one becomes overwhelmed and passive."
- R-4

In addition, mandatory environmental reporting can also lead to a focus on

compliance rather than actual environmental performance. Companies may prioritize meeting reporting requirements over reducing their environmental impact, which can undermine the effectiveness of the reporting requirements. Always complying with reporting requirements is not necessarily a bad thing as the CSRD requirements are perceived as quite strict, both by the participants and other companies (KPMG, 2023). Doing the bare minimum does not contribute to enhancing sustainability reporting industry-wise and potentially hinder the development of reporting practices. Companies may resort to "compliance-driven reporting" due to the financial costs of implementing EMA, as they may feel that the expenses related to R&D for EMA tools outweigh the benefits.

"Compliance-driven reporting does always concern us, especially for ourselves internally." - R-5

Many companies may lack the expertise or resources to implement and maintain effective environmental reporting. This can lead to inaccurate reporting and a lack of confidence in the reported data. Furthermore, environmental reporting requires collecting, analyzing, and managing large amounts of data. Companies may struggle to manage this data effectively, especially if they do not have the necessary systems or expertise in place. This is potentially a big problem for smaller companies which may lack the resources, both in terms of time and finances, to implement EMA and the associated reporting tools. One could argue that the extensive data requirements and detailed reporting stipulations of the CSRD is the CSRD's biggest problem and the main reason for resistance from the market.

"The smallest companies may potentially disappear into nothingness if they fail to keep up with the new legal requirements that are coming." - R-4

Overall, while the goals of mandatory environmental reporting are laudable, there are significant challenges associated with its implementation. The fact that EMA is a relatively new concept, combined with the costs and resistance to change that can arise from forced implementation, make it important to carefully consider the best way to encourage companies to incorporate environmental reporting into their operations.

5.3 LIMITATIONS OF REPORTING SOFTWARE

The case study reveals an intriguing discovery regarding the significant lack of adequate tools available for sustainability reporting. The interviewees state that although numerous tools are available, they typically only support specific processes rather than larger areas of use, consistent with Burritt et al. (2019) study indicating EMA tools are often case-specific, making it challenging to create standardized tools.

In our study, a prominent discovery is that all participants employ Microsoft‘s accounting program Excel and primarily use it for manual data input. A noteworthy instance was observed in the case of respondent R-4, who described having to extract and enter approximately 80 measurement-IDs into Excel manually. Respondent R-5, which is perceived as being the most experienced person in terms of sustainability reporting, states that this observation is "extremely noteworthy" for a few reasons and that "it highlights how challenging it [sustainability reporting] is." Firstly, it is surprising to witness a traditional accounting tool being employed so broadly for reporting on non-financial activities. Secondly, it is interesting to observe that all the participants use Excel, some more extensively than others, as a crucial component of their reporting process, and manual data entry is employed by every participant. Thirdly, the swift adoption of mandatory sustainability reporting indicates that the market lacks sustainable reporting tools and their development. Lastly, there is a conspicuous lack of integration between Excel and sustainability reporting tools, resulting in significant time and resource consumption for data entry.

"There are still many manual processes in some areas, we have good tools today for reporting, but there are still integrations and APIs that are not in place, and we need help with that, but there are good initiatives happening at the industry level."
- R-5

These findings reinforce the argument that sustainability reporting, particularly as per CSRD, represents a radical innovation. Furthermore, sustainability reporting innovation is unfolding so rapidly that the market lags far behind. Participant R-5 believes that there is a "significant market gap", and whoever develops a program that can collate all necessary information without requiring other programs will dominate the market.

5.4 DIFFERENCES IN REPORTING PRACTICES BETWEEN MEDIUM AND LARGER COMPANIES

Participant R-5 stands out as having a longer history of sustainability reporting, whereas the remaining interviewees have reported for a medium to short period. An intriguing discovery is the disparity in practices and level of sustainability reporting, as well as the types of data collected. Participant R-4 is relatively new to sustainability reporting and expresses uncertainty regarding the selection of relevant KPIs, as well as the way forward for their reporting. They also indicate that they collect only the data they have already decided to relate to. On the other hand, companies with more experience in the field tend to have one or more "main" KPIs that they focus on and are actively working to enhance their data collection systems. The KPIs used by the participants are derived from reporting directives, indicating a greater level of rigidity in terms of data collection. However, these companies are making efforts to streamline the data acquisition process. Those with a longer history in sustainability reporting have well-established, specific KPIs, and a larger collection of additional KPIs. These too are primarily derived from reporting directives. Such companies are also actively engaged in optimizing their data collection processes. However, the most significant difference between them and those with less reporting experience is that they have progressed to the implementation of concrete changes in their operations. These changes may include initiatives such as rehabilitation projects, alterations to mass handling and mass treatment processes, or ongoing discussions related to climate politics to remain ahead of the curve.

The present findings suggest that companies must have a thorough understanding of their reporting procedures to effectively identify areas where improvements can be made. Moreover, this reinforces the argument for the potential economic benefits of sustainability efforts, as adopting sustainable practices, such as recycling materials, could lead to reduced costs associated with resource acquisition. Despite the inconsistent and contradictory nature of EMA literature regarding its impact on economic performance, our analysis aligns with Whetman (2017)'s conclusions that there is no clear correlation between financial performance and EMA adoption.

Nevertheless, it is plausible that highly experienced companies implementing targeted operational changes may experience enhanced financial performance, as per Burritt et al. (2019)'s research.

5.5 ISSUES OF INFORMATION FLOW

One of the objectives of the thesis is to establish a connection between the EMA tools utilized by participants and Burritt et al. (2002)'s comprehensive five-dimensional EMA framework. However, during the interviews, it became evident that while the participants had close involvement with EMA and its associated tools, their understanding of the intricacies of these tools was limited. Consequently, it became apparent early on in the interview process that we would be unable to fully achieve this objective, as the participants' lack of comprehension of the tools constrained our research. Although the names of the software used were provided, there was insufficient time for a thorough self-study of these specific tools, and therefore, we relied on the interviewees' comments. This lack of understanding leads us to the topic of challenges related to information flow.

Upon conducting the interviews, it became evident that many participants had a limited theoretical understanding of EMA and its framework. While they were aware of EMA and grasped the purpose behind examining the tools, they lacked familiarity with the five dimensions of the framework and how it is employed to characterize EMA tools. Additionally, some participants were introduced to the concepts of formal and informal control systems, with only one already being acquainted with them, while the others understood the distinction when it was explained. The combination of insufficient knowledge regarding the inner workings of the tools and limited theoretical understanding of control systems highlights an issue with the comprehension of the flow of information. It is important to acknowledge that participants undoubtedly possess subconscious or indirect awareness of control systems' inner workings due to experience. Nonetheless, the lack of a comprehensive grasp of control systems and their contribution to information flow represents a clear weakness. This limitation has the potential to impede the optimal utilization of EMA tools and subsequently hinder the flow of information within the organization. Hence, it can be argued that the implementation and diffusion of EMA within the

organizations have not been carried out optimally, thereby reinforcing the findings from previous literature (Burritt et al., 2019, pg. 481-486; Thakur et al., 2012, pg. 563; Qian et al., 2018, pg. 1616-1617). Moreover, the findings suggest that the participants did not adhere to Rogers (2003)' five factors for successful adoption and implementation of innovations when incorporating EMA, thus possibly constraining the participants' understanding and utilization of EMA and associated tools.

6 | CONCLUSION

This thesis' ambition is to develop an understanding of the use of EMA and related tools in the Norwegian construction industry. The first step towards achieving this goal has been to establish a clear comprehension of the EMA concept. To understand the background of EMA and its relevance and importance, theoretical backgrounds are first introduced in the form of central sustainability initiatives: The Paris Agreement, UN Sustainable Development Goals, European Green Deal, and Sustainable Finance Action Plan. In addition, the thesis presents the origin of EMA and tries to explain the concept by introducing relevant concepts such as MACS and the EMA framework. Finally, the thesis highlights upcoming legislation and initiatives that require the use of EMA and are essential to the advancement of the concept. These include GRI, NFRD, European Taxonomy, CSRD, and ESRS.

To gain insight into how EMA and associated tools are used today, we have interviewed five individuals who work closely with EMA in Norwegian construction companies subject to the CSRD for the financial years 2024/25. The collected data has been subjected to qualitative analysis to gain insight into the methods utilized for sustainability reporting, the tools employed, and the approaches to disseminating sustainability-related information within the companies. In summary, the main findings are outlined in the following three paragraphs:

The Norwegian construction industry is presently obliged to comply with numerous sustainability-related legal requirements. The industry is highly supportive of these developments and welcomes the implementation of mandatory sustainability reporting. It is evident that the participants are working towards greater sustainability than what current regulations would ask for. This is to be understood against the backdrop of the following pressures, including corporate social responsibility, customer and stakeholder expectations, and the introduction of the CSRD. The industry is shifting from the conventional definition of sustainability, which focuses on energy consumption and GHG emissions, to a more comprehensive definition encompassing the ESG concept. As a result of these

changes, companies have modified their business models, introducing various sustainability initiatives such as certifications, creating dedicated sustainability positions, amending policies, and developing or purchasing EMA tools. Additionally, the increasing demands and expectations for sustainability reporting have played a significant role in driving these modifications. All the companies interviewed report on sustainability and has made their reports publicly available. With the exception of one participant, all others have established specific sustainability goals. Interestingly, based on our study, only 40% of participants feel prepared to report on CSRD, despite the interviewees being among the largest in the industry, which gives us some indication that the industry as a whole is largely unprepared.

The use of various EMA tools is prevalent among the studied firms, including both proprietary and purchased tools. The firms that have created their own EMA tools are leading the way in sustainability reporting, as their tools are tailored to their specific processes. However, the consensus is that the current tools are generally inadequate, due to issues such as difficulty synchronizing multiple tools and extensive manual data input. Uniform reporting is needed in the industry, and efforts are underway to develop a shared EMA tool that ensures this. Companies also differ in terms of their KPIs, with the more experienced companies having a few main KPIs with many underlying KPIs, while less experienced companies have many or no main KPIs. Most KPIs are based on existing reporting directives such as GRI and the EU taxonomy. However, the industry's biggest challenge is the lack of adequate tools available on the market and the limited automation in the reporting process. The information generated is primarily used by top management for decision-making and is thereafter disseminated through various channels to lower-level managers. Interestingly, 40% of the firms rely solely on verbal communication to relay sustainability information, whereas the remaining 60% receive it through both verbal communication and their internal systems.

From the theoretical background and interviews, it is evident that there are numerous challenges associated with the implementation of EMA and its tools. Some of these challenges may appear difficult to solve, such as managing data, EMA tools, the high level of detail in the CSRD and ESRS, value-chain mapping, and time and resource requirements. These issues will require significant investments, time, resources, and

expertise to overcome. On the other hand, some challenges are more subtle and may be simpler to address, such as uniformity, comprehension of ESG, compliance-driven reporting, reporting capabilities of smaller companies, and banks' handling of loans. These challenges often lie beyond the company's direct control or are easily resolved through clarification. Ultimately, all of these challenges are connected to the new and underdeveloped nature of EMA and its tools. EMA has existed for a few decades; however, it has not garnered much attention until recent years, which may explain why it is underdeveloped.

In conclusion, our analysis of the theory and data collected has allowed us to address the research question: *How are EMA and associated tools used in the Norwegian construction industry?* It is evident that the industry widely uses EMA and its tools for processing and distributing information, and data collection. Nevertheless, the quality of EMA varies significantly among actors, particularly in how it is integrated into business models, information flow, decision-making, and reporting tools. Thus, we conclude that EMA is extensively used in the construction industry and is increasingly becoming an integral aspect of day-to-day operations. Nonetheless, the concept can be challenging to comprehend, and the control systems meant to support EMA need to be improved.

6.1 LIMITATIONS AND FUTURE RESEARCH

This section addresses the internal and external limitations of our research that have potentially impacted the outcome and results of the study, while also addressing areas that may require further research. We will explore these limitations and their potential effects in detail.

(1) One limitation of our study is the restricted number of companies falling under the reporting requirements for CSRD during 2024/2025. As a result, we had a limited pool of companies to approach, and some were unwilling to participate in the study. Another limitation is that our study only includes Norwegian companies. (2) Limitation number two is related to the limited understanding of the EMA tools used by the companies due to the lack of complete insight from some of the interviewees. This has affected the studies comprehensiveness in understanding

the companies' practical use of EMA tools. (3) The limited research and available information on the practical use and impact of EMA tools on sustainability reporting within the construction industry poses a challenge for our study. The reliance on theoretical frameworks and hypotheses has resulted in a lack of practical information for comparison and benchmarking of our results. (4) Several of the interviewees had so many different EMA tools that it was not possible to gain an understanding of how each separate tool contributes to EMA and sustainability reporting. (5) Moreover, the timing of the study coincides with the annual sustainability reporting cycle, adding to the difficulty of securing interviews. With a larger number of interviewees, it would have been possible to gain a better understanding of how EMA and subsequent tools are used and their contributions to the reporting process.

Future research

In order to better understand the practical adaptation of EMA, the sustainability reporting process and how EMA tools contribute to increased information flow, further research is recommended. While the thesis is based on available research, which also faces similar limitations, future research should focus more on how the tools work, how they connect to Burritt et al. (2002)'s five-dimensional EMA-framework, and how they help distribute information to different stakeholders and managers in order to facilitate decision making. In the future, more companies will be required to report in accordance to the CSRD, which will yield more candidates available for research, thus offering greater insight into the use of EMA and associated tools.

BIBLOGRAPHY

Adams, C., Alhamood, A., He, X., Tian, J., Wang, L., & Wang, Y. (2021). *The Double-Materiality Concept: Application and Issues* (tech. rep.). https://dro.dur.ac.uk/33139/1/33139.pdf

Ahrens, T., & Chapman, C. S. (2006). Doing qualitative field research in management accounting: Positioning data to contribute to theory. *Accounting, Organizations and Society*, *31*(8), 819–841. https://doi.org/10.1016/J.AOS.2006.03.007

Amir, M., Rehman, S. A., & Khan, M. I. (2020). Environmental Management Accounting and Control System Mediating Role of Environmental Management Accounting and Control System between Top Management Commitment and Environmental Performance: A Legitimacy Theory. *Journal of Management and Research (JMR)*, *7*(1), 132–160.

Andersen, R. (2023). PwC: Hvilke standarder vi har og hvilke kommer? *DnB bærekraft*.

Anderson, J. C., & Frankle, A. W. (1980). Voluntary Social Reporting: An Iso-Beta Portfolio Analysis. *Source: The Accounting Review*, *55*(3), 467–479. https://www.jstor.org/stable/pdf/246408.pdf?refreqid=excelsior%3Af6fabb3f6d1455cb8d0ff38a2b21ba52&ab_segments=&origin=&initiator=&acceptTC=1

Anthony, R. N., Govindarajan, V., Hartmann, F. G., Kraus, K., & Nilsson, G. (2014). *Management Control Systems*. McGraw-Hill Higher Education. https://pure.eur.nl/en/publications/management-control-systems-2

Apiday. (2023). Corporate Sustainability Reporting Directive: All you need to know. https://www.apiday.com/blog-posts/corporate-sustainability-reporting-directive-all-you-need-to-know

Arjaliès, D. L., & Mundy, J. (2013). The use of management control systems to manage CSR strategy: A levers of control perspective. *Management Accounting Research*, *24*(4), 284–300. https://doi.org/10.1016/J.MAR.2013.06.003

Arnslett, A. (2015). Parisavtalen - hva ble egentlig vedtatt? https://cicero.oslo.no/no/artikler/parisavtalen-hva-ble-egentlig-vedtatt

Belkaoui, A. (1976). The Impact of the Disclosure of the Environmental Effects of Organizational Behavior on the Market. *Financial Management*, *5*(4), 31. https://doi.org/10.2307/3665454

Bhimani, A., Horngren, C. T., Datar, S. M., & Rajan, M. V. (2019). *Management & Cost Accounting* (7th ed.). Pearson education limited.

Bill, H. (2014). SCHOLEDGE INTERNATIONAL JOURNAL OF MANAGEMENT & DEVELOPMENT A CRITICAL REVIEW OF GLOBAL REPORTING INITIATIVE (GRI) GUIDELINES FOR SUSTAINABLE COPORATE REPORTING. *Scholedge International Journal of Management & Development*, *1*(3). https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=d64f7fa60a66f55ee2d6697e6739b67b941d3de5

Bolton, M. K. (1993). Organizational Innovation and Substandard Performance: When is Necessity the Mother of Innovation? *https://doi.org/10.1287/orsc.4.1.57*, *4*(1), 57–75. https://doi.org/10.1287/ORSC.4.1.57

Burritt, R. L. (2004). Environmental management accounting: Roadblocks on the way to the green and pleasant land. *Business Strategy and the Environment*, *13*(1), 13–32. https://doi.org/10.1002/BSE.379

Burritt, R. L., Hahn, T., & Schaltegger, S. (2002). TOWARDS A COMPREHENSIVE FRAMEWORK FOR ENVIRONMENTAL MANAGEMENT ACCOUNTING-LINKS ENVIRONMENTAL MANAGEMENT ACCOUNTING TOOLS BETWEEN BUSINESS ACTORS AND. *Australian Accounting Review*, *12*(27), 39–50. https://doi.org/10.1111/j.1835-2561.2002.tb00202.x

Burritt, R. L., Herzig, C., Schaltegger, S., & Viere, T. (2019). Diffusion of environmental management accounting for cleaner production: Evidence from some case studies. *Journal of Cleaner Production*, *224*, 479–491. https://doi.org/10.1016/J.JCLEPRO.2019.03.227

Busch, D., Ferrarini, G., & Hurk, A. V. d. (2021). The European Commission's Sustainable Finance Action Plan and Other International Initiatives (D. Busch, G. Ferrarini, & S. Grünewald, Eds.). *EBI Studies in Banking and Capital*

Markets Law. Palgrave Macmillan, 19–59. https://doi.org/10.1007/978-3-030-71834-3

Busch, T. (2021). *Akademisk skriving - For bachelor- og masterstudenter* (Vol. 2.Utgave). Fagbokforlaget.

Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting, Organizations and Society*, *28*(2-3), 127–168. https://doi.org/10.1016/S0361-3682(01)00027-7

COM/2018/097_final. (2018). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN CENTRAL BANK, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS - Action Plan: Financial Sustainable Growth. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0097

COM/2021/189 final. (2021). Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2013/23/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52021PC0189

Creswell, J., & Creswell, J. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches.* (Fifth Edition). Sage Publications.

Deegan, C. (2006). *Legitimacy theory*. Spiramus Press Ltd. https://researchrepository.rmit.edu.au/esploro/outputs/bookChapter/Legitimacy-theory/9921859454601341

Deegan, C. M. (2019). Legitimacy theory: Despite its enduring popularity and contribution, time is right for a necessary makeover. *Accounting, Auditing and Accountability Journal*, *32*(8), 2307–2329. https://doi.org/10.1108/AAAJ-08-2018-3638

Dubois, A., & Gadde, L. E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, *55*(7), 553–560. https://doi.org/10.1016/S0148-2963(00)00195-8

EFRAG. (2022). Draft European Sustainability Reporting Standards – Cover note for public consultation. https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2FESRS_CN.pdf

Ellefsen, H. C. (2019). Global Reporting Initiative – en kort innføring. https://www.regnskapnorge.no/faget/artikler/regnskap/global-reporting-initiative---en-kort-innforing/

Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. (1984). Organization Strategy and Structural Differences for Radical Versus Incremental Innovation. *https://doi.org/10.1287/mnsc.30.6.682*, *30*(6), 682–695. https://doi.org/10.1287/MNSC.30.6.682

EU/2022/2464. (2022). DIRECTIVE (EU) 2022/2464 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/23/EU, as regards corporate sustainability reporting. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2464

European Commission. (2020). Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088. *Official Journal of the European Union*. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32020R0852

European Commission. (2023). Corporate sustainability reporting. https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

European Commission a. (2023). Paris Agreement. https://climate.ec.europa.eu/eu-action/international-action-climate-change/climate-negotiations/paris-agreement_en

European Commission d. (2019). The European Green Deal. https://ec.europa.eu/commission/presscorner/detail/en/ip_19_6691

European Commission e. (2023). Overview of sustainable finance. https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en

European Commission f. (2023). EU taxonomy for sustainable activities. https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

European Union. (2013). DIRECTIVE 2013/34/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 June 2013 on the annual

financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC (Text with EEA relevance). *Official Journal of the European Union*. https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:182:0019:0076:EN:PDF

European Union, 2. (2014). DIRECTIVE 2014/95/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 22 October 2014 - amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups -. *Offical Journal of the European Union*. https : / / eur - lex . europa . eu / legal - content/EN/TXT/PDF/?uri=CELEX:32014L0095

Ferrell, A., Liang, H., & Renneboog, L. (2016). Socially responsible firms. *Journal of Financial Economics*, *122*(3), 585–606. https://doi.org/10.1016/J.JFINECO.2015.12.003

George, T. (2022). Semi-Structured Interview | Definition, Guide & Examples. https://www.scribbr.com/methodology/semi-structured-interview/

Global Reporting Initiative. (2018). *In Focus: Addressing Investor Needs in Business Reporting on the SDGs* (tech. rep.). https://www.globalreporting.org/media/sphmq4r0/addressing-investor-needs-sdgs-reporting.pdf

Global Sustainable Investment Alliance. (2021). *GLOBAL SUSTAINABLE INVESTMENT REVIEW 2020* (tech. rep.). www.robeco.com.

Golden-Biddle, K., & Locke, K. (1993). Appealing work: An investigation of how ethnographic texts convince. *Organizational science*, *4*(4), 595–616. https : / / www . jstor . org / stable / pdf / 2635082 . pdf ? refreqid = excelsior % 3A31fab1bf0eb8bce2c72325d4ec701e91 & ab _ segments = &origin = &initiator=&acceptTC=1

Gray, R., & Bebbington, J. (2001). *Accounting for the Environment: Second Edition - Rob Gray, Jan Bebbington - Google Bøker* (Second Edition). Sage. https://books.google.no/books?id=3EoawWFyMjsC&printsec=frontcover&hl=no&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Heinzelmann, R. (2012). 3. Methodology in: Diverging Identities and Professions in European Management Accounting, Doctoral Disseratation. *University of Innsbruck*, 38–53.

International Federation of Accountants. (2005). Environmental Management Accounting. https://www.ifac.org/system/files/publications/files/international-guidance-docu-2.pdf

KPMG. (2023). Corporate Sustainability Reporting Directive - KPMG Netherlands. https://kpmg.com/nl/en/home/topics/environmental-social-governance/corporate-sustainability-reporting-directive.html

Kreiner, K., & Mouritsen, J. (2005). The analytical interview-Relevance beyond reflexivity Platform production View project. https://www.researchgate.net/publication/292766351

Laguir, L., Laguir, I., & Tchemeni, E. (2018). Implementing CSR activities through management control systems A formal and informal control perspective. *Accounting, Auditing & Accountability Journal*. https://doi.org/10.1108/AAAJ-05-2016-2566

Lai, A., & Stacchezzini, R. (2021). Organisational and professional challenges amid the evolution of sustainability reporting: a theoretical framework and an agenda for future research. *Meditari Accountancy Research*, *29*(3), 405–429. https://doi.org/10.1108/MEDAR-02-2021-1199/FULL/PDF

Lee, L., Chowdhury, A., & Shubita, M. (2023). Impact of Paris Agreement on financing strategy: Evidence from global FPSO industry. *Technological Forecasting and Social Change*, *188*, 122266. https://doi.org/10.1016/J.TECHFORE.2022.122266

Liu, W., McKibbin, W. J., Morris, A. C., & Wilcoxen, P. J. (2020). Global economic and environmental outcomes of the Paris Agreement. *Energy Economics*, *90*, 104838. https://doi.org/10.1016/J.ENECO.2020.104838

Lukka, K., & Modell, S. (2010). Validation in interpretive management accounting research. *Accounting, Organizations and Society*, *35*(4), 462–477. https://doi.org/10.1016/J.AOS.2009.10.004

Mahama, H., & Khalifa, R. (2017). *Field interviews: Process and analysis* (H. Mahama & R. Khalifa, Eds.; 1st Edition). Taylor; Francis. https://doi.org/

10.4324/9781315674797-19/FIELD-INTERVIEWS-HABIB-MAHAMA-RIHAB-KHALIFA

Malmi, T., & Brown, D. A. (2008). Management control systems as a package—Opportunities, challenges and research directions. *Management Accounting Research*, *19*(4), 287–300. https://doi.org/10.1016/J.MAR.2008.09.003

Messner, M., Moll, J., & Strömsten, T. (2017). *Credibility and authenticity in qualitative accounting research* (tech. rep.).

Næringslivets Hovedorganisasjon. (2022). CSRD - EUs nye regler for rapportering om bærekraft. https://www.nho.no/tema/barekraftig-utvikling/artikler/csrd---eu-nye-regler-for-rapportering-om-barekraft/

Nordea. (2022). European Green Bonds: Proposed regulatory tightening aims to curb greenwashing. https://www.nordea.com/en/news/european-green-bonds-proposed-regulatory-tightening-aims-to-curb-greenwashing

Norwegian Government. (2016). Norway's follow-up of Agenda 2030 and the Sustainable Development Goals. https://www.regjeringen.no/en/dokumenter/follow-up-sdg2/id2507259/

Norwegian Industry of Climate and Environment. (2019). Norway´s National Plan. *Norwegian Industry of Climate and Environment*. https://www.regjeringen.no/contentassets/4e0b25a4c30140cfb14a40f54e7622c8/national-plan-2030_version19_desember.pdf

Opferkuch, K., Caeiro, S., Salomone, R., Tomás, I., & Ramos, B. (2021). Circular economy in corporate sustainability reporting: A review of organisational approaches. *Business Strategy and the Environment*. https://doi.org/10.1002/bse.2854

Plan- og bygningsloven. (2021). Lovdata - Lov om planlegging og byggesaksbehandling (plan- og bygningsloven). https://lovdata.no/dokument/NL/lov/2008-06-27-71/KAPITTEL_1#KAPITTEL_1

Prop. 208 LS (2020–2021). (2020). *Prop. 208 LS (2020–2021) - Det Kongelige Finansdepartement* (tech. rep.). https://www.regjeringen.no/contentassets/85b9ade4257f43a0b2ed33d0568b5fec/no/pdfs/prp202020210208000dddpdfs.pdf

Prop. 66 LS. (2020). Prop. 66 LS - Det Kongelige Finansdepartementet. https://www.regjeringen.no/contentassets/a479b21e10b14cecac1689f7f37652d4/no/pdfs/prp202020210066000dddpdfs.pdf

PwC. (2022). Enighet om bærekraftsdirektivet (CSRD). https://www.pwc.no/no/pwc-aktuelt/enighet-om-baerekraftsdirektivet-csrd.html

PwC. (2023). Taksonomien. https://www.pwc.no/no/pwc-aktuelt/baerekraftsrapportering/taksonomien.html

PwC a. (2023). Standarder for bærekraftsrapportering. https://www.pwc.no/no/pwc-aktuelt/baerekraftsrapportering/standarder-for-baerekraftsrapportering.html

PwC b. (2023). EUs bærekraftsdirektiv - CSRD. https://www.pwc.no/no/pwc-aktuelt/baerekraftsrapportering/eus-baerekraftsdirektiv-csrd.html

Qian, W., Hörisch, J., & Schaltegger, S. (2018). Environmental management accounting and its effects on carbon management and disclosure quality. *Journal of Cleaner Production*, *174*, 1608–1619. https://doi.org/10.1016/J.JCLEPRO.2017.11.092

Ranganathan, J., Corbier, L., Schmitz, S., Oren, K., Dawson, B., Spannagle, M., Bp, M. M., Boileau, P., Canada, E., Frederick, R., Vanderborght, B., Thomson, H. F., Kitamura, K., Woo, C. M., Naseem, Kpmg, P., Miner, R., Pricewaterhousecoopers, L. S., Koch, J., … Camobreco, V. (n.d.). A Corporate Accounting and Reporting Standard; *World Resources Institute*. https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

Rogers, E. M. (2003). *Diffusion of Innovations, 4th Edition by Rogers Everett M.. 9780743222099. Heftet - 2003 | Akademika.no* (Fifth Edition). The Free Press. https://www.akademika.no/realfag/naturvitenskap-filosofi-teori-og-metode/diffusion-innovations-5th-edition/9780743222099

Safdie, S. (2023a). What is the Non-Financial Reporting Directive (NFRD)? https://greenly.earth/en-us/blog/company-guide/what-is-the-non-financial-reporting-directive-nfrd

Safdie, S. (2023b). The GRI (Global Reporting Initiative): How to Implement it? https://greenly.earth/en-gb/blog/company-guide/the-gri-global-reporting-initiative-how-to-implement-it

Schaltegger, S., Burritt, R., Zvezdov, D., Hörisch, J., & Tingey-Holyoak, J. (2015). Management Roles and Sustainability Information. Exploring Corporate

Practice. *Australian Accounting Review*, *25*(4), 328–345. https://doi.org/10.1111/AUAR.12102

Schaltegger, S., Christ, K. L., Wenzig, J., & Burritt, R. L. (2022). Corporate sustainability management accounting and multi-level links for sustainability – A systematic review. *International Journal of Management Reviews*, *24*(4), 480–500. https://doi.org/10.1111/ijmr.12288

Seale, C., & Silverman, D. (1997). Ensuring rigour in qualitative research. *EUROPEAN JOURNAL OF PUBLIC: HEALTH*, *7*, 379–384. https://academic.oup.com/eurpub/article/7/4/379/551435

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. *Source: The Academy of Management Review*, *20*(3), 571–610.

Tanskanen, E. (2021). EU taxonomy consulting | Greenstep. https : / / greenstep . com / sustainability - services / eu - taxonomy - consulting ? utm _ source = google & utm _ medium = cpc & campaignid = 17590251111 & adgroupid = 141051117271 & keyword = eu % 5C % 20taxonomy & device = c & gclid = Cj0KCQiAw8OeBhCeARIsAGxWtUzAgHBkddjUGLzGUucjJWH3vHvvP0WKkPxc2iBD2jhOfi wcB

Thakur, R., Hsu, S. H., & Fontenot, G. (2012). Innovation in healthcare: Issues and future trends | Elsevier Enhanced Reader. *Journal of Business Research*, *65*(4), 562–569. https://doi.org/https://doi.org/10.1016/j.jbusres.2011.02.022

Thomke, S. (2001). Enlightened experimentation. The new imperative for innovation. *Harvard Business Review*, *79*(2), 66–75. https://bibsys-almaprimo.hosted.exlibrisgroup.com/permalink/f/1imu1ht/TN_cdi_webofscience_primary_000166667100011CitationCount

Tilleggsmandat 21/4280. (2021). *Tilleggsmandat 21/4280 - Det Kongelige Finansdepartement* (tech. rep.). https://www.regjeringen.no/contentassets/827e85ab40994aa6b66761732a4bbd7a/2021-11-10-tileggsmandat.pdf

Tomkins, C., & Groves, R. (1983). The everyday accountant and researching his reality. *Accounting, Organizations and Society*, *8*(4), 361–374. https://doi.org/10.1016/0361-3682(83)90049-1

United Nations Development Programme. (2023). Sustainable Development Goals | United Nations Development Programme. https://www.undp.org/sustainable-development-goals

United Nations Framework Convention on Climate Change (UNFCCC a). (2023). Nationally Determined Contributions (NDCs) | UNFCCC. https://unfccc.int/ndc-information/nationally-determined-contributions-ndcs

United Nations Framework Convention on Climate Change (UNFCCC b). (2023). Adaptation Fund | UNFCCC. https://unfccc.int/Adaptation-Fund

Weick, K. E. (1984). Small wins: Redefining the scale of social problems. *Peer Reviewed Journal*, *39*(1), 40–49. https://doi.org/https://doi.org/10.1037/0003-066X.39.1.40

Whetman, L. L. (2017). The Impact of Sustainability Reporting on Firm Profitability. *Undergraduate Economic Review*, *14*. https://digitalcommons.iwu.edu/cgi/viewcontent.cgi?article=1416&context=uer

Yin, R. K. (2014). *Case study research : design and methods*. SAGE.

Zimmerman, J. L. (1979). 1978 Competitive Manuscript Award: The Costs and Benefits of Cost Allocations on JSTOR. *The Accounting Review*, *54*(3), 504–521. https://www.jstor.org/stable/245977

APPENDICES

A | QUESTIONNAIRE SHEET

IND590-G Master Thesis
Ramton, K.P. and Skogstad, J.H. – Spring 2023

UiA School of Business and Law

Questionnaire Sheet
Intervjuspørsmål

First-time interview with/*Førstegangsintervju med* C O M P A N Y X
Attendee/*Deltakende*: N A M E , P O S I T I O N
Date/*Dato*: DD. MM. Y Y Y Y HH: MM- HH: MM

Introductory questions
Innledende spørsmål

Q1: Can you tell us a little about your company's commitment to sustainability and what motivates you to report in this area?
S1: Kan du fortelle oss litt om bedriftens engasjement for bærekraft og hva som motiverer dere til å rapportere på dette området?

Q2: How do you define the concept of sustainability in your company?
S2: Hvordan definerer dere begrepet bærekraft i deres bedrift?

Q3: How does the company's commitment to sustainability affect the business model and the decisions you make?
S3: Hvordan påvirker bedriftens bærekrafts engasjement forretningsmodellen og beslutningene dere tar?

Q4: Are you reporting on sustainability today?
S4: Rapporterer dere på bærekraft i dag?

Q5: Is sustainability and sustainability reporting something that top management further promotes in the company? If so, how is it promoted?
S5: Er bærekraft og bærekrafts rapportering noe som øverste ledelsen fremmer videre ut i selskapet? Hvis ja, hvordan fremmes det?

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Questionnaire Sheet

Intervjuspørsmål

Questions about CSRD:

Spørsmål om CSRD:

Q6: What is their knowledge of the Corporate Sustainability Reporting Directive (CSRD)?
S6: Hva er deres kjennskap til Corporate Sustainability Reporting Directive (CSRD)?

Q7: How do you think this new standard will affect your company's sustainability reporting?
S7: Hvordan tror du denne nye standarden vil påvirke bedriftens bærekraftsrapportering?

Q8: How do you prepare to meet the requirements of CSRD?
S8: Hvordan forbereder dere dere på å møte kravene i CSRD?

Q9: How do you think the introduction of CSRD will affect sustainability reporting in your industry in general?
S9: Hvordan tror dere at innføringen av CSRD vil påvirke bærekrafts rapporteringen i din bransje generelt sett?

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Questionnaire Sheet

Intervjuspørsmål

Questions about ESRS:

Spørsmål om ESRS:

Q10: Are you familiar with the European Sustainability Reporting Standards (ESRS)?

S10: Er dere kjent med European Sustainability Reporting Standards (ESRS)?

Q11: What is their view on ESRS and how do you think this will affect your company's sustainability reporting?

S11: Hva er deres syn på ESRS og hvordan tror du dette vil påvirke bedriftens bærekraftsrapportering?

Q12: What kind of support will you need to be able to implement ESRS?

S12: Hva slags støtte vil dere trenge for å kunne implementere ESRS?

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Questionnaire Sheet

Intervjuspørsmål

Questions about internal reporting tools:

Spørsmål om internrapporteringsverktøy:

Q13: What kind of tools do you use to report on sustainability?
S13: Hva slags verktøy bruker dere for å rapportere på bærekraft?

Q14: How have these tools contributed to the company's sustainability reporting so far?
S14: Hvordan har disse verktøyene bidratt til bedriftens bærekrafts rapportering så langt?

Q15: How did you arrive at the tools you use?
S15: Hvordan kom dere frem til verktøyene dere bruker?

Q16: Do you see any opportunities for improving or simplifying the internal reporting tools you use?
S16: Ser dere noen muligheter for forbedring eller forenkling av internrapporteringsverktøyene dere bruker?

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Questionnaire Sheet

Intervjuspørsmål

Concluding questions:

Avsluttende spørsmål:

Q17: What will the company's sustainability reporting look like in five years?

S17: Hvordan vil bedriftens bærekrafts rapportering se ut om fem år?

Q18: What goals have you set to improve sustainability reporting?

S18: Hvilke mål har dere satt for å forbedre bærekrafts rapporteringen?

Q19: What do you see as the biggest challenges for corporate sustainability reporting in the future?

S19: Hva ser du som de største utfordringene for bedriftens bærekraftsrapportering i fremtiden?

Q20: As an organisation, do you feel that you are able to report to CSRD when this occurs in 2024/2025?

S20: Føler dere som organisasjon at dere er i stand til å rapportere til CSRD når dette inntreffer i 2024/2025?

Master

UiA University of Agder