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Incentives for Environmental Management Accounting Implementation in Finnish Environmentally Sensitive Industries

Accounting and Finance

Master's thesis

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In the current era, businesses are facing increasing pressure to reduce the environmental impact of their activities. For example, the environmental reporting pressures from legislation, investors, and customers are high. Consequently, companies are encouraged to enhance their environmental performance. However, there is still a lack of clarity among companies regarding the intrinsic benefits of environmental performance besides meeting reporting requirements and maintaining the satisfaction of investors and customers.

This thesis addresses the topic of environmental management accounting (EMA), which is the counterpart to external environmental reporting. In other words, it refers to the internal use of environmental information. In practice, EMA involves the monitoring and utilization of environmental indicators and costs to inform decision-making and assist in traditional management accounting practices. Researchers have identified a multitude of benefits from EMA, including the reduction and improved allocation of costs, improved accuracy in pricing and evaluation of investment decisions, as well as new possibilities in process and product innovations.

This study examines the intrinsic benefits of EMA, which are distinct from those derived from external reporting. The topic was approached from the perspective of institutional theory, which explains the reasons behind organizational behavior in situations where the economic consequences of that behavior are not immediately apparent. In other words, the behavior would be irrational in the absence of institutional pressures that drive the organization towards it. A significant number of studies on EMA have been normative in nature, encouraging companies to implement EMA, often citing the climate crisis. This thesis takes a more critical approach, assessing the usefulness of EMA from a financial perspective.

The study involved interviews with accounting and environmental professionals from Finnish companies operating in environmentally sensitive industries. The concept of EMA was relatively unknown to the interviewees, but there were certain practices in the companies that could be characterized as EMA practices. These included the development of new business models and investment decisions based on environmental information. Potential benefits of EMA were also seen in the assessment of environmental costs and the reduction of waste. However, interviewees were uncertain about the financial benefits of EMA and whether any company would adopt its tools without the influence of institutional pressures. The study provides new insights into the challenges of EMA and its dependence on institutional pressures, which have received relatively little attention especially in Finnish research.

Key words: environmental management accounting, environmentally sensitive industries, institutional pressures

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Yrityksiin kohdistuu jatkuvasti kasvavia paineita, jotka liittyvät niiden toiminnan ympäristövaikutuksiin. Ympäristöön liittyvät raportointivaatimukset ovat ilmeisiä niin lainsäädännön, sijoittajien kuin asiakkaidenkin suunnalta, ja yrityksiä kannustetaan parantamaan ympäristösuorituksiaan. Yrityksille voi kuitenkin olla nykytiedon valossa epäselvää, mitä hyötyä ympäristösuoritumisesta itsessään on lakisääteisten raportointivaatimusten täyttämisen sekä sijoittajien ja asiakkaiden tyytyväisistä pitämisen lisäksi.

Tämä tutkielma käsittelee johdon ympäristölaskentatoimea, joka on ulkoisen ympäristöraportoinnin kääntöpuoli eli ympäristöön liittyvän informaation sisäistä hyödyntämistä. Käytännössä tämä tarkoittaa ympäristöindikaattoreiden ja -kustannusten seuraamista ja hyödyntämistä päätöksenteon sekä johdon laskentatoimen perinteisten menetelmien tukena. Johdon ympäristölaskentatoimi tuo yrityksille tutkijoiden mukaan hyötyjä esimerkiksi kustannusten kohdentamisessa ja vähentämisessä, hinnoittelussa, investointipäätösten arvioinnissa sekä prosessi- ja tuoteinnovaatioissa.

Tämä tutkimus keskittyy tutkimaan niitä johdon ympäristölaskentatoimen hyötyjä, jotka eivät johdu ulkoisesta raportoinnista. Aihetta lähestyttiin institutionaalisen teorian näkökulmasta, joka selittää, miksi organisaatiot toimivat tietyllä tavalla, vaikka toimintatavan taloudelliset hyödyt eivät olisi ilmeisiä; toisin sanoen toiminta olisi irratiionalista ilman institutionaalisia paineita, jotka tähän toimintaan ohjaavat. Monet johdon ympäristölaskentatoimea käsittelevät tutkimukset ovat olleet luonteeltaan normatiivisia, eli ne pyrkivät kannustamaan yrityksiä johdon ympäristölaskentatoimen käyttöön, yleensä ilmastokriisiin vedoten. Tämän tutkimuksen lähestymistapa on kriittisempi, ja johdon ympäristölaskentatoimen hyödyllisyyttä arvioidaan taloudellisesta näkökulmasta.

Tutkimuksessa haastateltiin laskentatoimeen ja ympäristöasioihin erikoistuneita ammattilaisia suomalaisista yrityksistä, joiden toimintaan liittyy merkittäviä ympäristövaikutuksia, toisin sanoen ympäristöllisesti merkittävien toimialojen yrityksistä. Johdon ympäristölaskentatoimi oli haastateltaville käsitteenä melko tuntematon, mutta yrityksissä oli tiettyjä käytäntöjä, joita voidaan luonnehtia termin alle kuuluviksi. Yritykset olivat muun muassa kehittäneet uusia liiketoimintamalleja ja tehneet investointipäätöksiä ympäristöinformaation perustuen. Potentiaalisia hyötyjä nähtiin myös ympäristökustannusten arvioinnissa ja hukan vähentämisessä. Haastateltavat olivat kuitenkin epävarmoja johdon ympäristölaskentatoimen taloudellisten hyötyjen arvioinnista ja siitä, ottaisiko mikään yritys sen työkaluja käyttöön ilman institutionaalisten paineiden vaikutusta. Tutkimus tuo esiin uusia näkökulmia johdon ympäristölaskentatoimen haasteista sekä riippuvuudesta ulkoisiin paineisiin, jotka ovat aiheina saaneet varsinkin suomalaisessa tutkimuksessa melko vähän huomiota.

Avainsanat: johdon ympäristölaskentatoimi, ympäristöllisesti merkittävät toimialat, institutionaaliset paineet

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1 Introduction

1.1 Background of the Thesis

Businesses face evolving external pressures that impact their operations, including increased competition, shifting social and economic trends, and directives from regulatory bodies. Recently, environmental considerations have become increasingly integral to business operations and are now a significant source of pressure. Environmental issues may become a strategic concern for companies due to their influence on several key factors, including an organization's image, profitability, competitiveness, markets, and products. These factors, in turn, have the potential to affect a company's future economic survival (Dias-Sardinha & Reijnders 2005, Schaltegger & Wagner 2006.) Porter and Kramer (2006) argue that responsibility should not be viewed as an additional cost, restriction, or charity, but rather as a source of opportunities, innovations, and competitive advantage. In addition, there are various organizations that rank companies based on their level of responsibility, and although the criteria for these classifications may be debatable or inconsistent, they receive significant public attention. Therefore, company management cannot ignore the importance of investing in responsibility. (Porter & Kramer 2006.)

Although the relationship between environmental considerations and accounting are not obvious, in numerous organizations, accounting professionals select critical responsibility indicators and compile responsibility reports, which in turn impact the strategic outcomes of the entire organization (Huang & Watson 2015). In many companies, traditional accounting systems and ecological accounting systems continue to be separate accounting and management systems, but this should not necessarily be an obstacle to the integration of their separate findings (Marelli 2015). Although sustainability is clearly necessary from a business standpoint, many companies address the issue piece by piece instead of attempting to eliminate the negative impacts of business altogether. This may be due to the lack of an environment in which companies are forced to consider all stakeholder demands. (Shevchenko et al. 2016.) Additionally, although there is extensive literature on responsibility aspects of business, actionable guidance for business leaders remains scarce. As a result, managers often seek insights from consultants and academic experts to determine the strategic relevance of corporate responsibility within their organizations. (Porter & Kramer 2006.) Kumpulainen and Pohjola (2008) emphasize a prevalent issue

in Finland: environmental concerns are not yet integrated into the core business processes of many companies but are often viewed as a means of appeasing environmentally conscious stakeholders.

Environmental management accounting (EMA) has emerged as a tool for companies to integrate environmental issues into their strategy and management. EMA allows companies to internally utilize information related to their activities' environmental impacts, rather than solely using such information for external reporting purposes. Although the concept of EMA lacks a strict definition, it broadly encompasses the integration of both physical and monetary data concerning environmental impacts into decision-making processes and performance evaluations. Depending on the accounting system, information can be obtained from e.g. environmental cost accounting, environmental investment appraisal, and environmental budgeting. (Burritt et al. 2002.) There is a growing interest in the relationship between environmental performance and economic performance, which has significant implications for EMA and its adoption (Marelli 2015).

It is conventionally believed that companies are strictly financially oriented and should always aim to make a profit and increase their value for shareholders (Järvenpää & Lämsiluoto 2016). EMA is often promoted as a tool to enhance both environmental and financial performance (e.g. Bennett et al. 2003, Solovida & Latan 2017, Qian et al. 2018, Deb et al. 2023). However, assessing the actual impact of EMA implementation on these outcomes is challenging. Evaluating whether and in which ways companies benefit from EMA practices is complicated by institutional pressures that influence the adoption and effectiveness of different EMA tools, especially when the pressures directly affect only the external reporting side. These factors necessitate an investigation into the way environmental measures become intertwined or isolated from those employed in the decision-making process. (Arroyo 2012, Qian & Burritt 2008.)

1.2 Objectives, Scope, and Methodology

This thesis examines the relationship between institutional pressures, EMA implementation, and the benefits derived from EMA for companies. The primary objective of the study is to determine whether the implementation of EMA is or would potentially be motivated by external pressures or by the intrinsic benefits of EMA. This inquiry is important because environmental accounting is typically focused on external

reporting requirements, but despite several benefits mentioned in the literature, the intrinsic benefits of implementing EMA within companies are not clear. Although environmental reports can be published thanks to environmental accounting information, environmental issues within companies may often be dealt with by environmental specialists with little connection to the company's decision-making (Stubbs et al. 2012). The thesis aims to contribute to the research on environmental accounting by focusing on EMA especially in the Finnish context of environmentally sensitive industries; a topic which has been studied to a limited extent.

Numerous studies have examined the impact of institutional pressures on environmental accounting and EMA practices, as well as their effects on environmental and financial performance. However, most of the studies conducted have been quantitative or based on questionnaire surveys aimed at establishing correlations between variables. Quantitative studies may be efficient in finding the relationships, but variables alone cannot fully explain the motivations and rationales for EMA implementation. This thesis aims to more deeply investigate the factors that motivate companies to implement EMA through qualitative semi-structured interviews with professionals working in Finnish environmentally sensitive industries.

The study focuses on environmentally sensitive industries, which are believed to have a higher tendency to adopt EMA (García-Meca & Martínez-Ferrero 2021, Ferreira et al. 2010). It is notable that this thesis focuses on the motivations and incentives for EMA implementation, mainly the influence of external pressures and perceived benefits of EMA, with less emphasis on considerations such as organizational size, cultural factors, and industry-specific dynamics which have been included as influencing factors in previous studies on EMA adoption.

The thesis objectives have guided the formulation of the following research questions:

1. In what ways is EMA implemented in environmentally sensitive industries in Finland?
2. What are the incentives for adopting EMA in the context of Finnish environmentally sensitive industries?
3. How can the implementation of EMA contribute to financial success in Finnish companies operating in environmentally sensitive industries?

The first research question aims to assess the extent to which EMA practices are currently utilized by the selected Finnish companies. This assessment is designed to gauge the companies' familiarity with EMA and the most prevalent methods of its implementation. Despite the prevalence of environmental strategies among companies, the integration with accounting, especially management accounting, remains somewhat ambiguous (Marelli 2015).

The second research question seeks to identify the rationale and incentives driving companies to adopt EMA practices. These factors may vary and include intrinsic factors or benefits, such as the potential of EMA in enhancing decision-making regarding environmental efficiency or environmental costing, and on the other hand institutional pressures, including governmental regulations, customer demands for eco-friendly products, and expectations of investors and the broader society for sustainable business practices.

The third question is designed to assess the financial results of implementing EMA practices for companies. The investigation aims to determine whether the adoption of EMA is perceived to positively affect the financial performance of companies, providing insights into the financial viability as well as benefits and challenges of integrating environmental accounting figures into internal decisions. The objective of this question is to determine whether EMA holds intrinsic economic value for companies or if the advantages are only indirect through improved reporting and reputation.

The use of the term “incentives” instead of “factors” is intentional, as it highlights the underlying reasons behind companies' decisions to implement EMA. Although factors such as organizational size, industry, or culture have been found to influence EMA implementation (e.g. Jamil et al. 2015, Järvenpää & Lämsiluoto 2016, Yassin & Ali 2020), they may not directly drive companies to adopt EMA practices; rather, they may be associated with EMA adoption as correlating factors. This study aims to uncover the specific motivations that encourage companies to implement EMA by examining potential incentives. This provides deeper insights into the underlying reasons for adoption within Finnish environmentally sensitive industries.

The research questions are designed in a way that should produce insights that are useful for accounting professionals specifically. Malmi and Granlund (2009) propose that management accounting theory and research should address questions such as what types

of accounting systems to use, how and under what conditions to use them, and how to implement changes in practice. However, a clear definition of management accounting theory is lacking, and many studies draw on theories from other disciplines that are not always useful for accounting professionals. Malmi and Granlund emphasize the importance of developing new theories in management accounting research, specifically in relation to value maximization, social equality, and environmental sustainability. This thesis aims to contribute to these discussions by investigating the interplay between environmental sustainability, value maximization, and management accounting practices. Malmi and Granlund (2009) also argue that many management accounting studies state the obvious. As an example, they mention findings from studies indicating that in ambiguous operational contexts, organizational leaders prioritize information systems that provide data on the external environment. However, such broad findings offer limited practical utility. Instead, Malmi and Granlund advocate for research that delves into how accounting systems can effectively support decision-making and align with organizational goals. The arguments presented by Malmi and Granlund serve as a key motivational factor for this thesis, particularly in emphasizing the importance of examining the tangible benefits of EMA for companies.

Dubey et al. (2017) propose institutional theory, combined with organizational culture, as a promising framework for sustainability measurement research. They argue that as the significance of sustainability measurement increases within institutions, the organizational culture plays a pivotal role in shaping responses to external pressures. While this thesis does not primarily examine the influence of company characteristics, it uses institutional theory to evaluate the impact of external pressures on management accounting practices, including factors that may not be explained through financial reasoning. The concept of legitimacy and its search are at the core of institutional theory. To gain legitimacy, organizations must be perceived as conforming to the expectations placed upon them. (DiMaggio & Powell 1983.) Institutional theory can explain the internal and external environments of a company and their impact on the management accounting practices it employs. Management accounting change is a complex process, and institutional theory can explain the various aspects of the complicated web of interrelated influences. (Scapens 2012.)

There are some other closely related theories which could have been employed to form a similar study. For example, stakeholder theory could be used to examine how companies

manage and report environmental performance to satisfy stakeholder demands. The resource-based view theory (RBV) could explore how EMA can be leveraged to enhance firm performance and create a competitive advantage. This, however, would require a deeper focus on companies that already have an established EMA system and where the advantages of it are visible. Stakeholder theory and RBV are closely related, as stakeholders are seen as a source of competitive advantage (Freeman et al. 2021), but this study focuses on the intrinsic benefits of EMA tools and not so much on the effects their use has on stakeholders as such. Legitimacy theory could analyze how companies use EMA and environmental reporting to align with societal norms and expectations to maintain legitimacy (Zyznarska-Dworczak 2018). While these theories do align well with some aspects of the study, institutional theory was selected as the main theoretical framework since it specifically focuses on explaining why companies choose to use certain management accounting practices that could not be rationally explained by other factors than the institutional pressures.

1.3 Structure of the Thesis

To provide context for the topic of EMA, the thesis begins with a literature review on EMA and institutional theory. The literature review commences with Chapter 2, giving an overview of EMA, exploring the relationship between corporate responsibility and sustainability considerations and accounting practices. This chapter examines the principles of EMA, its main methods and indicators, as well as evaluates EMA research in the Finnish context.

Chapter 3 delves deeper into the prior literature on incentives for the adoption of EMA. This chapter includes an analysis of the impact of institutional pressures on management accounting practices, an overview of the role of EMA in decision-making processes, and an assessment of the potential benefits and challenges associated with EMA implementation.

The methodology chapter (4) describes the research design and approach employed in the study. It specifies the data collection methods and selection criteria for interviewees, offering transparency into the methodology used to gather and analyze data. The chapter on results (5) presents key findings from the interviews, including the links between environmental and overall corporate strategies, the ways in which EMA practices are

implemented, the incentives for EMA implementation, and the realized and potential benefits from EMA adoption.

The discussion chapter (6) offers an interpretation of the results, a comparison with previous studies, and a discussion of the limitations and some practical implications of this study, thereby contributing to the ongoing discourse on sustainable business and accounting practices. The thesis ends with a conclusion chapter (7) which ties together the most important points from the study and offers recommendations for future EMA research.

2 Environmental Management Accounting (EMA): An Overview

2.1 Environmental Perspectives in Business and Accounting

The importance of corporate responsibility has recently grown in terms of academic research and practical business (Carroll & Shabana, 2010). The terms responsibility and sustainability are frequently used interchangeably, and the boundaries between environmental, social, and governance issues aren't always clear (Gray 2010). Sustainability has long been a part of the accounting field, but sustainability as a term can be quite ambiguous. This has led to several terms being used in accounting literature, such as *sustainability management accounting*, *sustainability financial accounting*, *green taxation*, *environmental auditing*, *sustainability accounting*, and *environmental accounting* (Ngwakwe 2012).

Corporate responsibility and the environment can be considered as strategic assets for companies. Porter and Kramer (2006) presented three categories by which a certain issue related to corporate responsibility can be described from the perspective of an individual company. First, *generic social issues*, while important to society, may not be directly influenced by the company's operations or significantly affect its long-term competitiveness. Secondly, *value chain social impacts* are those directly affected by the company's activities in its day-to-day operations. Thirdly, the *social dimensions of competitive context* include external factors that significantly influence the underlying drivers of competitiveness in the locations where the company operates. For example, carbon dioxide emissions can be a generic issue for a bank, a negative impact on the value chain for a transport company, and a competitive factor for a car manufacturer. The company's competitive position also affects how a certain aspect of social responsibility manifests itself in its operations. For example, some car manufacturers have focused on safety, while others emphasize climate issues. Porter and Kramer emphasize the strategic importance of focusing on the areas of sustainability that the company's activities mainly affect.

The terms environment and sustainability have gained popularity in the business world in recent years, although they were not commonly used in this sense as recently as 30 years ago. Elkington (1994) made a major contribution to integrating sustainability into

accounting by presenting the triple bottom line, which aims to balance the social, environmental, and financial dimensions (people, planet, profit) in measuring and controlling a company's performance and operations. According to him, a company acts responsibly when it tries to avoid and reduce negative effects and, on the contrary, to increase positive effects in every area. Porter and Kramer (2006) refer to this approach as an 'enlightened pursuit of self-interest', where companies prioritize long-term financial performance by avoiding short-term activities that could harm society or the environment.

Research has demonstrated that business leaders who fail to grasp the significance of sustainability may disregard it entirely, resulting in potential harm to their companies' reputation. When a company views CSR solely as a means of satisfying stakeholders, it often becomes trapped in a cycle of short-term defensive reactions that provide little societal value or strategic benefit to the company (Porter & Kramer 2006). However, the way in which CSR is implemented also affects its consequences: Carroll and Shabana (2010) argue that there can only be a market for virtue and a business case for CSR when firms are able to pursue CSR activities with the support of their stakeholders.

It has also been observed that companies miss out on significant savings targets and business opportunities because they do not have the necessary information to act on them. This is simply due to the lack of monitoring and data collection. (Doorasamy & Baldavaloo 2016.) In studying the actions of Ford executives, Doorasamy and Baldavaloo found that they often sacrificed long-term sustainability to maximize short-term profits. Based on this, they suggested that the operational activities and the company's strategic goals should be combined as well as possible to maintain the long-term operating conditions.

Despite these findings, many business leaders plan and implement their sustainability strategy separately from the organization's core strategy, as integrating sustainability into strategic decision-making seems challenging (Ahmed & Sundaram 2012, Vandaele & Decourette 2013, Calabrese et al. 2019). To facilitate decision-making, sustainability thinking should be comprehensive according to the recommendations in the literature, but despite several theoretical contributions, practical tools have received less attention (Calabrese et al. 2019).

The importance of sustainability thinking has grown especially in terms of companies' external reporting. Industries traditionally associated with negative environmental

impacts have long reported on environmental issues and developed frameworks for managing them (Guthrie & Parker 1989), but nowadays more and more companies are required to deal with ESG matters. International requirements have also been created for reporting, such as IASB and IFRS standards at the global level and EFRAG standards at the European level, which have also taken steps in the direction of emphasizing sustainability recently. (Tettamanzi et al. 2022.) In 2023, the European Union introduced the Corporate Sustainability Reporting Directive (CSRD), which mandates a wider range of large companies and listed SMEs (small and medium-sized enterprises) to comply with new regulations in 2024. The implementation of these standards is expected to encourage companies to prioritize sustainability and environmental considerations in their accounting and reporting practices (European Commission 2024.)

For business leaders, the incentives and benefits of complying with regulations or voluntarily reporting on environmental matters may seem ambiguous. Some studies on the relationship between accounting and sustainability have been written in a heavily normative tone from a strictly environmental perspective without mentioning tangible benefits for companies (e.g. Mathews 1997). In this regard, Ngwakwe (2012) studied the topicality of the criticism that accounting as a field is indifferent to society and the environment. According to him, clear efforts have been made in accounting from the point of view of business sustainability. However, due to the lack of standards, regulation, and general accounting practices, even the modern consideration of sustainability in accounting remains at the level of a loose interpretation of the triple-entry financial statements. Geneidy and Kotiaho (2024) present an integrated financial-environmental impact statement as an alternative to the current separated reports of financial and environmental accounts and argue that this integration should be mandatory for all organizations with financial disclosure obligations.

Environmental accounting is designed for both internal and external users. Internally, it generates environmental information to assist in management decisions related to, for example, pricing, controlling overhead, and capital budgeting. Externally, it discloses environmental information that is of interest to the public and the financial community. (Yakhou & Dorweiler 2004.) There is a high degree of commonality between strategic management accounting, environmental management, and environmental accounting. These include a concern with consequences over different timescales, aligning functions within organizations, concern with outcomes rather than efficiency, long-term

orientation, and monitoring of external contexts. Environmental accounting is a kind of intermediary that connects the organization's management accounting and environmental strategy. It provides useful information for the planning, implementation and guidance of practices related to the organization's environment. (Gibassier 2021.)

2.2 Introduction to Environmental Management Accounting

2.2.1 EMA as an Intermediary between Corporate Strategies

Environmental management accounting (EMA) is a specialized branch of environmental accounting designed for internal users within a company. A primary objective of EMA is to enhance managerial awareness of the potential significance of environmental impacts on corporate economic performance, both in terms of positive and negative outcomes (Burritt et al. 2002). The principal instruments of EMA encompass the identification, collection, calculation or estimation, analysis, internal reporting, and utilization of data regarding materials and energy, environmental costs, and other information to facilitate decisions that advance environmental protection (Vasile & Man 2012). Bouten and Hoozée (2013) list capital investment decision-making, budgeting, performance measurement, incentive systems, and costing based on environmental information as the most prevalent EMA instruments. Figure 1 depicts the four main approaches to environmental information use as defined by Bartolomeo et al. (2000). *EMA and energy and materials accounting* are aspects for internal decision support, whereas *financial reporting* and *social accountability reporting* are forms of external reporting.

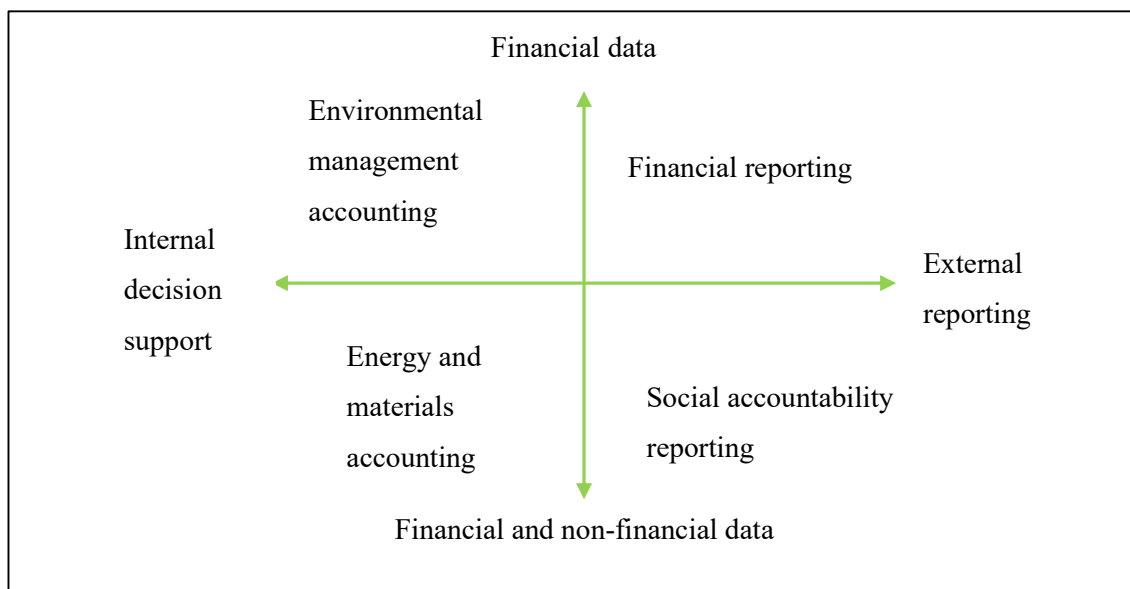


Figure 1 Four approaches to environmental accounting (based on Bartolomeo et al. 2000)

Most organizations of any significant size have a management accounting function, management accountants, and management accounting tools (Bennett et al. 2003). EMA enhances traditional management accounting by incorporating non-market activities and

social costs, as well as integrating ecological and monetary issues. Environmental costs may be a substantial portion of a company's total costs, although many companies are not aware of the actual magnitudes of them. EMA can be used in all types of routine management activities, such as product and process design, cost allocation and control, capital budgeting, purchasing, product pricing, and performance evaluation (Staniskis & Stasiskiene 2006.) Burritt et al. (2019) state that EMA broadly provides a set of tools designed to support management to make better decisions about cleaner production. Cleaner production is a closely related term which refers to a preventive, company-specific environmental protection initiative with a focus on avoiding pollution and waste throughout the entire production cycle, through the efficient use of raw materials, energy, and water (Schaltegger et al. 2008).

EMA is also closely related to strategic management accounting (SMA). SMA encompasses strategic business unit identification, strategic cost analysis, strategic market analysis, strategy evaluation, benchmarking, and multidimensional performance measures. EMA can be seen as an extension of SMA, incorporating a broader environmental perspective into strategic decision-making processes. When SMA principles are combined with EMA practices, they make up the concept of strategic environmental management accounting (SEMA). SEMA aims to integrate environmental considerations into strategic management processes, aligning business strategies with environmental objectives and facilitating sustainable business practices. (Gibassier 2021.)

To integrate environmental aspects into management accounting, versions of management accounting tools have been introduced with sustainability in mind, such as the Sustainability Balanced Scorecard, which can take three different forms: a specific environmental and/or social scorecard, the extended model with the addition of an extra perspective to traditional scorecards, or the integration of social and environmental objectives within the four existing scorecard perspectives (Figge et al. 2002). The Balanced Scorecard has emerged as a modern approach to translating strategy into action and bridging the gap between strategic goals and operational management activities, and the integration of sustainability has been a widely discussed topic in trying to assess the usefulness for for-profit companies (Bennett et al. 2003).

Even if environmental aspects are not treated separately, they are inevitably included, at least indirectly, in conventional cost calculations, effectiveness and efficiency

assessments, investment evaluations, and performance assessments. Factors such as the full cost of waste, material efficiency, energy efficiency, and assessments of new technologies are largely integrated into traditional calculations but remain "hidden" in other figures and information. An underlying theme in the EMA debate is that this lack of focus leads to inefficiency, excess waste, and poor environmental performance, as environmental issues are important to companies and other organizations, both in immediate operational terms and for future performance. (Bennett et al. 2003.) Christ and Burritt (2013) demonstrated that the environmental strategy is a contingency variable that significantly affects the adoption and impact of EMA. In other words, the environmental strategy needs to be an integral part of overall business strategy to make the implementation of EMA effective.

The role and definitions of environmental accounting and EMA have at times been unclear (Bennett et al. 2003) and they have gone through periods of uncertain status. The oldest literature on environmental accounting originates from the 70s and 80s. Back then the nature of environmental accounting research was both descriptive and normative. The focus of the discussion was the role of accounting and the environmental information reported to external stakeholders. In the late 90s the tools and tasks of EMA started to evolve and one of the first tasks was to measure environmental performance on the part exceeding the standards set on the business. (Yakhou & Dorweiler 2004, Mathews 1997.) Many companies recognized that the structure of conventional accounting systems was not an adequate starting point for efficient environmental organization, leading to theorization and development of many different approaches (Marelli 2015). Some studies have used the term *sustainability management accounting* as a broader term, as EMA is solely focused on the environmental aspects (Schaltegger et al. 2022).

EMA has been a topic of interest in governmental bodies. The United Nations Department of Sustainable Development defines EMA as the identification, collection, analysis, and use of information related to environmental issues either physically or financially. Physical information is related to the use and end destinations of energy, water, and materials as well as waste. Financial information, on the other hand, describes costs, benefits, and savings related to the environment. It is a combined solution that enables the improvement of material efficiency, the use of economic and cost figures to reduce environmental impacts and risks, and the reduction of the amount of money used for environmental protection. The UN DSD formed a working group in cooperation with

agencies and independent experts, the purpose of which is to promote EMA through publications and pilot projects. They also established an international forum for discussion on the role of governments in promoting EMA. (Jasch 2003.) Several organizations have published guidance documents on EMA, as well as on the related subject of environmental costing for financial accounting and reporting. It is possible for different countries and organizations to adopt those EMA concepts and practices that suit their own goals. (Kumpulainen & Pohjola 2008.)

As discussed, the main purpose of EMA is to provide information about the environment to support management. The main types of information are related to environmental performance indicators and environmental costs, and these types of information can support decision making in different ways.

2.2.2 Environmental Performance Indicators

The term "environmental performance" is defined as "an overview of the use of operational performance indicators that evaluate the use of resources, waste disposal, emissions, or water consumption" (Nawrocka & Parker 2009). A robust corporate environmental strategy is a prerequisite for attaining optimal environmental performance. It is of paramount importance for companies to meticulously document and continuously refine environmental performance indicators to effectively address ongoing environmental challenges. The assessment of these indicators will be closely aligned with the company's environmental strategy. (Rodrigue et al. 2013.)

Some companies adopt a basic approach to environmental performance measurement, while others employ more sophisticated methods. Azzone et al.'s (1996) ecobalance tool, for instance, offers a straightforward assessment of environmental performance. It focuses on three primary elements: inputs (e.g., resources), stock holdings (e.g., capital), and outputs (e.g., waste). This tool provides a simplified overview of a company's environmental impacts. Nowadays a plethora of more sophisticated environmental performance indicators are available to companies, allowing them to select the most appropriate indicators for their business. Solovida and Latan (2017) identify several key environmental performance indicators, including compliance with standards, energy input, community relations, solid and liquid waste outputs, air emissions, financial impacts, maintenance, raw materials and water inputs, implementation of environmental policies, auxiliary materials, and indicators providing local, regional, and national

environmental data. Furthermore, they discuss indicators related to historical orientation, ISO certification, investment in research and development, long-term environmental commitment, reporting structure, performance in air, waste, water, and energy categories, relative performance, and environmental awards.

The importance of environmental performance indicators at the company level has been increasing for a long time. This is due, in part, to the growing demand from stakeholders for environmental improvements and proof that these have been made. (Azzone et al. 1996.) The process of developing key performance indicators (KPIs) for the purpose of sustainability reporting has focused attention on social and environmental performance. The desire to report data externally has led to the development of data collection systems and the integration of social and environmental performance data into decision-making, risk management, and performance measurement. (Adams & Frost 2008.) Consequently, companies must persist in documenting and developing environmental performance indicators to address existing environmental issues. Environmental performance indicators should be derived from the company's environmental strategy, as an appropriate environmental strategy will determine the success of a company's environmental performance. (Solovida & Latan 2017.) However, in practice, companies often don't consider environmental performance as important as short-term financial performance. For example, in Järvenpää and Lämsiluoto's (2016) study on Finnish companies, all their environmental indicators were selected based on how they would affect the companies' costs because the companies had a profit-driven collective identity and thus emphasized short-term financial goals over environmental strategy.

The reporting practice may give organizations a reason to also implement the environmental information internally and look for new opportunities. In their action research study, Adams and McNicholas (2007) discovered that engaging in the sustainability reporting process resulted in organizational change. They propose that the act of compiling a report and the subsequent exposure of sustainability performance data served as a catalyst for enhancing sustainability performance. Bartolomeo (1998) observed that some companies initially construct an information system to manage environmental performance indicators (EPIs) and subsequently publish their environmental reports, whereas in other companies, the environmental report serves as the catalyst for the development of a more comprehensive environmental performance management system. To support decision-making and improve sustainability, it is

necessary to develop KPI measures from financial, physical, and attitudinal aspects. In addition to analyzing past performance, these metrics should be used to assess risks, develop plans, and determine performance-based rewards. (Adams and Frost 2008.)

2.2.3 Environmental Costs

The other main task of EMA is related to the tracking of costs related to the environmental impacts of operations. Gray (1994, 33) presents the concept of sustainability cost, which refers to the amount of money that an organization should spend at the end of the accounting period to restore the biosphere to the state it was in at the beginning of the accounting period. The United States Environmental Protection Agency (2024) presents environmental costs divided into four categories: traditional, hidden, contingent, and image and relationship costs. Traditional costs are, for example, raw material and energy costs, which have significant environmental implications. Hidden costs are those that are considered in the accounting system but lose their meaning later. Contingent costs are those that become relevant later, such as cleaning costs. Finally, the image and relationship costs are non-monetary costs, such as the costs related to the preparation of environmental reports.

Henri et al. (2016) defined environmental cost tracking as the identification and accumulation of specific internal costs related to the protection of the environment. This is integral to the implementation of environmental initiatives aimed at exercising operational control over activities affecting the environment. Environmental costing can be used strategically through executional and structural cost management. Executional cost management is a cost management strategy that aims to enhance performance in accordance with a given strategy. It is based on common management accounting tools, which are employed to assess cost performance in relation to competitive benchmarks. These benchmarks are utilized to identify potential areas for improvement. On the other hand, structural cost management encompasses the activities undertaken with the objective of modifying the cost structure of a given firm. These activities may include the implementation of organizational tools, products, and processes designed to construct a cost structure that is in alignment with the firm's strategic objectives. In essence, structural cost management is concerned with the strategic decisions that typically define the gross parameters of the firm's cost structure. Both aspects are reflected in environmental costs: an executional aspect aimed at managing, controlling, and optimizing costs for a given

environmental strategy, and a structural aspect based on their influence on the firm's cost structure, notably in terms of product design, raw materials used, and operational process design. (Henri et al. 2016.)

When environmental costs are accurately evaluated, they can be used for many purposes. Jasch (2003) suggests that when total annual expenditure (energy input, wasted material, emission treatment, environmental protection, and management) is assessed, improvement options, savings, and investment projects as well as product prices can be re-calculated. In terms of environmental protection investments, conventional investment appraisal methods often cannot be used without adaptation. Therefore, whenever possible, environment-driven costs should be allocated directly to the activity that causes the costs and to respective cost centers/cost drivers. However, the allocation of overheads to cost centers is typically based on arbitrary criteria that bear no relation to the actual causal relationships between environmental factors and costs. This can result in the misallocation of environmental costs, which may in turn lead to incorrect product line and pricing decisions, as well as inappropriate investment decisions that affect the profitability of the business. By separating these environmental costs from overheads and allocating them to the relevant cost centers, the company will be able to make more informed decisions about its products and pricing, thereby enhancing its profitability. (Godschalk 2008.)

2.3 Environmental Accounting and EMA in Finland

The Finnish society has been interested in environmental issues since the late 1960s (Laine 2009). Many Finnish companies are reporting on their sustainability metrics annually, indicating the widespread use of environmental information gathering tools. However, there is a lack of recent studies focusing on environmental accounting and EMA implementation in Finnish companies. Finnish environmental reporting used to be a voluntary activity, mainly driven by demands from various interest groups. The most significant pressures in the past were consumer preferences for environmentally friendly products and increasingly stringent legal regulations for environmental protection. Already in the 90s, an examination of voluntary disclosure found that Finnish industrial companies have the potential to address environmental concerns and were willing to disclose their environmental impacts in their annual reports. Back then disclosure was more commonly qualitative than quantitative or financial. (Niskala 1994.)

In Finland, the chemical industry, pulp and paper industry, and energy utility corporations have traditionally been the most active in developing and applying environmental accounting, but it has spread to many other industries as well. For example, the Finnish forest industry's environmental reporting is diverse, including multiple indicators and units of measurement, the average number of indicators used in a single report being 59.7 (Mäkelä 2017). According to McNally's (2015) research, Finland is among the countries that have implemented best practices in requiring the reporting of environmental information in financial reports. Finland has also been developing a system of national accounts to integrate environmental information with economic information for decades, focusing on timber accounting on the macro level as two thirds of the country is made up of forests (Niskala 1994).

Finland is subject to EU regulations, and the country has many laws concerning the relationship between companies and the environment. Companies are required to minimize the risks, including environmental risks, related to their operations. At the very least, this means assessing the environmental risks of the company, using raw materials and energy sustainably and efficiently, and minimizing emissions that harm the environment. Companies also have a responsibility to compensate and repair any environmental damage caused by their operations. (Suomen Riskienhallintayhdistys 2024.)

The European Commission published a proposal for a directive on sustainability due diligence in February 2022. The so-called EU corporate responsibility legislation aims to increase respect for human rights and environmental protection and to create a level playing field for companies. It also aims to avoid regulatory fragmentation caused by the different regulatory regimes in EU Member States. In Finland, the Ministry of Economic Affairs and Employment published an assessment report in March 2022 outlining alternative regulatory models for implementing the due diligence obligation in national legislation and assessing the impact of the obligations on human rights, the environment, and the business sector. According to the report, company management should assess the impact of its decisions on sustainable development, i.e. the impact on human rights, climate change and the environment in the short, medium, and long term. In addition, management should be responsible for implementing and monitoring the due diligence required by the directive. Companies are required to stop all existing harmful effects of their activities. This may include paying compensation to individuals or entities,

developing and implementing a corrective action plan, and contractually binding business partners to the company's code of conduct and corrective action plans. In addition, temporary or permanent termination of business relationships may be necessary if the adverse effects are considered serious and cannot be adequately stopped or mitigated by other means. (Tuominen 2022.) These changes elevate the significance of the consideration of environmental impacts in the form of increased reporting pressures, although voluntary reporting was already popular in Finland.

Some studies have been conducted on factors affecting the environmental reporting of Finnish companies. Dutta and Dutta (2024) conducted a study on the relationship between corporate biodiversity reporting decision and corporate environmental performance in 34 listed Finnish companies. Biodiversity is defined as “the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”. Corporate biodiversity reporting is a subset of corporate environmental reporting which refers to a business organization’s direct and indirect impacts on biodiversity, encompassing e.g. greenhouse gas emissions, consumption of surface water, and generation of waste. Dutta and Dutta compared the reporting decision with corporate environmental performance and found that firms with a higher propensity to consume water and generate waste were more likely to report on biodiversity information. Their findings suggest that companies with poor environmental performance may choose to disclose information on biodiversity to gain legitimacy, thus supporting the influence of legitimacy theory in environmental accounting practices.

In a study conducted by Laine (2009), the changes in environmental disclosures in a Finnish company over a 34-year period were examined. The results demonstrated that there had been significant shifts in the language utilized by the case company in its environmental disclosures. These shifts aligned with changes in the social and institutional landscape. It was suggested that the case company had adapted its disclosures to align with the evolving institutional demands, thereby maintaining its legitimacy within society.

While most of the environmental accounting research in Finland is focused on external accounting, there is some evidence of EMA implementation as well. In Finland, Tuula Pohjola's doctoral dissertation research in the mid-1990s represents one of the earliest

attempts to develop EMA systems. Between 1995 and 1996, a total of ten pilot projects were conducted in six Finnish companies, with pilot EMA systems designed for their energy management, transportation, and/or logistics processes. In the study, environmental costs, including legislative and internal environmental costs, were calculated for the companies and potential improvements in processes were simulated. (Kumpulainen & Pohjola 2008.) In their 2008 follow-up study of these case companies, Kumpulainen and Pohjola examined the implementation of EMA in four major Finnish companies, including Kesko Food (a large retailer), Elisa (a telecommunications company), Fujitsu Services (an IT Services provider), and VR (the state-owned railway company), based on their previous longitudinal case studies in the companies in the period 1996–2005. Only one of these, Kesko Food, had voluntarily and successfully continued developing its pilot EMA system, whereas the others had abandoned their systems due to not adding enough value. The investments made by these companies in EMA had been primarily focused on ensuring compliance with environmental legislation. Consequently, most of the information about the pilot EMA systems has been lost over the years.

According to the Kumpulainen and Pohjola (2008), only a few other Finnish companies have voluntarily implemented EMA. The authors address a prevalent issue in Finland: environmental concerns are not yet fully integrated into the core business processes of many companies but are often viewed as a means of appeasing environmentally conscious stakeholders. Therefore, the authors stress the importance of understanding senior management's attitude before embarking on an effective EMA development project.

3 Drivers and Barriers to EMA Adoption

3.1 Institutional Pressures on Management Accounting Practices

Institutions, according to institutional theory, are settled ways of thinking and doing in a social system. Habits and routines are important components of institutions. (Ribeiro & Scapens, 2006). The theory suggests that a firm's performance, including both economic and environmental aspects, is significantly impacted by its institutional environment. This environment comprises regulatory frameworks, normative beliefs, and societal values, which shape regular interactions within the organization. (Latif et al. 2020.) Companies frequently adopt specific practices guided by institutional pressures, even when there is uncertainty about the financial outcomes. This behavior may seem irrational in the absence of such pressures. (DiMaggio & Powell 1983.)

Three distinct theoretical frameworks of institutional theory have been defined and their utility in investigating the evolution of management accounting practices explained: new institutional economics (NIE), new institutional sociology (NIS), and old institutional economics (OIE). NIE and NIS examine the impact of external economic and institutional (i.e., social, and political) pressures on the structure of organizations and the nature of their management accounting and control practices. In contrast, OIE focuses on the institutions (ways of thinking) within organizations and the internal pressures and constraints that shape management accounting practices. All three types of institutional theory emphasize the importance of institutions. However, they view institutions in somewhat different ways. In NIE, institutions constrain economic activities and shape governance structures. In NIS, institutions embed the social and political norms and values to which organizations must conform if they are to be seen as legitimate by their broader constituencies and stakeholders. Finally, in OIE, they are the unspoken norms and values that guide organizational decision-making. These need to be recognized and, where necessary, challenged to manage processes of change and implement new management accounting systems. Collectively, the various types of institutional theories have made significant contributions to management accounting research, particularly research into processes of management accounting change. (Scapens 2012.)

Institutional pressures are categorized into three main types: *coercive*, *normative*, and *mimetic*. Coercive pressures relate to law and regulation, normative pressures relate to

society's expectations, and mimetic pressures relate to pressure from competitors. The categories of institutional pressures are not always empirically distinct. For instance, external actors may compel a company to conform to competitors by mandating a specific task, in which case the pressure could be described as both coercive and mimetic, blurring the lines between these categories. Changes in a company's actions and operations resulting from institutional pressures are referred to as *institutional isomorphism* (DiMaggio & Powell 1983.)

Coercive pressures are both formal and informal pressures exerted on organizations by other organizations which they depend on as well as by cultural expectations in the society the organizations function in. In many circumstances, organizational change is a direct response to government mandates, for example in adapting new pollution control technologies to conform to environmental regulations. After all, firms operate within a shared legal framework that influences numerous aspects of an organization's behavior and structure. (DiMaggio & Powell 1983.) Coercive pressures may be stronger in developed countries where legislation is stronger, and corruption is low (Yassin & Ali 2020). Coercive pressure often refers to external accounting standards that firms are required to follow. For instance, Finnish companies mainly comply with EU financial accounting regulations. Although coercive pressures are not as relevant in internal accounting, companies may require specific operational and accounting procedures from their suppliers. However, dependence-based coercive pressure mostly arises within companies between their internal units rather than between companies. (Granlund & Lukka 1998.)

Normative pressures relate to society's expectations and in the business context stem primarily from professionalization. Two key aspects of professionalization serve as significant sources of isomorphism. First, formal education and legitimation are rooted in a cognitive foundation generated by university experts. Second, the expansion and refinement of professional networks that transcend organizational boundaries facilitate the rapid diffusion of new models. Universities and professional training institutions play vital roles as hubs for shaping organizational norms among professional managers and their teams. (DiMaggio & Powell 1983.) Management accountants are a highly professionalized group, which may contribute to homogenization of management accounting practices between organizations (Granlund & Lukka 1998).

Mimetic pressures relate to pressure from competitors or other companies in general. Especially in uncertain environments, there is often an inclination to adopt the best practices used by other companies in the field. For example, organizational goals may be unclear, or technology may not be well understood, making it a reasonable choice to follow what other companies are doing. Consultants may also be a source of mimetic pressure. (DiMaggio & Powell 1983). The extent to which mimetic isomorphism occurs depends largely on the amount of information companies can obtain about their competitors' practices (Yassin & Ali 2020). Consequently, the effects of mimetic pressure are most observed in external environmental reporting, as exemplified in the study by Laine (2009), which shows that a Finnish chemical company's rhetorical transition was significantly influenced by mimetic pressures and the diffusion of discourse surrounding good environmental management.

All the three types of pressures have a significant impact on management accounting practices in companies (Granlund & Lukka 1998), but motivations for implementing management accounting practices in response to pressures may differ. Some researchers have argued that organizations strategically respond to institutional pressures by complying with regulations or adopting specific formal structures and procedures in a manipulative manner to gain legitimacy and secure resources, grants, etc. (Oliver 1991, Edelman 1992). Granlund and Lukka (1998) argued that modern organizations are affected by both economic and institutional pressures and organizations' strategic responses emerge from the search for legitimacy and efficiency. Furthermore, they argued that institutional and economic pressures are driving convergence of management accounting practices among companies worldwide. As previously discussed, various factors are driving the demand for environmental information reporting in Finland. The extensive regulatory framework for environmental information reporting includes voluntary standards and diverse reporting methods. Regulation in this context is decentralized, and parallel regulatory frameworks may intersect with each other. (McNally 2015.)

Several factors have been identified as influencing the implementation of EMA practices, including national dependency, financial dependency, regulative environments, public exposure, and political visibility. In the USA, for instance, the country's strict environmental liabilities regime and regulatory penalties have led to a focus on recognizing and avoiding liabilities and penalties. Conversely, the focus of EMA in

European countries is more towards identifying and implementing opportunities for reducing resource and waste costs. This is due to the relatively high costs of resources in European countries in comparison to other parts of the world. (Bartolomeo et al. 2000.)

A significant proportion of the literature on EMA takes a normative perspective, advocating for governmental interventions to encourage the wider adoption of environmental considerations in corporate management. Additionally, many studies focus on strategies to enhance companies' interest and investment in environmental aspects of business. Bennett et al. (2003) emphasize the imperative for both private-sector enterprises and public-sector organizations to integrate EMA practices to fulfil their objectives and meet the expectations of stakeholders and the public. Mathews (1997) emphasizes the necessity of maintaining the current momentum in EMA research, as it has the potential to catalyze transformative actions and reshape the relationships between businesses, societal stakeholders, and the environment, which are essential for our collective sustenance.

In many cases, institutional pressures are drivers for the adoption of new management accounting practices, resulting in improved performance. The literature indicates an overall positive association with institutional pressures, EMA adoption, and environmental and financial performance, with slightly differing results. Most studies on the topic have been based on quantitative data or surveys. Chaudhry and Amir (2020) studied the impact of institutional pressures on EMA implementation in Pakistan and found that coercive, mimetic, and normative pressures are significant drivers of EMA implementation, leading to improved environmental performance. Wang et al. (2019) conducted a similar study in China, and they found that coercive and normative pressures had a positive and significant impact on EMA implementation, whereas mimetic pressure had no significant effect. Furthermore, they found that management's perceived benefits of EMA have a moderating role in the relationship between institutional pressures and EMA implementation. Ngo (2023) studied the relationship between institutional pressures, environmental management practices, and environmental performance in Vietnamese SMEs and found that environmental management practices were implemented due to institutional pressures, but they didn't necessarily lead to environmental performance.

A study in Egypt by Yassin and Ali (2020) is one of the few studies focusing on the influence of institutional pressures on EMA adoption that used qualitative interviews as research method. They found that coercive pressure has more influence on EMA adoption than normative and mimetic pressures. Normative pressures in Egypt are weak due to the poor influence of Egyptian accounting professional associations and environmental institutions. In Egypt, corruption is an additional factor for top management in small and medium size companies neglecting environmental requirements, as well as the low number of qualified inspectors. Small company managers also note that they don't have sufficient funds to improve environmental performance. Thus, the study suggests that coercive pressures may have the most impact on EMA practices and that companies may adopt defiance strategies (Oliver 1991) in response to coercive pressures.

Kong et al. (2022) investigated the effects of institutional pressures and environmental uncertainty on the implementation of EMA, the resulting environmental performance, and perceived benefits, as well as other variables in Chinese companies. Environmental uncertainty refers to a situation where information about the relevant environmental issues is lacking. The study suggests that environmental uncertainty has a larger influence on EMA adoption than institutional pressures, but the firm's environmental strategy is more influenced by institutional pressures. Among institutional pressures, coercive pressures were observed to have the most influence on EMA implementation. This may support the idea that the adoption of EMA practices, in addition to environmental strategic alignment, is influenced not only by institutional pressures but also by the specific characteristics of the organization, as suggested by Monteiro & Ribeiro (2023).

Jamil et al. (2017) investigated the factors influencing the adoption of EMA in Malaysian SME firms. Their findings revealed that coercive and normative pressures exerted a significant influence on EMA practices. They argue that governmental regulations and professional factors play a pivotal role in driving the adoption and enhancement of EMA practices within companies. Susanto and Meiryani (2019) studied the antecedents of EMA use in Indonesian SMEs and found that regulatory pressure has a positive and significant impact on EMA implementation.

The most notable environment-related external pressure especially for listed companies is the mandatory disclosure of environmental information by capital markets (García-Meca & Martínez-Ferrero 2021, Gao et al. 2005) which drives companies to improve

their environmental practices and to enhance EMA to provide the required information. Some studies propose that EMA practices might not be adopted at all in the absence of external pressures, as the perceived benefits may not be readily apparent (Jamil et al. 2017). Earlier research even suggested that companies would be unlikely to consistently disclose sustainability-related reports without substantial regulatory requirements (Gray, 1994).

Sustainability reporting has grown in prominence due to the European Directive on non-financial reporting as well as the international frameworks of Global Reporting Initiative (GRI). The initiatives encourage private firms to disclose their sustainability endeavors in the form of Sustainable Development Goals (SDGs), but only a minority of companies have still adopted a specific SDG strategy. It is believed that even in firms with specific strategies, the approach is often symbolic rather than substantive. (García-Meca & Martínez-Ferrero 2021.)

Different industries face different types and degrees of pressures. The literature identifies several industries as "more environmentally sensitive", including mining and resources, chemicals, oil, gas, and consumable fuels, utilities, as well as forest, paper, and pulp industries (Wilmshurst & Frost 2000). While other industries are often excluded by environmental accounting researchers, other "dirty" industries could also be included in the environmentally sensitive definition, such as the manufacturing industry (Christ & Burritt 2013). Nearly all businesses create some kind of environmental impact, but in these industries the effects are obvious results from the companies' core business operations.

Monteiro and Ribeiro (2023) studied the adoption of EMA in a Portuguese company operating in an environmentally sensitive industry and found that environmental issues have been incorporated into the group's strategy and management practices as result of external pressures, from legislative and stakeholders' demands. The proactive strategy included an organizational restructuring, changes in production processes, an introduction of clean technologies and a circular economy approach, as well as an implementation of environmental management systems.

Bouten and Hoozée (2013) studied the interaction between environmental reporting (ER) and EMA practices in response to disturbances of the natural environment. Data were collected from four Belgian case companies to explore how ER and EMA practices evolve

in the face of changes such as environmental regulation, green consumerism, and societal pressures for environmentally responsible conduct. The findings indicate that the interplay between ER and EMA practices is influenced by the specific pathways of environmental disturbances. Additionally, factors such as the severity of environmental disturbances, top management commitment, and the presence of an environmental champion play a pivotal role in shaping the development of a recursive relationship between ER and EMA practices. Bouten and Hoozée define an environmental champion as a key person driving the implementation of environmental aspects into business considerations. Of note, the study highlights that the interplay between ER and EMA practices can either facilitate or hinder organizational greening efforts, depending on the way of implementation.

3.2 Benefits of Implementing EMA

EMA's key value propositions are first, to improve decision making and financial performance; second, to improve the environment itself; and third, to integrate financial and environmental perspectives (Bennett et al. 2003). The implementation of EMA can provide several practical benefits, including cost reductions, improved product pricing, attraction of human resources, and reputational improvements (Bennett et al. 2003, Burritt et al. 2002, de Beer & Friend 2006, Gibson & Martin 2004, Hansen & Mowen 2005, Ferreira et al. 2010). Germany's Federal Environmental Agency (FEA 2003) categorizes the applications and advantages of EMA into three primary categories. *Compliance benefits* result from cost-effective adaptation to environmental regulations and self-imposed environmental policies. *Eco-efficiency benefits* are achieved through the simultaneous reduction of costs and environmental impacts via more efficient use of energy, water, and materials in a company's operations and final products. Finally, *strategic positioning benefits* are derived by evaluation and implementation of effective and environmentally sensitive programs that ensure a company's long-term competitiveness.

It has been noted that EMA can also lead to a general competitive advantage (Vasile & Man 2012). On the other hand, management accounting systems are not necessarily designed as a driver of competitive advantage, but rather to support the operational effectiveness of companies; as Granlund and Lukka (1998) stated: "It is hard to imagine a company that truly regards its management accounting system as making a significant

competitive difference in the marketplace". Some competitive advantages can still be gained, such as by being the most environmentally responsible company in an industry (Kumpulainen & Pohjola 2008). However, it is difficult to evaluate whether being the most responsible company creates significant financial value for the company.

It is widely suggested that companies can derive various benefits from implementing EMA, although most studies seem to focus primarily on the environmental aspect of performance. However, it is important to consider the financial benefits of implementing EMA, as companies aim to maintain long-term profitability. The relationship between environmental and economic performance was first developed based on a socio-economic theory called eco-efficiency (Birkin & Woodward 1997). The formula is simple: eco-efficiency is the value added divided by environmental impact. However, implementing eco-efficiency has proven to be difficult despite its theoretical and empirical support for simplicity and effectiveness. (Marelli 2015).

The relationship between EMA practices, environmental performance, and economic performance cannot be solely attributed to EMA implementation, as economic performance may be influenced by various factors. For instance, the implementation of EMA can lead to better reporting of environmental issues, which can subsequently improve financial performance. In this case, the reporting is the explanatory factor for financial performance, rather than the EMA practices. The advantages of sustainability reporting for corporations are plentiful. According to Adams and Frost (2008), companies can benefit from an enhanced reputation, which can positively impact stock values, employee pride and loyalty, and competitiveness in the market. Additionally, companies can improve their gathering and reporting of internal data, as well as their social and environmental performance. Therefore, it is important to attribute financial benefits to the correct sources.

There is extensive research on how EMA can improve a company's environmental performance. Susanto and Meiryani (2019) conducted a study on the relationship between EMA and environmental performance in Indonesian SMEs and found a positive and significant correlation. Similarly, Solovida and Latan (2017) also conducted a study in Indonesia and found a positive and significant relationship between EMA and environmental performance. Empirical analysis by Qian et al. (2018) indicates that the application of EMA has a significantly positive impact on both corporate carbon

management and disclosure quality. Their further analysis reveals that audit and benchmarking tools, as well as control tools, have a significant effect on carbon management and disclosure. Bartolomeo et al. (2000) suggest that while the benefits of EMA may appear negligible, the identification and implementation of environmental improvements can be facilitated by demonstrating their value, in addition to environmental performance, in short-term business effects. The early adoption of simple improvements can encourage subsequent receptiveness to more ambitious proposals.

There is also extensive research on the relationship between environmental and financial performance. Deb et al.'s (2023) study is crucial to this thesis as it shows a positive and significant correlation between EMA and both Environmental Performance (EP) and Financial Performance (FP) in Bangladesh. Deb et al. integrate stakeholder theory and institutional theory into the EMA model to demonstrate how pressures from stakeholders and institutions encourage manufacturing firms to adopt EMA practices. The study also highlights a strong link between recognized factors that influence EMA and EP. However, it is important to note that the environmental performance of environmentally sensitive companies likely has a greater impact on their financial performance in developed countries than in emerging markets (Nasruzzaman et al. 2022).

Studies note that the use of EMA often benefits organizations by providing them with different information for decision-making which would normally be hidden within the conventional management accounting framework (Adams & Zutshi 2004, Bennett et al. 2003, Burritt et al. 2002). Environmental information can reveal hidden opportunities such as improved waste management, reduced energy and material consumption, and opportunities for material recycling (Ferreira et al. 2010). Like traditional management accounting, EMA adds value by improving the quality of decisions and providing decision makers with the vocabulary to communicate effectively about environmental management issues and performance measurement (Bennett et al. 2003).

According to Marelli (2015), the most important goal of EMA is that all relevant and significant costs are considered when making business decisions. In other words, environmental costs are only part of a larger cost picture that is necessary for good decision-making. Environmental costs could offer monetary measures to improve efficiency and profitability analysis as well as enhance decision-making by coordinating, directing attention, and legitimizing. (Marelli 2015.) It is crucial that both physical and

monetary information is tracked, as both together provide a basis for decision-making (Godschalk 2008).

A study by Laforest (2008) shows an example of how environmental costs can be used in decision-making. The analysis of material and energy flows provided the basis for assessing and comparing the performance of the production processes against the standards defined by the technical specifications of the existing technology and against the standards of best available technology or theoretical standards. Based on this analysis, companies were enabled to make strategic decisions such as to phase out products and to plan investments in environmental technologies through a step-by-step approach. Henri et al. (2016) examined the impact of environmental cost tracking and the implementation of environmental initiatives on financial performance and found an indirect correlation between environmental cost tracking and financial performance, as well as a direct correlation between environmental initiatives and financial performance. These studies support the argument that environmental costs are a valuable tool for companies as they support decision making which may lead to improved financial performance.

A chemical company in Mexico implemented a robust process reengineering project that employed environmental management accounting as a tool. This resulted in a notable increase in production output while simultaneously reducing CO₂ emissions, wastewater, and solid waste per ton of production. In this case, an investment of \$20 million in environmental efficiency improvements resulted in \$30 million in savings. (Thorpe & Prakash-Mani 2003.) Minimizing waste has the effect of promoting a more sustainable use of environmental resources, thereby ensuring the continued availability and use of these resources and the environment from which they are drawn. Furthermore, it reduces the costs associated with managing waste. Additionally, it prevents the overloading of waste management infrastructure. (Godschalk 2008.)

The value proposition of EMA has significant implications for several functions within an organization. First, for the environmental management function, EMA serves as a valuable tool to assess and improve environmental performance while aligning it with the organization's business objectives. Second, the accounting function benefits from EMA as an additional tool to highlight aspects of corporate performance that are relevant to stakeholder decision making. This includes both internal stakeholders within the organization and external stakeholders such as investors and regulators. Finally, for the

organization as a whole, EMA demonstrates a commitment to environmental responsibility and sustainability by integrating environmental performance measurement into day-to-day operations and contributing to the pursuit of sustainable development goals. (Bennett et al. 2003.)

Some benefits of EMA can also be attributed to institutional pressures. For example, coercive pressure can drive organizations to adopt EMA to more effectively follow regulations which may lead to benefits such as bank financing at a low rate, and a subsidy in tax (Latan et al. 2018). Coercive pressure can assist firms to achieve financial benefits, social justice, and government funding (Latif et al. 2020). Implementing EMA practices can also assist top management in enhancing the organization's level of social responsibility, thereby improving market image and reputation (Qian & Burritt 2008).

3.3 Challenges of Implementing EMA

For an organization to apply environmental accounting to its fullest extent, it must be able to demonstrate that it makes business sense. Implementing environmental accounting may require a lot of resources, particularly in the initial stages. Therefore, a business must assess the benefits and costs of doing so. (Godschalk 2008.) EMA requires expertise in various areas, including environmental, technical, accounting and finance, marketing and public relations, and general management (Kumpulainen & Pohjola 2008). EMA is often separated from traditional management accounting practices, which have historically focused on monetary measurements and information. Accounting departments often view environmental issues as the exclusive domain of the environmental department. Mainstream management accounting literature has traditionally overlooked EMA until the 2000s, and accounting departments have generally not integrated EMA into their practices to any significant degree. (Bartolomeo et al. 2000.)

Communication between accounting and other departments is often inadequate, as environment-related cost information is often hidden in a company's overhead accounts or not found in accounting records at all. Additionally, materials use, flow, and costs are seldom tracked adequately, and investment decisions are thus made on the basis of incomplete information. (Kumpulainen & Pohjola 2008, International Federation of Accountants 2005.) In addition, scholarly discussions have raised significant concerns regarding the accuracy and completeness with which corporate responsibility reports reflect companies' social and environmental impacts (Adams & Frost 2008). The

relationships between different environmental accounting tools are complex, and thus their usefulness is difficult to evaluate (Marelli 2015). For example, while the significance of EMA to corporate sustainability has been increasingly acknowledged, existing literature has devoted minimal attention to the assessment and comprehension of EMA application and its impact on the quality of carbon emission management and disclosure (Qian et al. 2018).

Gray (2010) identifies two problems with current decision-making related to environmental effects. Firstly, future environmental issues are not yet known. Secondly, traditional cost and management accounting cannot assess many activities that entail future environmental and social effects. The estimation of external costs, also known as economic valuation, has been of interest to environmental economists for some time. However, the credibility and validity of these estimates have raised concerns that have functioned as a barrier to the widespread adoption of this technique as a popular decision-making tool. (Bennett et al. 2003.) A major challenge for companies is to integrate and balance different dimensions into a performance measurement system that meets all strategic objectives (Gibassier, 2021). To add value, relevant EMA tools must be selected and developed to provide good practical support to management (Bennett et al. 2003).

Some elements of environmental accounting may have more prominent benefits than others (Godshalk 2008). For example, cost management helps greatly in improving efficiency in using resources and cutting waste, but limited integration with EMA leads to a situation where managers have little help from EMA information and monetary environmental performance measures when it comes to decision-making. The practical usefulness of EMA tools is sometimes difficult to evaluate due to oversimplification and narrow focus. (Marelli 2015.) Key issues in product costing and pricing include determining the optimal method for integrating environmental cost accounting into conventional management accounting systems and exploring strategies for incorporating environmental life cycle costing into the product development process (Bennett et al. 2003).

Managers at operational levels are responsible for making tactical and operational decisions regarding the optimal utilization and coordination of material and human resources in functions such as production, marketing, and distribution (Bennett et al. 2003). The performance of various types of managers is evaluated based on the

information they provide, which may be physical, monetary, or a combination of both. For instance, managers within the corporate environmental department have diverse objectives, including identifying priorities for environmental enhancements, prioritizing environmental initiatives and measures, integrating environmental considerations into product pricing, and development choices, ensuring transparency regarding environmentally significant corporate activities, addressing the requests and information needs of key environmental stakeholders to secure resources and access, as well as providing rationale for environmental management division and conservation efforts. Environmental managers require a variety of information to achieve their objectives. This encompasses physical measures concerning material and energy flows, stocks, processes, products, and their environmental repercussions. It also includes monetary metrics detailing the economic ramifications of environmental endeavors (e.g., payback periods, return on investment, etc.). Finally, it includes qualitative assessments of stakeholder assertions. (Burritt et al. 2002.) This complexity of information may be one reason why EMA is not fully utilized in companies.

Schaltegger and Synnestvedt (2002) argue that the relationship between environmental performance and economic performance is not solely determined by the level of environmental performance itself. Instead, the critical factor is the way in which a certain level of environmental performance is attained. They suggest that environmental performance can potentially hinder economic performance if it is pursued in a manner that does not align with the organization's strategic objectives. If a company invests in sustainability without a strategic approach in response to institutional pressures or stakeholder demands, there is a risk of shifting to activities that are not related to its core business or strategy (Porter and Kramer 2006). Therefore, Porter and Kramer argue that sustainability should not be limited to investing in public image but should also lead to innovation, opportunities, and competitive advantage, ultimately supporting sustainable development in the long term.

A study by Järvenpää and Lämsiluoto (2016) focused on the impacts of collective identity and institutional logic on the design and use of an environment performance measurement system in an international Finnish food company. Institutional logic is the way in which the cultural dimensions of institutions both enable and constrain social action. The cultural dimensions include values, norms, justifications, and legitimacy. In the study, new environmental measures were reshaped by aligning them with the existing and

dominant collective identity in the case organization, which were cost savings and profitability. The case company's institutional logic forced the environmental measures to remain as non-strategic, and traditional financial measures held their dominant position. The results may indicate that environmental accounting is still mainly seen as a way to appease stakeholders, as the different institutional logics may be in conflict, and in many cases the possible economic benefits of EMA are not considered since the initial costs of implementation may seem too high.

Generalizations cannot be made solely from research focusing on correlations between EMA and financial performance, as management accounting practices and their usefulness can be influenced by a firm's internal characteristics as well. Empirical evidence shows that there are internal factors related to the degree of EMA implementation, such as company size, industry, and culture (Yassin & Ali 2020). Previous research indicates that companies' responses to external pressures are closely tied to the flexibility or control orientation of their management systems and organizational cultures. A control-oriented organizational culture tends to prioritize addressing external pressures, while a more flexible organizational culture allocates resources toward enhancing the company's capabilities and competitiveness relative to competitors. (Dubey et al. 2017.) Interactive controls can stimulate innovation and the search for new strategic opportunities and are particularly suitable for environmental topics (Gibassier 2021).

Shevchenko et al. (2016) highlight the difficulties that large and well-established companies encounter in attaining sustainability, often prioritizing meeting external stakeholder demands over fostering internal long-term innovation. This is also supported by Qian et al. (2018) who conducted a study involving 114 major firms across the US, Germany, Australia, and Japan. The findings indicate that while a significant number of companies have adopted certain EMA tools, only a minority have embraced the full spectrum of available EMA tools. Conversely, small companies have fewer resources and more constraints, making investment in sustainability a potentially significant competitive advantage (Calabrese et al. 2019). However, according to Bennett et al. (2003), SMEs frequently encounter difficulties when attempting to implement process-based environmental cost accounting and management. Thus, it can be stated that larger companies generally have more resources and capabilities to implement new systems such as EMA than smaller companies, but smaller companies could benefit from EMA

intrinsically to a higher degree, as larger companies are more focused on appeasing environmentally conscious stakeholders.

Kumpulainen & Pohjola (2008) studied the success of EMA implementation in four large Finnish companies. The EMA systems were initially established as part of a coordinated research project. However, when researchers revisited the companies after a few years, they discovered that only one company had maintained its EMA system. The primary explanatory factor for this discrepancy was identified as the attitude of senior management. In the company that continued its system, senior management not only considered compliance benefits but also recognized potential eco-efficiency and strategic positioning benefits. One significant obstacle was the perception in many companies that environmental issues were not integral to core business processes but merely a way to appease environmentally conscious stakeholders. The “critical failure factors” in EMA based on the study involve a lack of management support and insufficient allocated resources, too narrow a project group in EMA design and development, unclear or missing quantification of added value, and problems with technical implementation. Internal resources may not always be sufficient, and external support is often costly. Challenges arise in business fields where core operations are not considered environmentally impactful or if the company is not closely connected to end customers, making it easier to ignore environmental aspects. Rapid changes in the business environment, especially during the initial stages of EMA development, pose additional challenges. (Kumpulainen & Pohjola 2008.)

Incorporating EMA into decision-making processes is often met with uncertainties, particularly relating to the technological investments required for EMA. Marelli (2015) argues that the establishment and global dissemination of environmental standards could mitigate these uncertainties. By doing so, multiple benefits could be realized: it would level the playing field for companies worldwide, aiding them in adapting to change. It would also clarify the definitions of internal and external environmental costs. Furthermore, it would permit management to implement measures that would enhance efficiency and reduce costs. Importantly, such standardization would also support organizations in achieving mandated environmental reductions. This approach underscores the potential for a synergistic relationship between corporate efficiency and environmental responsibility, facilitated by clearer and more consistent global standards.

3.4 Theoretical Framework and Research Rationale

As the core idea of my thesis is to identify the incentives and motivating factors for EMA implementation in environmentally sensitive industries, it was a logical choice to utilize the theoretical framework of institutional theory, which describes how external pressures lead to practices that could otherwise be considered irrational (DiMaggio & Powell 1983, Latif et al. 2020). In the context of management accounting and this study, this refers to rational or irrational management accounting practices when it comes to the *financial benefits* derived from them. The main objective of the research is to evaluate the extent to which EMA usage would be irrational in the absence of external pressures. This is achieved by comparing the relative importance of the intrinsic benefits of EMA and the coercive, normative, and mimetic pressures that influence management accounting practices and EMA adoption. Consequently, the framework of the thesis incorporates aspects of strategic management accounting theory, given that EMA is mainly intended for strategic decision-making within companies (Gibassier 2021).

The logic of the thesis is explained in Figure 2. The fundamental premise of this study is that companies are influenced by coercive, normative, and mimetic environment-related pressures, which may prompt them to utilize EMA tools. These tools may, in turn, lead to enhanced environmental and/or financial performance. This research aims to explain the nature of these relationships and assess whether the benefits of EMA are overstated.

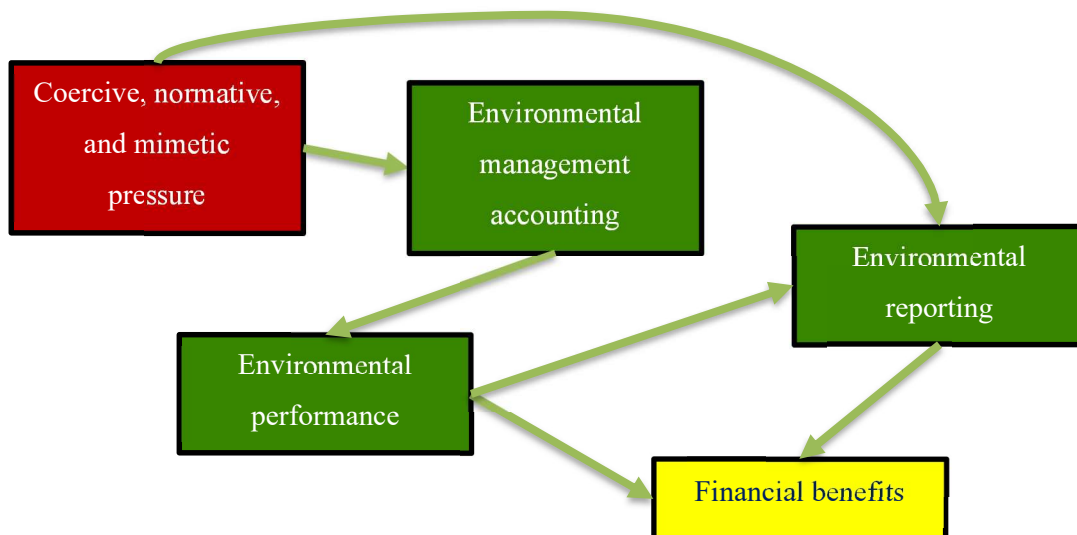


Figure 2 Pathways of institutional pressures leading to financial benefits through EMA and/or environmental reporting

As this study is qualitative in nature, it is not conventional to propose hypotheses. However, some assumptions have been made based on the extensive literature review on environmental accounting research. Based on the literature review, it is assumed that EMA practices are mainly driven by external pressures (e.g. Qian et al. 2018, Shevchenko et al. 2016, Niskala 1994), given that the use of EMA is still not widespread in Finland (Kumpulainen & Pohjola 2008), and studies on the tangible benefits of EMA seem somewhat lacking. In the literature review chapters of this thesis, several studies on the influence of external factors on EA and EMA use have been reviewed (e.g. Jamil et al. 2017, Monteiro & Ribeiro 2023, Shevchenko et al. 2016, Niskala 1994). Since this study is focused on Finnish companies, it is important to note that the external, especially coercive and normative, factors may be notably more powerful than in developing countries where many of the previous studies on EMA and institutional pressures have been conducted. It can be speculated that in developed nations where governance is of a higher quality and regulatory efficiency is more prevalent, the implementation of sustainability within business practices is influenced to a greater extent by these factors (Tolmie et al. 2020).

It is also important to note that the definition of EMA is not precise (Burritt et al. 2002, Bennett et al. 2003). The definition utilized in this study has been expanded to encompass all types of environmental information utilized in a company's internal decision-making processes, with a particular focus on the role of this environmental information from the perspectives of accountants and management. The redefinition was necessary for the purposes of this study because the effects, incentives, benefits, and challenges regarding EMA cannot be evaluated if the respondents have no experience of using the particular tools or do not even know what EMA means. The study mainly focuses on the use of environmental performance indicators and environmental costs, as they appear to be the two most fundamental and prevalent uses of EMA based on the literature, but other tools are not excluded if they could theoretically be considered a part of EMA. It is possible for certain EMA tools to be identified within a company's practices, even in cases where the company may be unaware of this.

4 Methodology

4.1 Research Design and Approach

The empirical part of the research was conducted as a qualitative study. The qualitative research method allows for a comprehensive understanding and interpretation of the phenomenon under study, including social and cultural factors (Eriksson & Kovalainen 2008, 4-9). Qualitative research is characterized by the collection of data in textual form, derived from interviews or observations. Unlike quantitative research, which typically involves a larger number of cases, qualitative research focuses on a smaller number of cases that are then analyzed (Eskola & Suonranta 2008.)

Within accounting literature, management accounting research is arguably a leader in the application of qualitative research methods (Parker 2012). While a quantitative research approach is well-suited to analyzing the technical aspects of management accounting, focusing on factors like rationality and efficiency, quantitative methods often overlook the dynamic and human elements intrinsic in accounting practices across various contexts. To gain a deeper understanding of these dynamics, qualitative research strategies are essential for delving into the complexities of contextual relationships within management accounting. (Alshahari & Al-Shboul 2019.) The qualitative tradition contributes to the understanding and critique of management and accounting processes, as well as to the concerns of practitioners and policy makers (Parker 2012). The predominance of “how” questions is a common reason why qualitative methods are considered more suitable for management accounting research (Johnstone 2020).

In the context of this study, qualitative observations are particularly important because it deals with the views, expectations, and experiences of professionals regarding EMA, which cannot be easily measured quantitatively. The qualitative research method in this research was designed to elicit ideas from the interviewees about the phenomenon under study (EMA) and thereby generate new knowledge that is deeper than what could be attained through quantitative studies.

4.2 Data Collection Method

The empirical data was collected using semi-structured interviews. The use of semi-structured interviews was considered an appropriate approach as they allow the researcher

to employ a broad framework for questioning, which enables them to explore similar issues with a number of different individuals. This framework also allows for sufficient flexibility to delve deeply into the subjects under investigation and to follow up on the responses provided by the interviewees. (Scapens 2004.) The use of semi-structured interviews, with their open format, provides a valuable means for researchers to explore the extent to which their theoretical assumptions are reflected in the behavior and perceptions of significant actors in the arena of accounting changes. Furthermore, semi-structured interviews enable interviewees to highlight their particular expertise and delve deeper into specific responses through the use of follow-up questions, depending on the interviewee. (Horton et al. 2004.)

Semi-structured interviews facilitate a dynamic and interactive exchange between the interviewer and the interviewee, fostering a comfortable environment for participants to openly share their perspectives. This conversational interview style encourages participants to elaborate on their responses, leading to a deeper understanding of the factors influencing EMA adoption, the challenges encountered, and the perceived or potential benefits. This aspect of semi-structured interviews is especially useful in EMA research, where the terms are somewhat ambiguous, and the usefulness of different tools can be difficult to quantify. Researchers must consider many different variables since there are different methods, approaches, and EMA tools that aim to achieve profitable environmental measures, as well as various companies have different strategies, targets, and practices for enhancing their sustainability. (Marelli 2015.)

The interview questions were designed to elicit responses that would facilitate a comprehensive exploration of the topic of EMA and its implementation within companies, and the views and expectations of professionals on EMA. Each question was crafted with care to address specific aspects of EMA, ensuring that the topic would be fully and effectively addressed. The topics were selected based on the research questions and formulated based on previous literature on EMA. There were six main interview questions with follow-up questions which served as a guide on the different topics of the informal discussions:

- Environmental strategy and integration to overall strategy
- Institutional pressures and impact on management accounting practices

- Collection of environmental information
- Role of environmental information in management accounting
- Benefits of EMA or internal use of environmental information in general
- Challenges in implementing EMA.

This interview structure was designed to elicit comprehensive insights into the way companies approach or would approach EMA implementation. The full interview questions are found in Appendix 1. The interview questions were slightly modified from one interview to another, as the companies and their situations, as well as the roles of interviewees, varied.

4.3 Selection of Interviewees and Interview Process

Since the study does not focus on either management accounting or environmental management, but rather on the integration of environmental issues into management accounting, it is best to interview people with experience in both areas. The roles of employees within companies can vary considerably with respect to the integration of environmental issues and management accounting. There may be problems such as different departments not communicating environmental and accounting information with each other (e.g. Jasch 2003) and environmental strategies not being integrated into the overall company strategy (e.g. Kumpulainen & Pohjola 2008).

The companies selected to be interviewed were selected based on their industry. According to a study conducted by Christ and Burritt (2013), companies operating in environmentally sensitive industries are more likely to adopt EMA practices. Their study examined various correlations related to EMA implementation and found that both current and anticipated use of EMA are influenced by factors such as environmental strategy, organizational size, and industry type. Thus, companies operating in industries with significant environmental impacts were prioritized. In addition to the conventional environmentally sensitive industries (mining, forestry, construction, and metal industries), a retail company was included in the interviews. The retail company was deemed an appropriate addition to the industries of research based on the findings of Kumpulainen and Pohjola (2008), which indicated that the sole company with a successful EMA implementation was Kesko, a retail company.

Dozens of experts and companies via email and LinkedIn, with 66 invitations sent in total. An interview material of three pages was sent to the interviewees after the initial approval. The material contained an overview on environmental management accounting, examples of its use and benefits, as well as a brief explanation of institutional pressures and the research rationale. During the course of contacting potential interviewees, it became evident that environmental managers generally had little knowledge of top management operations and management accounting practices. Conversely, those employed in financial and managerial roles seemed to have very little idea about EMA or using environmental information in management accounting. Many interview invitations were immediately rejected due to these reasons. Some representatives from companies were initially interested in participating, but later realized they may not have anything of value

to offer to the research after reading the interview material. Contacting higher-level accountants, managers, and executives through LinkedIn and emails proved to be particularly challenging.

The interviews were conducted on the Microsoft Teams platform, with an hour of time allocated for each session. Before the interviews, the participants were asked to consent to the audio recording of the interviews. Three interviews were conducted in a one-to-one format, and two involved more participants. The interviews were conducted in Finnish, with the exception of Company A, where the first half was conducted in English. Table 1 contains information on the interview durations, positions of interviewees, and the industries the companies operated in.

Table 1 Description of interviews

Company	Duration	Interviewee position(s)	Industry
A	60 min	Sustainability manager Junior sustainability expert Environmental manager Chief legal officer	Mining
B	53 min	Sustainable finance controller	Forestry
C	50 min	Cost Controller	Metals
D	57 min	ESG Controller	Retail
E	41 min	Group Controller Quality Manager	Construction

The names of interviewees and companies are kept anonymous for confidentiality reasons. Some of the companies were publicly listed and large in size, while others were private and smaller. Unfortunately, the companies cannot be described in more detail, as this could lead to their identification.

4.4 Data Analysis and Research Tools

The interviews were recorded and automatically transcribed by the Microsoft Teams software. The data analysis was conducted with the help of these files as well as some additional notes written during and after the interviews, which assisted in picking out direct interesting quotes. When working with transcripts, coding tools are generally

considered particularly appropriate for data derived from multiple structured interviews (Scapens 2004). However, in less structured interviews the analysis may benefit from the researcher working with the interview transcripts, as participants' expressions of subjectivity may elicit deeper meanings and invite a more critical interpretation than does scanning for predetermined categories. The process of coding is somewhat subjective, as the researcher determines which concepts to focus on. (Walsham 2006.)

My result analysis approach is inspired by Walsham's (2006) methodology, which differs from the more mechanical approach commonly employed in coding and analyzing transcripts. In his method, impressions are documented during the research, often after each interview. He then generates more organized sets of themes and issues after a group of interviews. Subsequently, he endeavors to reflect on the insights attained from his data. This process is rather unstructured and subjective. Walsham posits that the most effective analytical tool for a researcher is their own mind, which can be augmented by the insights of others when ideas and work are exposed to them. In conducting this study, the data analysis method of Walsham was implemented by writing impressions about key points during and after each interview. This was an appropriate method, as the interviews differed somewhat in structure, and the representatives of each company had more relevant things to say about some questions than others. Learning from the results from the previous interview helped in restructuring the interview questions and preparing for the next one. The questions were changed to focus on a specific aspect depending on the interview, for example questions about costs were emphasized in the discussion with the cost controller but received less attention when interviewing environmental managers.

In addition to the interviews, company sustainability reports were analyzed to provide context. The text in this thesis has been written with partial assistance from artificial intelligence programs DeepL and ChatGPT, which were used to modify certain sentence structures and select more suitable wordings to achieve a more convincing and academic tone, as well as enhanced readability. Bibliographic management was handled using Zotero, which ensured efficient organization of sources.

4.5 Reliability and Validity

Qualitative research has been the subject of criticism due to some weaknesses when it comes to validity, reliability, and generalizability of results. It has been argued that it is difficult to meet the quantitative standards of evidence required to demonstrate validity

and reliability. In contrast to the quantitative tradition, which assumes the neutral, independent researcher, the qualitative tradition embraces the researcher's close and often personal encounter with the participants. (Parker 2012.) Validation is a process of persuading readers of the accuracy of research findings while simultaneously ensuring that explanations are deemed plausible (Lukka & Modell 2010). However, given the differing orientations and types of knowledge contributions sought by qualitative researchers, the strictly quantitative notions of validity and reliability are not necessarily relevant to the assessment of qualitative research methods and findings. Qualitative research aims towards the production of credible accounts of organizational and management accounting processes and understandings. (Parker 2012.) Lukka and Modell (2010) proposed a strategy for validating qualitative research. This strategy involves the development of informed explanations, which draw upon available theoretical and empirical knowledge. The aim of this approach is to validate qualitative explanations by offering rich, contextually sensitive understandings and advancing plausible theoretically informed explanations.

The reliability and generalizability of this study's results are naturally limited due to the small sample size of five companies. In addition, the interviewees didn't have all the knowledge possibly found in the companies at hand, as the companies were quite large, and none of the interviewees were working in a top management position where there could be more information to each interview question. According to Walsham (2006), recording an interview may also make the interviewee less open or truthful, and transcripts don't necessarily capture the tacit, non-verbal elements of the interview. The latter problem was mitigated with the help of the notes from the interviews. The validity of this study's results was ensured by a thorough literature review which provided the framework for the interview questions, and the results of the interviews were thoroughly compared to existing literature.

5 Results

5.1 Link between Environmental Strategy and Financial Goals

The interviewees were initially asked whether they were familiar with the concept of EMA. This was to set the tone of the interviews and to adjust the questions according to the expertise areas of the interviewees. It was evident that none of the interviewees were particularly familiar with the subject of EMA. Interviewees from Companies C and E were the only ones who had heard of the term EMA before and mentioned that it had been discussed in management accounting courses in their universities, but neither had practical experience of it. They were the only ones who worked in management accounting-related roles.

“It was good that you sent this short introduction because you had a definition. So, we went through the questions based on that definition.” (Company A)

“I have to say that I hadn’t come across the term, especially the Finnish term.” (Company B)

The first main theme of the interviews was the environmental strategy of the company and its role in the overall business strategy. In Companies A, B, C, and D, the environmental strategy was seen as a very important part of the overall business strategy. The interviewees mentioned the increasing importance of environmental matters and the value of integrating environmental goals into the overall business strategy.

“More and more environmental matters are considered all the time. It’s not like we have a separate sustainability strategy, we are rather integrating it into the overall business strategy.” (Company D)

“These themes are at the very core of our whole corporation’s strategy. So, sustainability, circular economy, reducing CO2 emissions, and through all these to add value to our customers as well.” (Company A)

The only company where environmental strategy was not yet as integral a part of overall strategy as in the other companies was the Construction Company (E). This can be explained by the smaller size and being a private company. In addition, the company has had to focus more on short-term financial aspects due to recent circumstances in the industry. It was still considered that the environment may become a more important aspect in the future.

“In the large picture, there aren’t currently a lot of environmental considerations in our company, but they may become more important. Discussions about our strategy and values are still in a bit of a state of flux. Of course, the last years have been difficult for the construction industry, which has also delayed the progress [of developing an environmental strategy].” (Company E)

When further discussing the importance of environmental considerations in the overall strategy, the companies mentioned some examples of environmental goals which are important to the top management of the companies, indicating a genuine interest for integrating environmental goals to overall strategy. Representatives from Company A mentioned the goals of CO₂-free operations and net-zero emissions as well as new developments in the realm of circular economy, which are important to the top management.

“What might be most important is when discussing these topics, we aim for CO₂-free operations and net-zero in the future and seizing the new opportunities of the circular economy. These are the drivers that are constantly discussed in almost all meetings, and it involves all of us [in the meeting] as well as our production and our different level managers.” (Company A)

Representatives from Companies B and C emphasized the importance of environmental goals that are tied to the overall strategic objectives, for example renewability and carbon neutrality.

“Of course, our company has financial goals, but we also have a lot of sustainability goals, which are related to our products where we aim for renewability and carbon neutrality, and in that respect, it has become like a whole strategy.” (Company B)

“The environmental strategy has a large importance, and it is strongly related to the demands for clean [products] in the European market, and we are aiming for carbon neutral production probably by 2030.” (Company C)

The companies generally didn’t see large problems or difficulties in balancing financial and environmental goals. The Mining Company (A) described an overall difficulty in getting funds for almost all purposes, but mentioned that the company does have a positive view of investing in environmental matters, as those are important to the owner.

“I think it's always a bit tricky to get money nowadays to do anything, but I think that our owner is very eager to invest in this [CO₂ neutrality] transformation... I could say almost every single decision by management depends on the information we have also received on the environmental side.

I think it would be strange if the environmental department didn't have such a large role in an industry such as ours." (Company A)

One example of the balancing of environmental and financial objectives in Company A is the current energy crisis. This has at times led to the difficulty of choosing whether to invest in renewable energy and renewable fuels or to continue with the cheaper, less environmentally friendly options. The representatives pointed out that it is, however, not only a cost-related question.

"One could say that especially now that there was this energy crisis and so on, it was, for example, a tricky to balance whether to get this, like renewable electricity or renewable fuels, or whether they choose for sale ones or just like a great mix electricity. It also means more costs in a sense, but it's not only like cost related question." (Company A)

The interviewees were also requested to comment on the degree of collaboration between departments regarding environmental information. It was observed that some companies had greater collaboration between environmental and financial or management departments than others. The responses appeared to be largely dependent on the specific roles of the interviewees, given that they had varying levels of knowledge and experience in relation to the integration.

"We do a lot of collaboration between our departments. The board members are responsible for the environmental reporting, and therefore the CEO and CFO are very interested in the environmental figures. We also work with the department of internal controls. The processes are streamlined, and sustainability is an inseparable part of our business strategy... Without the [sustainable finance] role there would maybe not be a clear link between the environmental and financial functions." (Company B)

"The environmental information does flow between our departments, for example in our reports. However, let's say, it's not that visible in my own work (cost accounting)." (Company C)

"Our management is interested in the environment-related information we gather... especially the types of information which have already proved to be beneficial." (Company D)

In conclusion, the companies appeared to have largely integrated environmental goals into overall strategic goals. This was particularly evident in the larger companies, whereas the smaller company (E) had not yet considered the possibilities of integrating environmental considerations into its strategy. In the larger companies, there was a greater

degree of collaboration between the environmental and financial management departments.

5.2 Institutional Pressures Influencing Environmental Considerations

The interviewees were asked to evaluate the impacts of coercive, normative, and mimetic pressures related to environmental considerations and accounting practices specifically. It was evident that coercive pressures had a significant impact on the integration of environmental aspects, stemming largely from stakeholders such as government legislation, customers, and investors, especially in the larger companies. Legislation was identified as the main source of environmental pressure in most companies.

“Considering our industry (mining), of course environmental and sustainability related matters influence us quite much and all our operations are based on our permits and legislation... It is quite soon that the new directive on corporate sustainability reporting will be obliged... We are now preparing ourselves for CSRD reporting as well... The Finnish accounting law requires the reporting of environmental costs and environmental investments which has been the reason for implementing these.”
(Company A)

“For example, the EU taxonomy affects our operations... Now that regulation is increasing, we are focusing on the topic and quality of data more.”
(Company B)

“For sure, the law is the first thing, again especially due to the smaller size of our company.” (Company E)

The pressure from customers was also a significant factor in many companies, particularly in those that sell raw materials to corporate customers. The interviewees mentioned that customers demand sustainability from the companies and may pay more for greener products.

“The pressure from our customers the pressure is very, very hard. So basically, that is the strongest in addition to the legal requirements, of course.”
(Company A)

“Of course, our customers expect us to operate in a sustainable manner. Some customers are more willing to pay [for environmentally friendly products] and some less.” (Company B)

“The need to keep raw materials clean affects our customers, especially the demand for green [products] is higher at least in the Euro zone and so on... Let’s say however that behind all this is the legislation and directives which

create new obligations, so it in a sense has direct and indirect effects.”
(Company C)

Additionally, in the Retail Company (D), customers expressed concerns about the environmental footprint of the products through customer surveys. According to the representative, there is a growing desire for transparency.

“There's a significant focus on environmental issues and a considerable concern that consumers are not aware of the emissions associated with products. There is a desire for greater transparency in this area.”
(Company D)

In some companies, the pressure from investors related to environmental considerations was also identified as considerable.

“Naturally, as a listed company, the investors have a central role in this, for example the questions about what is the cost of equity and cost of debt.”
(Company B)

“Everything (environmental information) we have here affects how easily we get investments... We can show investors how we operate and that we consider these things... It's a sort of positive cycle...” (Company A)

When discussing the impacts of pressures on accounting practices specifically, legislation was again recognized as a large one. Legislation comes especially from the EU. It was mentioned that the CSRD brings even more importance to considering environmental impacts. Additionally, the Mining Company (A) mentioned that the company's image in the eyes of customers and the public overall is important.

“The CSRD Direct directive requires this double materiality analysis, which includes measuring the financial risks and opportunities as well. So, those have been considered, like all the impacts that we have considered to be material to us also from environmental perspective are considered or we are in the process of considering them. So yeah, they are affecting accounting as well. I couldn't speak for the entire history, but for decades, closer to 100 years, our operations have been based on laws that have required environmental and mining permits, which involve monitoring environmental issues and have thereby influenced decision-making on how we've been able to expand our mines.” (Company A)

“For example, neighbors may be concerned about something, for example noises coming from our sites. These types of concerns may also affect our investors because they may affect our image.” (Company A)

Mimetic pressures were not seen as an influencing factor when it comes to the implementation of environmental considerations into management or reporting decisions.

This was due to the intensity of coercive pressures which already exist before mimetic pressures and the difficulty of mimicking the management accounting practices of other companies. Company A didn't see many benefits of mimicking competitors due to already having a good position in the market.

“We have like a dominant market position here. We see ourselves still as a front runner in these aspects when it comes to sustainability and environmental matters, even though there is lot to do still to be at the level where we want to be. So, from competitors' side I would say that the pressure is not too high.” (Company A)

In a similar vein, in all the companies the possibilities of mimicking EMA practices were seen as quite irrelevant or difficult. The potential effects of competitors on accounting practices were mostly indirect. For example, in Company B it was recognized that nearly all listed companies compare their sustainability reports, but that it is quite impossible to obtain information about what practices the competitors are using internally.

The representative from Company E mentioned the possibilities of employees switching from one company to another and bringing their expertise to the new company, leading to changes in management accounting practices. This type of pressure could be described as normative, as the possible management accounting change stems from the professionalization of a single accounting professional. In general, normative pressures were seen as the least significant in the interviews but were still considered a potential source of pressure.

“It is difficult to get useful information from other companies' internal practices... But it may be that some new software could bring useful information between companies, especially if people switch from one company to another, and this could lead to new possibilities for business.” (Company E)

In addition to the previous example, the representative from Company E continued to mention consulting services as a possibility of normative pressure affecting management accounting practices.

“Maybe some firms which offer consulting services etc.... For example, we heard of a possibility where a consultant would come to do some kind of audit and so on, and maybe something like this could start a development process [of an environmental accounting system].” (Company E)

Another example of a possible source of normative pressure was given by the representative from Company C who mentioned that there are often training courses

where sustainability topics are discussed. However, it was noted that the impacts of these courses on management accounting practices were difficult to evaluate.

In conclusion, coercive pressures were seen as by far the most significant when it comes to possible EMA implementation and environmental accounting practices in general. Among coercive pressures, legislation was seen as the most powerful driving force. In addition, pressures from customers and investors were described quite high in the larger companies. Mimetic pressures were difficult to evaluate, as the accounting practices are generally dictated by legislation already, and it is difficult to obtain useful information about other companies' internal accounting practices. Normative pressures weren't considered high either, but some examples of it were discussed as possible additional sources of pressure which may affect accounting practices, such as formal training. In Company E, institutional pressures didn't have any significant effect on environmental accounting practices, which was due to the smaller size of the company and the situation of the construction industry.

5.3 Internal Roles of Environmental Information

All companies had some internal uses for environmental information, but the degrees varied. Many companies gave examples of decisions and improvements made based on environmental information. The larger companies had extensive sustainability reports which included various types of environmental information. The information gathered and reported by the companies is mostly physical, relating mainly to environmental impacts, water, and raw materials. Internally this information was used to different degrees in the companies.

Although none of the companies had an "actual" EMA system in place, environmental information was used in many decision-making situations. In the Mining Company (A), this was highlighted in the company's emissions calculations and Environmental Product Declarations (EPDs):

“What I was hired to do was precisely this emissions calculation and EPDs, so through them, new information is now being generated. For example, I can see how much, say, electricity consumption affects the carbon footprint of our products, so once I have that information, I can share it with management. This, in turn, may influence decisions regarding the type of electricity or fuel we use. The amount of information is increasing.” (Company A)

Company B regularly uses product life cycle analyses in product development decisions as well as pricing. The company also evaluates the CO₂ emissions in each raw material purchase. The indicators found in external sustainability reports are also reported to management in each quarter and serve as additional information for decision making, for example, in decisions about large purchases.

“Well, as a general principle, regardless of the topic, we monitor and highlight important [environmental] issues alongside the monetary information.”
(Company B)

In the Retail Company (D), environmental information is gathered for internal purposes, such as selecting products for sale with the least environmental impact. The data is benchmarked and compared with competitors. Additionally, the company evaluates the potential costs that would result from scenarios where environmental regulation would be tightened as part of a risk management policy. However, environmental costs are not yet used as a tool for product pricing.

In the Metals Company (C), the term "environmental costs" is not commonly used in the costing system. However, for example, carbon tariffs are a component of the regulatory framework that affects the company, and their monitoring brings additional costs to the company. Another cost associated with environmental protection is mineral taxation, which is allocated to activities as variable costs based on the quantity produced. Waste generated during production, energy consumption, and CO₂ emissions are reported monthly internally alongside some other environmental information. Some general targets are established based on environmental information, which are incorporated into the company's control systems.

In the private Construction Company (E), the role of environmental information is currently quite minimal, and information is tracked quite loosely. The company still sees the potential in developing some kind of an EMA system, but it is not seen as relevant at the current moment.

“The tracking of environmental information is done separately for each construction site and written down in meetings sometimes. There is not really a system at the moment.” (Company E)

In conclusion, all the companies gather some kinds of environmental information, but none had a system consisting of environmental indicators or environmental costs which could be described as an EMA system like in previous literature. The larger companies

had significantly more sophisticated systems of gathering environmental information for external reporting, but the information was used in some ways internally as well. The internal uses were still not highly sophisticated, and the information was mostly physical. The nature of responses on this topic differed based on the role of the interviewee.

5.4 Benefits of EMA Practices

The interviewees mentioned several benefits from implementing environmental information into accounting practices, some of which were already realized, while others were hypothetical. Naturally, it was difficult to evaluate the exact benefits of the internal use of environmental information since the companies didn't have formal EMA systems, and many benefits could be attributed to both the external and internal uses of environmental information. Several of the benefits discussed can still be described as benefits of EMA.

According to representatives from Company A, the measurement of environmental information is important in conveying information to customers, partners, and investors. When environmental information is accurately conveyed, it brings tangible benefits to the company.

“It (environmental measurement) affects our agreements and when it comes to our business with our customers or with our suppliers, these things are also considered at the contractual level. By this we can prove to our investors how we operate and that we consider these things and are able to do something concrete, but on the other hand it is also important to our partners that we demand a certain standard. The customers are more likely to be satisfied, which in turn potentially increases our sales.” (Company A)

In retail Company D, emissions aren't seen as the main aspect of the company's possibilities in utilizing environmental information. Instead, environmental information has been used to create new business models. For example, the company has opened a service where it buys used products, fixes, and sells them. The goal is to bring positive effects to the environment through the circular economy that is currently a subject of considerable interest. This concept has also proven quite lucrative.

"While the emissions from all companies are significantly important, and of course, each company should and can take actions to address their emissions, particularly those at the beginning of the process, there is another major area where we can make an impact on the environment: developing a circular

economy. By focusing on circular economy initiatives, we can significantly influence environmental outcomes." (Company D)

These benefits could be attributed to both internal and external environmental accounting. To focus purely on the benefits of internal environmental accounting, interviewees were asked to imagine a scenario where there were no institutional pressures and evaluate whether there could be intrinsic benefits of implementing EMA practices. A potential concrete benefit of environmental information tracking for Company A is the ability to assess what scale of investments need to be made for efficient operation. The example investment related to a potential problem in the efficiency level of a water pump in a mine.

"Another concrete aspect to consider is the water level. We need to know how much water is present in the mine to ensure we have sufficient pumps and pumping capacity to manage it effectively. If water continuously flows into the mine without proper pumping, it could fill up like a lake, rendering operations impossible. So, understanding water levels and having adequate pumping infrastructure is critical for our operations." (Company A)

In this example, environmental information would be used to improve the efficiency of an activity. In addition, the representatives of Company A believe that the tracking of environmental indicators would intrinsically lead to increased material efficiency as well as improved decision-making in products and investments.

"Yes, at least material efficiency. It immediately comes to mind that it's still important if we can optimize all material usage, meaning any excess material that doesn't provide any benefit or revenue. It has always been and will always be important." (Company A)

When it comes to environmental costs, the representative from Company C mentioned that environmental costs could be useful in achieving greener production, as the cost structures of products are currently not optimized. It was discussed that the additional data which EMA brings would possibly help in reaching this goal.

"I consider it extremely important, as I actually like collecting all kinds of data. In my opinion, regardless of the type of data, it is intrinsically important and can be refined into valuable information in many ways. Therefore, all data related to the environment is crucial to collect and analyze. Data analysts can then use this information to create impressive reports using tools like Power BI." (Company C)

The representative from the Retail Company (D) suggested that environmental information could be utilized to prioritize logistics partners whose environmental impacts

are smaller and to analyze the parts of the supply chain in which most emissions originate. With this information, environmental costs could be allocated to products. The representative recognized the potential of EMA and its intrinsic benefits.

“But generally speaking, I believe that environmental issues are not discussed enough in terms of their actual benefits. It shouldn’t be just an unnecessary obligation.” (Company D)

However, when considering a scenario in which external pressures for environmental friendliness are absent, the representative expressed skepticism that companies in general would be motivated to develop EMA systems.

“It’s an interesting question... The legislation and talk about climate change of course lead and guide these developments a lot... But still some benefits could be reached with the help of these... However, not many firms would probably put a lot of effort into it.” (Company D)

In the Construction Company (E) environmental costs could be used to evaluate the life cycle and the energy classification of a new construction and calculating the amounts of raw materials used, which could help in some kinds of decisions. In addition, calculations could be used for reducing the consumption of water and energy as well as the emissions resulting from the use of concrete by trying different construction materials. The maintenance costs of the buildings could also be reduced. This could also help the company to obtain green funding and EU subsidies.

As the companies hadn’t implemented an EMA system as such yet, it was quite difficult for the interviewees to evaluate the exact benefits, and answers remained somewhat general or hypothetical. For this reason, it is not possible to accurately evaluate financial benefits especially, although generally the interviewees could see the potential positive effects of EMA. The representative from Company B mentioned that in the future it could be a next step to think about how the environmental information that is already available through reporting could be used in budgeting and other types of models. The representative of Company C also suggested that the benefits of EMA could be realized in the future, as the company strives to be the first among its competitors in producing completely green products.

5.5 Challenges in EMA Implementation

Although the companies didn't have experience from EMA implementation as such, their representatives were able to mention some key challenges in a potential implementation. The challenges were mostly related to the difficulty of evaluating the costs and benefits of such a system as well as practical problems such as simply not having the relevant information about the possibilities of different EMA tools.

“The biggest problem for us related to the topic of environmental accounting is that we have the question, what [information] do we fill, where do we fill it and so on, in other words, what is the place where we gather information, and especially at this point the question about software becomes relevant... We used to gather all information in Excel, which is a practice of the old world.” (Company E)

An evident challenge in the implementation of a formal EMA system among the interviewees are the necessary structural changes and large investments. A challenge for the Mining Company (A) in implementing new accurate indicators is the fact that it requires significant changes in processes and machines. The representatives further added that the global economy also has an impact on what decisions can be made in the first place. The representative from Company B similarly mentioned that the development of new KPIs may be a challenge and not necessarily worth it.

“As we track indicators, it requires significant changes from us and our processes. And even if we were to change energy sources or something like that... Of course, considering the global situation and so forth, it's always difficult to determine the correct decisions to be made and investments to be undertaken. There's always challenges... It seems simple, but it involves huge changes in practice, huge investments in incorporating corporate sustainability for example, so it is not so widely used even if there are already some applications.” (Company A)

“When talking about these kinds of environmental indicators, it's not a really fast or easy task to come up with a new KPI. You have to define the calculation practices and the gathering of data as well as be sure that all business units report the data in the same way etc.” (Company B)

The representative from the Retail Company (D) mentioned that a goal in the future would be to create a system of classification for products which would make it easier for customers to compare the environmental effects. However, the problem here according to them is that the classification system would need to be used by all retail companies for it to be accurate. Therefore, there is no incentive for a single company to start developing

such a system. Another problem according to the representative would be that the benefits of implementing a comprehensive EMA system would be difficult to quantify.

The representatives from Company E thought it would probably be difficult to create an EMA system for a construction company due to the unique nature of the business. The cost of developing such a system could be too high, and the tangible benefits of such a system are difficult to evaluate. The representatives disagreed slightly when discussing the potential image benefits from increased environmental performance. The group controller thought that customers would not really care about the environmental impacts of a building as much as an electric car, for example. The quality manager slightly disagreed and pointed out that apartment buyers actually do make their choices based on the environmental impacts, for example if the building has solar panels. This is an example of how the results of a potential EMA system are difficult to evaluate beforehand. That's why investing in the development of such a system seems unlikely for the company at this stage.

The cost controller from Company C mentioned that although the company strives for greener products, replacing all raw materials with green options would bring higher costs, at least in the short term. The company would also need more evidence of tangible benefits of implementing an EMA system, as the current environmental accounting practices are mainly driven by external factors.

“Companies probably implement these kinds of tools when the need arises. There may be a lack of evidence of the benefits and articles from researchers may not give enough guidance on what a good way is to implement EMA.”
(Company C)

In conclusion, none of the interviewed companies viewed the implementation of an EMA system as a process without any problems. The most significant problems were related to the uncertainty of costs and benefits, as it is difficult to evaluate whether the system would bring profits, at least in the short term. There was also a lack of knowledge about EMA and its potential benefits which naturally make the implementation unlikely to happen. It was also mentioned in some companies that the development of new environmental performance indicators takes a lot of effort and may not be worth it if the usefulness is not known. These problems are amplified by the already difficult situations in some industries, such as the mining and construction industries.

6 Discussion

6.1 Importance of Environmental Considerations for Business

Generally, the companies described environmental considerations as a very significant part of their overall business strategies. This was especially the case in the larger listed companies where stakeholder demands were stronger. This result was not surprising, as the fact that the most notable external pressure especially for listed companies is the mandatory disclosure of environmental information by capital markets, has been well documented in previous studies (e.g. García-Meca & Martínez-Ferrero 2021, Gao et al. 2005). However, in terms of accounting for environmental impacts, the integration of traditional accounting systems and ecological accounting systems was still quite low among the companies. This is a common phenomenon which is highlighted by e.g. Marelli (2015).

The results also validate the issue raised by Kumpulainen and Pohjola (2008) that environmental concerns in Finnish companies are viewed as a means of *appeasing* environmentally conscious stakeholders. This is evident from the fact that the larger companies had significantly more environmental accounting tools than the smaller private company (E). The representative from Company E also admitted that environmental considerations are not seen as important because there simply are *no external requirements* for it. This is a similar result to Jamil et al.'s (2017) study where they found that EMA practices might not be adopted at all in the absence of external pressures, as the perceived benefits may not be readily apparent. Overall, the results from the interviews indicate that the implementation of EMA is or would be mainly driven by institutional pressures and the search for legitimacy and stakeholder satisfaction, which are seen as crucial for survival.

Stubbs et al. (2012) described how environmental issues within companies may be dealt with solely by environmental specialists who have little or no connection with the actual decision-making processes. This was also evident among the interviewed companies: for example, in Company A, the four interviewees worked in more environment-focused roles and had only a vague idea on how the information they produce is used at the management level, although its importance was described as high. This may raise the

question of how the financial impacts of environmental departments and the information generated by them could be evaluated more accurately.

Similarly to how Kumpulainen and Pohjola described the situation in 2008, the results from the interviews indicate that EMA is not a common concept in Finnish businesses. Still, environmental information is used internally for various purposes alongside external reporting. The results support the findings from previous literature (e.g. García-Meca & Martínez-Ferrero 2021, Ferreira et al. 2010) that environmental considerations and EMA tools are more likely used in *environmentally sensitive industries*. In this study, three of the companies operated in the environmentally sensitive industries described by Wilmshurst and Frost (2000): mining, metals, and forestry industries. These companies had a higher degree of EMA tools usage than the companies operating in retail and construction, although the latter industries could also be described as significant from the environmental perspective. This correlation cannot however be attributed to this alone, as the companies in environmentally sensitive industries were also larger, which has been described as a key factor in the probability of EMA implementation (Bennett et al. 2003, Yassin & Ali 2020).

The level of interest in EMA practices was highly influenced by the institutional pressures related to environmental aspects on the companies. Coercive pressures were clearly the most influential, among which legislative pressures were the most significant according to all companies. Legislation was influential especially in the listed companies, and the pressure came mostly from EU regulation. As suggested by Yassin and Ali (2020), legislative pressure is strong in developed countries such as EU countries. The interviewees expressed similar points as McNally (2015) about different legal frameworks intersecting each other, such as the EU taxonomy for sustainable activities, Scopes 1, 2, and 3 carbon emissions, and the new CSRD regulation. Pressure from investors was regarded as a significant factor next to legislative pressure, as they demanded environmentally friendly practices from the companies. According to the interviewees, becoming greener also helps the companies in receiving cheaper financing. Customers were seen as another significant source of coercive pressure, as they are becoming more environmentally conscious, and companies need to make decisions which result in an improved environmentally friendly image.

Normative pressures were not considered as significant, although the interviewees who worked in accounting roles mentioned that the formal education and trainings may have some effect on how professionals view the importance of environmental information in accounting and potentially even in terms of internal decisions. As explained by DiMaggio and Powell (1983), formal education and professional training institutions can shape organizational norms among professionals.

Mimetic pressures on EMA use were difficult to evaluate according to the interviewees firstly since the coercive pressures already had such a strong effect, and they dictate the environmental accounting practices of competitors as well. Secondly, the internal accounting practices used by competitors or other companies are often not public, which naturally makes mimicking them quite impossible according to the interviewees. This is a similar result to that by Yassin and Ali (2020); the extent to which mimetic isomorphism occurs depends largely on the amount of information companies can obtain about their competitors' practices.

These results about institutional pressures affecting EMA practices were in line with existing literature, as there are several studies which indicate a positive relationship between institutional pressures and EMA implementation (e.g. Chaudhry & Amir 2020, Ngo 2023, Jamil et al. 2017, Susanto & Meiryani 2019). When comparing the impact of each category of institutional pressure, the results are similar to Wang et al.'s (2019) results in that coercive and normative pressures were seen to incentivize EMA implementation more than mimetic pressures. These studies were quantitative, but the most similar study to the current one was Yassin and Ali's (2020) study where interviews were used as the research method. According to their interviewees, coercive pressures had the most influence on EMA adoption, like in this study. An interesting notion is also the result by Kong et al. (2022) where the firm's environmental strategy is mostly affected by institutional pressures, but the impact on EMA wasn't as high. The results of this thesis also point to the fact that the environmental strategies of companies are highly affected by institutional pressures, but the companies still hadn't implemented EMA to a high degree.

In addition to institutional theory, which was the main theoretical framework for the study, some of the results could be explained by other theories, such as stakeholder theory, resource-based view theory and legitimacy theory. Stakeholder theory explains that the

survival of companies depends on stakeholders (Freeman et al. 2021), which was evidently the case in, for example, Company A, where the importance of investor and customer relations was emphasized. According to the resource-based view, stakeholder relations can be seen as a resource for the company and thus a competitive advantage (Freeman et al. 2021). Legitimacy theory explains how a company fulfils its social contract to maintain legitimacy, and legitimacy in turn ensures a company's survival (Zyznarska-Dworczak 2018). The legitimacy aspect was emphasized in all companies except Company E, where the concept of legitimacy did not seem to be at the forefront of strategy due to the situation in the construction industry.

6.2 Benefits and Challenges of Current and Potential EMA Tools

The benefits of EMA tools were discussed in practice and hypothetically. Some companies had practices which could fall under the definition of EMA, but none had what would be called an actual "EMA system". Environmental information was used mostly for external reporting purposes, with internal use receiving less attention.

In most companies, performance measurement was used to evaluate specific processes, which had led to practical improvements. The companies had successfully chosen indicators that are related to the most significant environmental impacts from the companies' operations. When indicators are derived from the company's environmental strategy, it leads to improvements in environmental performance, as suggested by Solovida and Latan (2017). In contrast, Järvenpää and Lämsiluoto's (2016) study highlighted a case where a company was profit-driven to the degree that all environmental indicators were chosen based on how they would affect the companies' short-term costs. None of the companies interviewed in this study displayed this kind of strategy. Rather, they showcased examples in their companies of how environmental strategy serves as a key starting point. For example, the retail company (D) had developed lucrative business models based on information on returned products and customer surveys which revealed the importance of environmental information about the products sold. In Company A, environmental information was recognized as an important factor in investment and process improvement decisions. Of course, these decisions are also made with financial goals in mind, but they are focused on the long-term goals considered important by the companies rather than cutting costs in the short term.

In general, the benefits of EMA were difficult to evaluate for the interviewees, as none of the companies had a formal EMA system and thus no accurate financial data was available on the matter. However, several benefits were mentioned on a practical level, which may have positive financial effects too. Still, it is not possible to draw conclusions on the financial benefits of EMA from the results of the interviews. This is because the evaluation of financial benefits would require the analysis of costs and benefits resulting from a systematic EMA implementation where the costs may outweigh the benefits.

An interesting result from the interviews was the lack of environmental cost tracking in the companies. Environmental costs were recognized, but they weren't accurately allocated to activities or products in any of the companies. The companies recognized mainly traditional environmental costs such as raw material and energy costs as well as image and relationship costs. Rather, environmental costs were treated as an overhead cost in the companies, which is often the case according to Jasch (2003). The challenge in implementing an environmental costing system according to the interviewees is mainly the lack of knowledge of how much costs could be saved and how much work and capital such an investment would need.

In general, a challenge for EMA implementation in the companies was the lack of knowledge about EMA and the difficulties in evaluating its potential benefits and costs. While some vague benefits could be expected, their financial impacts seemed almost impossible to evaluate. Overall, the interviews showed that EMA may still be viewed merely as a theoretical concept that only environmental researchers are interested in, with limited implications for real business. Further implementation in the companies would be mainly driven by tangible financial benefits in the companies since the external requirements were already considered fulfilled. Still, the interviewees generally had a positive attitude towards EMA tools and were open to considering their possibilities.

Christ and Burritt (2013) stated that environmental strategy needs to be an integral part of overall business strategy to make the implementation of EMA effective. This was a clear problem for Company E, where environmental considerations were not yet an integral part of the business and therefore developing an EMA system would not be considered at this point. In the other companies, the environmental strategy was described as an integral part of the overall strategy, but based on the interviews, there was still a

lack of systems which would make the environmental information sufficiently relevant for decision making.

Overall, the challenges indicated in previous research on EMA were supported by the results of this study. The problems were similar to those pointed out by Bartolomeo et al. (2000), according to whom accounting departments often view environmental issues as the exclusive domain of environmental departments, which may be a reason the possibilities of EMA are not considered at all. Another similar challenge seen in the interviewed companies was similar to that proposed by Gibassier (2021), namely integrating and balancing different dimensions into a performance measurement system that meets all strategic objectives. When these problems are combined with the lack of knowledge about EMA in Finland and the high costs of implementing an EMA system, it is not surprising that the companies haven't yet seen EMA implementation as relevant.

6.3 Limitations and Implications for Practice

It was quite evident from the start that EMA was not a well-known concept among Finnish companies (Kumpulainen & Pohjola 2008), and even with the initial interview material and its explanations, the terms seemed quite difficult to grasp for many professionals. In the process of this thesis, nearly 70 experts in the management, accounting, and environmental roles of various companies operating in environmentally sensitive industries were contacted via LinkedIn and email, but nearly all of them rejected the invitation due to a lack of expertise and knowledge on EMA on a personal or company level. The typical response from financial accountants and controllers was to recommend consulting with experts in sustainability and ESG, and vice versa. This may indicate a lack of integration of the different departments within companies and a general lack of knowledge about EMA in Finland. The initial idea for the research was to only interview companies where there is an actual EMA system in use, but the scope needed to be widened to include potential considerations since it was difficult to find companies where EMA is implemented. Therefore, it may have been unnecessary to study the complicated relationship between institutional pressures and EMA implementation at this point in time, as there doesn't appear to be much implementation in Finland to study.

Another related problem in conducting the interviews was self-selection bias. While it would have been best to focus on the perspectives of middle managers, as they may tend to have more experience using EMA information in practice (Marelli 2015), they were

difficult to reach for the interviews and most likely weren't interested in participating. This is why most of the interviewees were working in environment-focused roles. It is recognized that individuals specializing in environmental aspects may have biased views that could shift the focus too far from the management accounting perspective, which may have happened in this study as well. The fact that people working directly with the environmental strategies of companies were notably more inclined to partake in the study may have given some skewed results. Some people mostly worked with external environmental reporting, and thus only had a vague idea of how the environmental information is used in decision making. For example, in Company A it was somewhat unclear to the interviewees how relevant environmental information is to some stakeholders such as investors, as they don't deal with them personally, and this is more a task of the top management. The interviewee from the forestry company acted as an intermediary between the environmental department and management. They had a bit more insight into the usage of environmental information in decision-making, but still not actual hands-on experience on EMA systems used in the company.

Although the study did not include an analysis of a comprehensive EMA system due to the aforementioned issues, some practical implications can be drawn from the results and research process, where nearly 70 organizations were approached. The low level of knowledge of EMA among the companies contacted indicates that there may be some untapped potential in implementing EMA in Finland, although this cannot be confirmed solely based on the results of this thesis. Some companies responded to the interview invitation with messages that indicated a general interest in the EMA practices which were mentioned in the invitation and interview material and considered that they should perhaps investigate the theory and possibilities of EMA. However, these are only general insights which reflect the current landscape of environmental accounting in environmentally sensitive industries in Finland. It would not be appropriate to conclude that EMA methods *should* be implemented to achieve *financial benefits* based on the results of this study.

7 Conclusions

The purposes of this study were to evaluate the degree of environmental management accounting implementation in environmentally sensitive industries in Finland, discover the effects of coercive, normative, and mimetic institutional pressures on environmental accounting implementation, and analyze the possible benefits and challenges of implementing EMA from the perspectives of different kinds of professionals. The study was mainly motivated by the question whether companies can benefit from using environmental information in support of their decision making even if there were no external pressures which drive companies to monitor environmental information in the first place.

The empirical part was carried out as semi-structured interviews, and people from five companies were interviewed. The interviewees worked in positions related to environmental or accounting tasks in environmentally sensitive industries. The study's findings support the previous findings in the literature that institutional pressures are the main drivers of environmental strategy and environmental accounting implementation. Some of the companies participating in the study were listed companies, and they emphasized the pressure from EU legislation which requires them to report environmental information externally. Pressures from customers and investors were also considered quite high. Nevertheless, the pressures do not appear to result in the implementation of EMA to any significant extent. Rather, the focus of the companies is on external stakeholders with regard to environmental information.

Based on the results of the interviews, EMA implementation is still at a low level in Finland, even in environmentally sensitive industries. This conclusion is also supported by the fact that nearly 70 companies were invited to an interview, but nearly all invitations were rejected due to unfamiliarity with the topic. No actual EMA systems were used in the companies interviewed, and environmental information was used mainly for external reporting purposes. There were, however, certain practices in the companies that could be characterized as EMA practices. Realized benefits of these practices included the development of new business models and investment decisions based on environmental performance information. Potential benefits of EMA were also seen in the assessment of environmental costs and the reduction of waste. Nevertheless, the interviewees expressed

uncertainty regarding the evaluation of financial benefits associated with EMA. Without the influence of institutional pressures, the implementation of EMA was seen as unlikely.

Future EMA research should focus more specifically on the perspectives of accountants, preferably those in higher positions within companies. As Malmi and Granlund (2009) suggest, management accounting theory should focus on what types of accounting systems to use, how and under what conditions to use them, and how to implement changes in practice. To reach these objectives, it should be considered to limit the interviews for companies where a more comprehensive EMA system is already in place. Employees in higher positions within companies should be interviewed since they may have more comprehensive knowledge and opinions on how an EMA system could benefit a company. Future research could also investigate whether companies would be more willing to invest in EMA technologies if they were more clearly defined and standardized, which could level the playing field for companies (Marelli 2015), since many companies seemed hesitant about the benefits of such an investment. Another viable research option would be to conduct a case study where an EMA system is tested in a company to find its benefits and drawbacks in practice, as seen in Kumpulainen and Pohjola's (2008) study.

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Appendices

Appendix 1 Interview Questions

1. What is your company's environmental strategy and what is its significance in the overall strategy of the company?
2. How closely do environmental and financial/management departments collaborate?
3. What external pressures, especially related to environmental issues, does your company face?
4. What is the impact of coercive, normative, and mimetic pressures, and which are currently the most significant?
5. Do these external pressures affect your company's accounting practices?
6. Are there challenges in balancing environmental and financial goals?
7. How is environmental information collected in your company?
8. Is environmental information physical or also monetary?
9. What is the role of environmental information in your company's internal accounting?
10. Are any of the methods listed above [in the interview material] used?
11. Who primarily uses environmental information in your company?
12. What decisions are made based on environmental information?
13. What are the benefits of internal use of environmental information for your company?
14. Are the benefits primarily related to external reporting, or have some methods provided direct benefits? (e.g., those listed above)
15. Is it possible to assess the monetary benefits of environmental accounting?

16. What challenges are there in incorporating environmental information into management accounting?
17. Is there information about EMA methods in the company?
18. Are the benefits of EMA methods difficult to evaluate?
19. Do EMA methods seem complex or difficult to implement?

Appendix 2 Data Management Plan

The empirical data for this study was collected through interviews with volunteers recorded using the Microsoft Teams software. Prior consent was obtained from all interviewees in accordance with the research objectives. Processing personal data, including job descriptions, experience, and current titles during interviews, is necessary for data management purposes. This process is in accordance with Article 6 of the EU General Data Protection Regulation and the University's mission under Article 2 of the University Act (558/2007) and its commitment to the public interest. Research data will be securely stored for a maximum of five years from the date of approval of the thesis, after which it will be securely disposed of in accordance with data protection regulations.