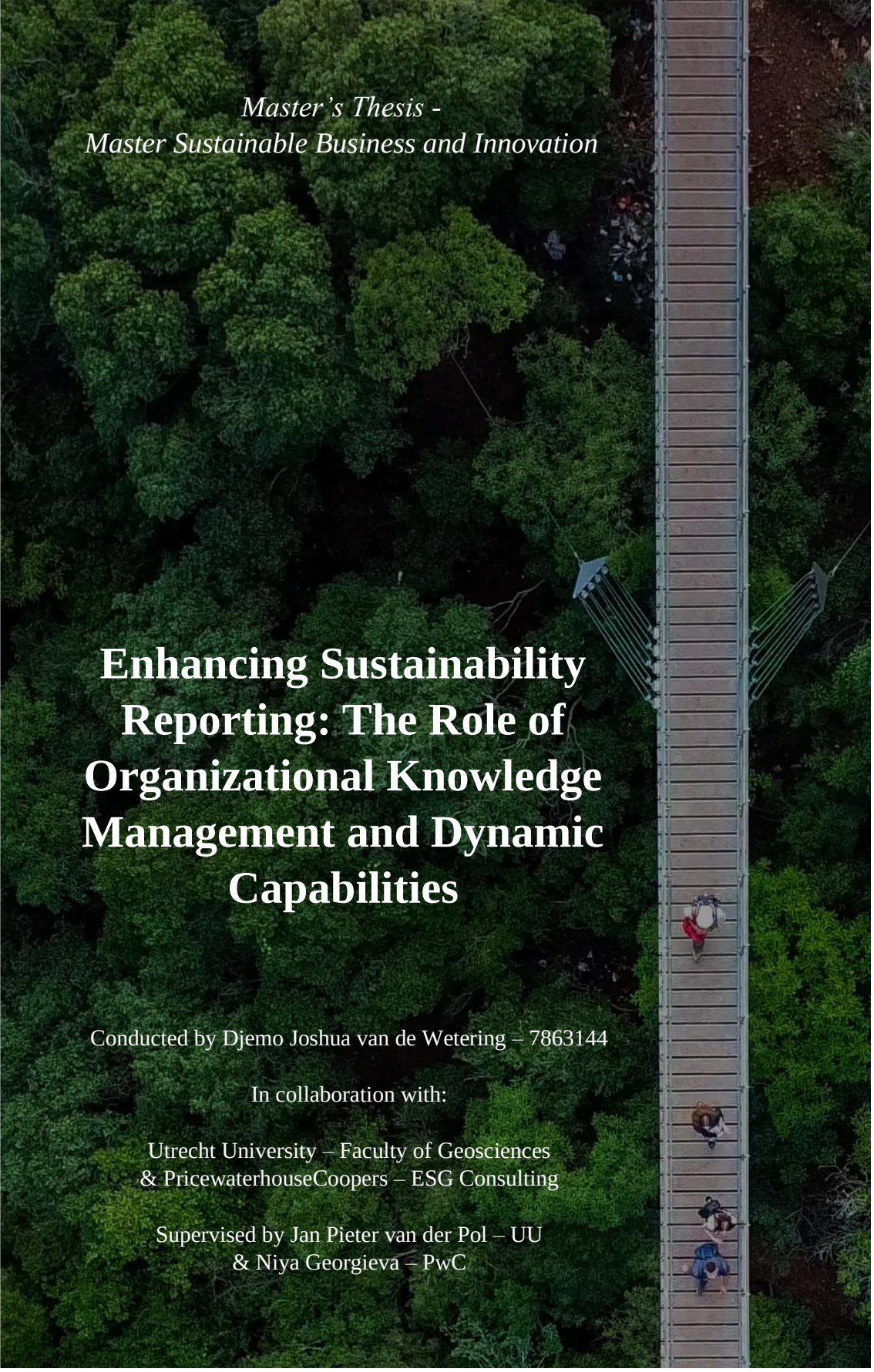

Master's Thesis -
Master Sustainable Business and Innovation

Enhancing Sustainability Reporting: The Role of Organizational Knowledge Management and Dynamic Capabilities

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ABSTRACT

Implementing the Corporate Sustainability Reporting Directive (CSRD) poses significant challenges, with many companies relying on external assistance due to a lack of in-house expertise, resources, and capabilities. This study aims to bridge the gap in both literature and practice by examining the relationships between organizational capabilities and effective CSRD compliance. Specifically, it investigates how organizational knowledge management and dynamic capabilities contribute to effective CSRD-aligned sustainability reporting.

Utilizing the Knowledge Management Capabilities framework by Gold et al. (2001) and the Dynamic Capabilities framework by Teece (2007), this research employs a mixed-methods approach that integrates quantitative data and qualitative insights from PwC's professional experience. The study explores the influence of these frameworks on CSRD-aligned sustainability reporting effectiveness and identifies best practices for organizations.

The findings reveal that robust knowledge management capabilities and dynamic capabilities significantly impact sustainability reporting. Key practices such as establishing strong data processes, fostering cross-functional collaboration, and engaging top executives are essential for CSRD compliance. Additionally, the study highlights the importance of a supportive technological, cultural, and structural infrastructure in facilitating effective sustainability reporting.

This research not only provides actionable insights for organizations aiming to enhance their sustainability reporting practices but also contributes to the academic understanding of the operationalization of knowledge management and dynamic capabilities in the context of CSRD compliance. Future research is recommended to validate the proposed model and further explore the micro-foundations of these capabilities across diverse organizational contexts.

PREFACE

The journey of this thesis has been both challenging and rewarding, marked by significant discipline and growth. This research was conducted as part of my thesis internship at PricewaterhouseCoopers (PwC) in the ESG Consulting department. The dynamic and practical environment at PwC provided a valuable, tangible, and engaging context for my personal and professional development, as well as for this study.

During my internship, I had the opportunity to experience the complexity and reality of the Corporate Sustainability Reporting Directive (CSRD). This experience shed light on its vast scope, depth, and organizational implications, highlighting the significant challenges it poses for many organizations.

The insights gained allowed me to better understand what it truly means for organizations to become CSRD-ready. My internship helped bridge the gap between theory and practice, offering a practical perspective grounded in a theoretical understanding of the CSRD's implications.

I am grateful for the support and guidance provided by my colleagues at PwC, as well as my academic supervisor. Their expertise and encouragement have helped shape this thesis and pushed me beyond my expectations. I hope this research will contribute meaningfully to the field of sustainability reporting and support organizations in their journey towards CSRD compliance.

EXECUTIVE SUMMARY

PricewaterhouseCoopers (PwC) is required to comply with the Corporate Sustainability Reporting Directive (CSRD), reporting its non-financial data for FY2025 in FY2026 according to the standards. Additionally, PwC provides professional services to help other organizations achieve CSRD readiness and compliance. The goal of this research was to explore how organizational knowledge management and dynamic capabilities relate to effective CSRD implementation and identify best practices that organizations can adopt. As such, the findings of this study are particularly relevant to PwC, offering actionable and practical insights grounded in a theoretical foundation that can enhance PwC's own sustainability reporting practices and improve its CSRD-related advisory services.

Firstly, this study reveals that most companies still rely heavily on external support for CSRD-compliant reporting. There is a slightly greater reliance on understanding the requirements of the CSRD (the "what") compared to managing effective CSRD-aligned reporting (the "how"). No significant differences in reliance on external support or confidence levels in being CSRD-ready were found between different types of organizations or reporting years. This underscores the broad demand for professional services that guide CSRD compliance and highlights the extensive market potential for these services.

Organizations face the most significant challenges with data availability and quality, the complexity of the value chain, and specific topics such as Workers in the Value Chain (ESRS S2) and Biodiversity and Ecosystems (ESRS E4). PwC can address these major difficulties by tailoring its value propositions to meet organizations' specific needs, thereby enhancing the relevance and impact of its services. Additionally, emphasizing the potential value of sustainability reporting under the CSRD – such as improved environmental performance, better stakeholder engagement, and effective risk mitigation – can help organizations see CSRD compliance as an opportunity rather than just a regulatory obligation. This approach can drive greater demand for professional assistance, ensuring that organizations fully leverage the benefits of their sustainability reporting efforts.

Furthermore, this research demonstrates that CSRD-aligned sustainability reporting necessitates the effective management of both explicit (the “what”) and tacit (the “how”) knowledge. This underscores the importance of prioritizing robust processes alongside embedding infrastructure, including technological, cultural, and structural elements, to facilitate the assimilation of both explicit and tacit knowledge essential for effective sustainability reporting. Consequently, it is recommended to approach CSRD implementation holistically and organization-wide, emphasizing diverse organizational capabilities such as strong data management processes integrated within a supportive technological infrastructure, culture, and structure. Additionally, organizations that adopt a proactive and adaptive approach to sustainability reporting by being able to sense their environment – including stakeholders, regulations, and value chain – and reconfiguring in response to new information and changes, are better positioned to meet CSRD requirements. Therefore, it is advised to develop these dynamic capabilities to enhance timely and effective CSRD implementation.

Several best practices for effective CSRD implementation have been identified embedded in these capabilities. Firstly, establishing robust data processes and systems for long-term, recurring annual sustainability reporting is essential. This especially involves acquiring sustainability data throughout the value chain and utilizing integrated specialized technology to effectively manage large amounts of non-financial data. Achieving CSRD compliance also requires extensive cross-functional collaboration and organizational mobilization. Secondly, engaging top executives and senior managers is imperative, with Chief Financial Officers (CFOs) and Chief Information Officers (CIOs) playing crucial roles in supporting Chief Sustainability Officers (CSOs). CFOs ensure investor-grade disclosures through their financial expertise, while CIOs manage the necessary technologies and systems. Lastly, given the complexity and novelty of CSRD implementation for many organizations, fostering a culture of high engagement, continuous learning, and improvement will distinguish sustainability reporting leaders.

PwC can leverage this study's insights to refine its own sustainability reporting and provide more targeted, impactful advisory services to its clients. Ensuring high-quality sustainability reporting not only complies with the CSRD but also creates new opportunities for driving sustainability through corporate strategies, ultimately contributing to a positive environmental and societal impact.

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1 INTRODUCTION

The European Union (EU) is actively working to foster a sustainable economy and become a climate-neutral continent by 2050 with its Green Deal program initiated in 2020 (European Commission, 2024). Central to this effort, the European Commission has launched a series of regulations, such as the Corporate Sustainability Reporting Directive (CSRD), to enhance the transparency and quality of corporate non-financial Environmental, Social, and Governance (ESG) disclosures (European Commission, 2023a). The CSRD, more comprehensive than previous measures, such as the Non-Financial Reporting Directive (NFRD), in terms of the scope, depth of reporting requirements and the number of companies involved, mandates companies to not only disclose sustainability information but also to formulate and monitor sustainable development strategies (European Commission, 2023a). The directive came into force in 2023 and the first companies will have to apply the new rules for the first time in the financial year 2024, for reports published in 2025 (European Commission, 2023b). Starting from 2028, the sustainability reports will be subject to reasonable assurance by independent auditors (European Commission, 2023a). This initiative aims to boost the sustainable finance sector by ensuring greater clarity about the sustainability impacts of companies, thereby facilitating the flow of investments towards more sustainable activities.

In addition to these broader economic implications, the CSRD is also expected to significantly influence individual companies (KPMG, 2023). It could necessitate extensive organizational changes for compliance, including alterations in processes related to knowledge acquisition, stakeholder engagement, data collection, data integration, and decision-making, especially during the implementation of sustainability reporting (SR) (European Commission, 2023b). Organizations that do not comply with the standards risk legal consequences, financial repercussions, and impact on reputation and future business opportunities (CSRD Compass, 2023). Consequently, the introduction of the CSRD could significantly impact organizational operations.

Yet, a study by the economic research bureau SEO and the University of Amsterdam in late 2023 ascertained that 27% of the Dutch companies that fall under the CSRD from 2025 are currently not compliant ready (Koeman et al., 2023). Over and above that, 60% of the small and medium-sized enterprises (SMEs) who must be compliant by 2026 are currently not confident to be compliant ready either (Koeman et al., 2023). Henk Volberda, a researcher in the study conducted by SEO and the University of Amsterdam, emphasized that complying with the CSRD is a challenging task for companies, as they **often lack the necessary in-house knowledge and capabilities** for effective implementation (Koeman et al., 2023).

General research has been done on the challenges of sustainability reporting (Baret & Helfrich, 2019; Bouten & Hoozée, 2015; De Micco et al., 2020), the costs and benefits of CSRD compliance for organizations (EFRAG, 2022), and general CSRD implications (Baumüller & Grbenic, 2021; Baumüller & Sopp, 2022). Nevertheless, to the author's knowledge, there remains a notable scarcity of research focusing on how organizations can effectively navigate the CSRD requirements within the dynamically evolving regulatory and sustainability reporting landscape. Specifically, there is a notable lack of detailed studies that address the practical organizational capabilities required for CSRD-aligned sustainability reporting, particularly from a process-oriented and knowledge-based perspective, supported by concrete quantitative evidence.

This research aims to address that gap by building on the premise that robust organizational knowledge management and dynamic capabilities are imperative for effective CSRD compliance. To this end, this study examines the organizational Knowledge Management Capabilities (KMC) framework by Gold et al. (2001) and the Dynamic Capabilities (DC) framework by Teece (2007) in the context of CSRD compliance effectiveness using a mixed-methods approach. This approach primarily includes quantitative data supplemented with qualitative insights drawn from PwC's professional experience. Based on this, the following research question is formulated:

"To what extent do organizational knowledge management and dynamic capabilities influence effective CSRD-aligned sustainability reporting, and what best practices can organizations adopt?"

This research significantly contributes to the ESG literature by broadening the understanding of the relationships between organizational capabilities and sustainability reporting. The broad applicability of the KMC and DC theories allows for the examination of sustainability reporting across various domains such as organizational processes, culture, structure, technology, and strategy. This versatility enables an organization-

wide analysis of which elements and capabilities within the KMC and DC frameworks influence effective sustainability reporting. By narrowing this scope, the study identifies effective practices, processes, and strategies, thereby providing insight into how these frameworks can be operationalized to enhance CSRD compliance effectiveness. As such, this study addresses critical research gaps in the current academic literature.

Furthermore, by empirically establishing the relevance of these frameworks in the context of sustainability reporting, this research positions KMC and DC theories as foundational lenses for future research in the field. Demonstrating their effectiveness also attributes benefits to robust knowledge management and dynamic capabilities, thereby enriching the theoretical and practical understanding of KMCs, DCs, and sustainability reporting. Consequently, applying the KMC and DC frameworks to the domain of CSRD compliance offers a novel and innovative perspective in ESG studies and organizational capability literature, while also identifying new avenues for future research.

Additionally, this research offers valuable insights for practitioners and managers seeking to optimize sustainability reporting processes and facilitate CSRD compliance. By identifying and understanding the critical elements and capabilities necessary for effective sustainability reporting, organizations can enhance their sustainability strategies and more efficiently implement the CSRD. Highlighting effective processes, practices, and key capabilities provides organizations with actionable steps to enhance their own or other organizations' sustainability reporting effectiveness.

Moreover, the CSRD aims to ensure the availability of reliable and comparable sustainability information, enabling stakeholders to make well-informed decisions that support sustainable business activities. Enhanced sustainability reporting and CSRD compliance will not only help businesses improve their operations but also contribute positively to societal and environmental well-being. Therefore, this research holds significant social and environmental relevance, aiding organizations and the European Union in advancing the broader sustainable development agenda. By bridging the gap between theory and practice, this study supports the practical implementation of sustainability reporting, thereby promoting long-term sustainable growth and accountability.

The outline of the rest of the paper is as follows: Chapter 2 provides the theoretical background that shapes the context of this study, followed by Chapter 3, which presents the theoretical framework on which this study builds. Chapter 4 elaborates on the research methodology applied, while Chapters 5 and 6 present the results of the different datasets analyzed. Chapter 7 offers a discussion, emphasizing the theoretical and practical implications through comparative analysis, and highlights the study's limitations and avenues for future research. Finally, Chapter 8 concludes the paper by summarizing the findings and providing closing insights.

2 THEORETICAL BACKGROUND

2.1 CORPORATE SOCIAL RESPONSIBILITY AND SUSTAINABILITY REPORTING

Corporate activities profoundly shape life both in the EU and globally, impacting product and service offerings, job creation, working conditions, human rights, health, environmental health, innovation, and educational opportunities (European Parliament, 2021). Over the past two decades, the growth in corporate economic and political influence has been primarily driven by privatization, deregulation, and liberalization which has reduced trade barriers and facilitated globalization (Benn et al., 2014; Jenkins et al., 2002; Korten, 2001). As such, companies are perceived to be responsible for many negative impacts on the environment and on societies (Benn et al., 2014; Küpers, 2011).

In 1987, to address the requirements of the developing world, the Brundtland Commission introduced the concept of 'sustainable development' as: "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*" (United Nations, 1987, p. 43). Supporting sustainable development has since then become one of the major goals of the United Nations (UNFCCC, 2015; United Nations, 2015).

In line with sustainable development, John Elkinton (1994) introduced the Triple Bottom Line (TBL). The TBL is a renowned concept that proposes organizations focus on three key performance areas to be sustainable:

social, environmental, and financial. It is often summarized as "people, planet, and profit," shifting the focus from primarily financial growth.

Additionally, the European Commission (2011) increasingly requires enterprises to take responsibility for their impacts on society, which is described as Corporate Social Responsibility (CSR). CSR has the aim to drive sustainable development entailing; maximizing the creation of shared value for owner/shareholder, other stakeholders, society at large, and identifying, preventing and mitigating possible adverse impacts (European Commission, 2011). Fulfilling CSR involves companies establishing processes that incorporate ESG considerations into their business practices and core strategies, while actively collaborating with stakeholders (European Commission, 2011)

Although frequently used as synonyms in scientific discourse, ESG and CSR represent different meanings, nevertheless similar ones (Gillan et al., 2021). While CSR pertains to the social responsibilities of a company, the ESG principle originates from sustainable investments and is focused on making the sustainable impact of organizations measurable within the environmental, social and governance dimensions (Li et al., 2021). This allows investors, creditors and other stakeholders to evaluate the sustainability of organizations.

Emerging from the broader concept of CSR and as part of a company's strategy, companies measure their sustainable impact. Consequently, in addition to financial information, they can engage in the disclosure of non-financial information within the ESG dimensions known as Sustainability Reporting (SR). The adoption of SR has also been driven by increasing societal awareness of environmental and social issues, regulatory requirements, stakeholder and investor pressure and the recognition that sustainable business practices can contribute to long-term organizational success (SASB, 2021; United Nations Environment Programme, 2019). SR allows stakeholders to assess an organization's commitment to sustainable development and its progress towards sustainability goals (Global Reporting Initiative, 2021). The primary purpose of SR is to provide transparency, enabling stakeholders to make informed decisions based on the sustainability performance of an organization.

2.2 CORPORATE SUSTAINABILITY REPORTING DIRECTIVE

On November 28th, 2022, as part of the European Green Deal (EGD), the European Council formally adopted the Corporate Sustainability Reporting Directive (European Commission, 2023a). As of January 5, 2023, the CSRD officially entered into force, amending the reporting requirements of the NFRD (2023). The CSRD is developed as a mean to achieve the broader climate and sustainability goals of the EU in respect of the EGD (2023). Mainly by (Raad voor de Jaarverslaggeving & EFRAG, 2023): (1) aiming to reduce systemic risk to financial system from climate-change and other sustainability issues; (2) making capital flow to companies that address and do not aggravate the sustainability crisis more easy; (3) making companies more accountable for their impacts on people and the environment.

Under the new regulations starting January 2024, organizations already reporting under the NFRD will report 2024 data in 2025 (KPMG, 2023). From January 2025, all large companies (listed and non-listed) not presently under NFRD will report 2025 data in 2026. And starting January 2026, only listed small and medium-sized enterprises (SMEs), smaller and less complex credit institutions, and captive insurance entities will start reporting their 2026 data in 2027 (with the ability to opt-out until 2028) (2023). Micro-sized companies do not have to adhere to the CSRD.

For an organization to be classified as a specific size according to the annual accounts requirements, it must meet at least two out of the three specified criteria for two consecutive fiscal years (SER, 2023):

Table 1. CSRD Organization size criteria specifications

	Micro	Small	Medium	Large
Turnover	< €700.000	< €12M	< €40M	> €40M
Assets	< €350.000	< €6M	< €20M	> €20M
Employees	< 10	< 50	< 250	> 250

Additionally, entities not based in the EU but with securities listed on European stock markets, or those with annual revenues exceeding €150 million within the EU, are also required to comply with CSRD standards from 2028 (KPMG, 2023). Under the CSRD, approximately 50.000 companies within the EU will be affected (KPMG, 2023).

Companies subject to the CSRD are required to report according to the European Sustainability Reporting Standards (ESRSs), formulated by the European Financial Reporting Advisory Group (EFRAG), an independent organization representing diverse stakeholders (European Commission, 2023a). The ESRSs, effective as delegated regulations since December 2023, are designed to align with EU policies while building on and contribution to international standardization efforts (European Commission, 2023a). Additionally, whereas the auditing of sustainability reports was previously a voluntary choice for organizations under the NFRD, the CSRD mandates that organizations obtain "limited" assurance for their reports (KPMG, 2023). By 2028, they will be required to secure a more thorough "reasonable" assurance provided by independent auditors.

2.3 EUROPEAN SUSTAINABILITY REPORTING STANDARDS

The contemporary published European Sustainability Reporting Standards consist of 12 Sector-Agnostic standards, see figure 1. Encompassing a total of 84 Disclosure Requirements and 1.144 quantitative and qualitative datapoints (EFRAG, 2022). The Sector-Specific- and SME-Proportionate standards are expected to be published later in 2024 (EFRAG, 2023). The Sector-Agnostic Standards consists of the Cross Cutting Standards (ESRS 1 & ESRS 2) and the Topical Standards (ESRS E1-5, ESRS S1-4 & ESRS G1) (European Commission, 2023b). The sector-agnostic nature of the cross cutting- and topical standards means that they apply to all undertakings regardless of the sector of operation (European Commission, 2023b).

The Cross Cutting standards, ESRS 1 General Requirements and ESRS 2 General Disclosures, are applicable to sustainability matters that are addressed by both topical and sector-specific standards (European Commission, 2023b). The ESRS 1 outlines the structure of the European Sustainability Reporting Standards, explaining the drafting rules, key concepts, and general requirements for preparing and presenting sustainability-related information. The ESRS 2 sets the disclosure requirements for reporting on a wide range of material sustainability matters, encompassing aspects like governance, strategy, impact, risk and opportunity management, as well as metrics and targets.

The mandatory information to be disclosed by every undertaking within the scope of the CSRD irrespective of the outcome of the double materiality assessment (European Commission, 2023b):

- **A.** ESRS 2 – General Disclosures
- **B.** EU legislation data points (SFDR, EU Benchmarks, Pillar III, EU Climate law ..), see Appendix D of ESRS 2.
- **C.** ESRS E1 – Climate Change
- **D.** ESRS S1 – Own workforce disclosure requirements 1-9 for undertakings with 250 employees or more.

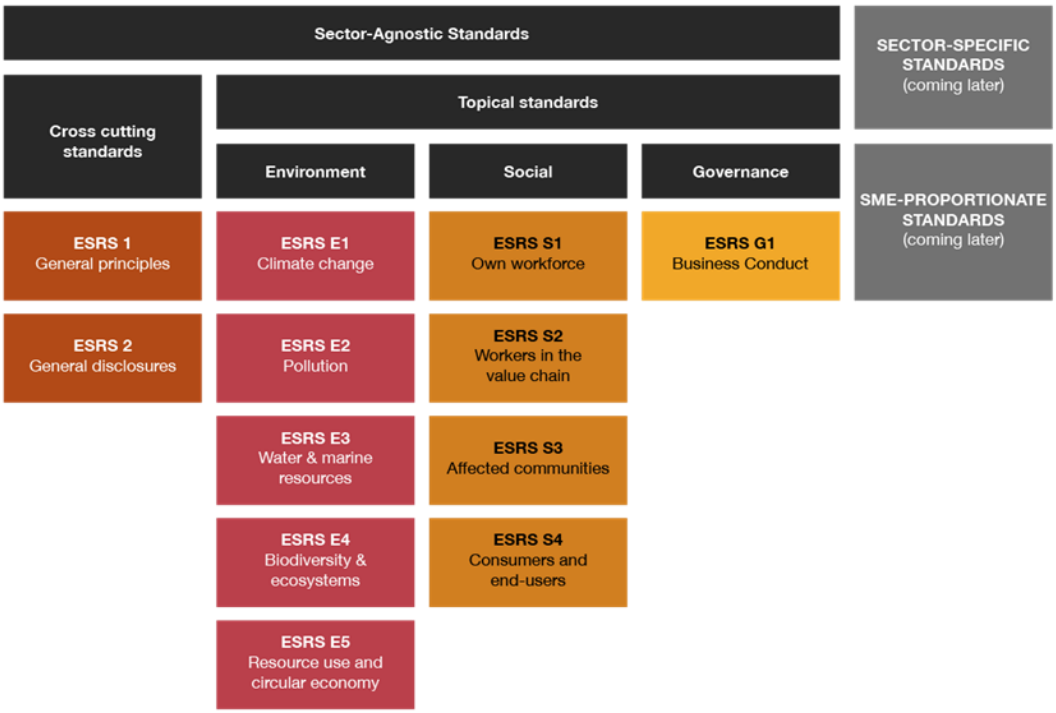


Figure 1. *European Sustainability Reporting Standards overview* (PwC, 2024)

2.4 ESRS 1 – General Requirements

Performing a double materiality assessment is the starting point for sustainability reporting under the ESRSs (European Commission, 2023b). Double materiality is a concept central to the ESRSs and comprises two dimensions: impact materiality and financial materiality. In essence, a sustainability matter is considered 'material' if it fulfils the criteria for either impact or financial materiality, or both.

Impact materiality refers to the significance of a company's actions on sustainability matters, which is assessed through understanding the business context, identifying actual and potential impacts by engaging with stakeholders and experts, and evaluating the materiality of these impacts (European Commission, 2023b). Financial materiality involves identifying risks and opportunities that could influence the company's financial standing, performance, and capital access in the short to long term (European Commission, 2023b). This assessment includes evaluating the company's dependency on natural and social resources and categorizing them as potential sources of risk or opportunity.

Materiality assessments are crucial for pinpointing material impacts, risks, and opportunities for disclosure, considering the sustainability topics in the ESRS 1 appendix. If a topic is deemed material, the organization must report it according to the relevant ESRS Disclosure Requirements (European Commission, 2023b). Stakeholder engagement throughout the process ensures that due diligence addresses the concerns of affected individuals, investors, business partners, civil society, regulatory bodies, and nature as a stakeholder.

Furthermore, the sustainability reports should not only present information on the reporting entity but also expand to cover the material impacts, risks, and opportunities that are associated with the entity's direct and indirect business relationships within both the upstream and downstream segments of the value chain (European Commission, 2023b). This will be officially phased in after 3 years, 2027. It should also present its due diligence process which refers to the ongoing practice where businesses identify, prevent, mitigate, and manage the real and potential adverse effects on the environment and people linked to their operations (European Commission, 2023b).This, too, encompasses the company's own activities and those related to its upstream and downstream value chain.

Additionally, all disclosed data must meet specific qualitative characteristics such as (European Commission, 2023b): relevance (material topics), faithful (accurate) representation, comparability, verifiability, and understandability. The mandated CSRD disclosed information is required to be integrated into the annual/management report, adopting an integrated reporting approach.

2.5 ESRS 2 – General Disclosures

The ESRS 2 introduces disclosure requirements that are sector-agnostic, encompassing ESG matters without being contingent on a materiality assessment (European Commission, 2023c). This framework adopts a 4-pillar approach that is in line with international sustainability reporting frameworks, ensuring comprehensive coverage of essential aspects:

1. *Governance:* This pillar focuses on the role of administrative, management, and supervisory bodies, detailing the information these bodies are provided with and the sustainability matters they address. It encompasses the integration of sustainability-related incentive schemes, statements on sustainability due diligence, and risk management and internal controls over sustainability reporting.
2. *Strategy:* This aspect covers the market position, strategy, business models, and value chain of the undertaking. It takes into account the interests and views of stakeholders, along with the material impacts, risks, and opportunities and their interplay with the undertaking's strategy and business model.
3. *Impact, Risk, and Opportunity Management (IRO):* Here, the process for identifying material sustainability impacts, risks, and opportunities is described. This includes the disclosure requirements in the European Sustainability Reporting Standards (ESRS) covered by the undertaking's sustainability statements, policies and actions, and entity-specific material topics.
4. *Metrics and Targets:* This pillar deals with the metrics and targets associated with sustainability efforts, providing a quantifiable measure of progress and objectives.

The 4-pillar approach (Governance, Strategy, IRO, Metrics, and Targets) is the foundation of the ESRS 2 and of the Disclosure Requirements within every topical standard. Additionally, the *Disclosure Content* in ESRS 2 specifies the content to be disclosed for every material topical ESRS in addition to the respective topic standard. It requires the disclosure of policies, metrics leading to targets, and actions undertaken. The disclosure content necessitates that the material sustainability data is to be integrated into decision-making.

The reporting of the elements discussed in this section requires companies to create and manage knowledge from within and outside the organization. Even though previous reporting duties might have provided firms with some existing routines, capabilities and explicit and tacit knowledge bases (Nelson & Winter, 1982), they will need to adapt to the new and evolving standards. This puts knowledge management and dynamic capability at the centre of effective SR under CSRD compliance.

3 Theoretical Framework

Recognizing knowledge as a central resource and the need for adaptability in dynamically evolving environments, this study explores existing literature and frameworks in knowledge management and dynamic capabilities. This research aims to understand and assess these interconnected concepts in the context of CSRD-aligned sustainability reporting.

3.1 Knowledge Management Capabilities

The Knowledge Management Capabilities framework (Gold et al., 2001) is rooted in the Knowledge-Based View (KBV) (Grant, 1996), which extends from the foundational principles of the Resource-Based View (RBV) (J. Barney, 1991; Grant, 1991). The RBV, as formulated by Barney (1991), proposes that a firm's resources, encompassing assets, capabilities, organizational processes and knowledge, are integral for strategizing and implementing efficient and effective business practices. According to Grant (1991), the distinction between resources, such as physical assets and individual skills, and capabilities, which refer to the collective ability to perform tasks, is essential. Capabilities, derived from these resources, form the essence of a firm's competitive advantage and are the primary source of profit.

The KBV further extends the RBV by underscoring the strategic importance of knowledge and assumes it is the most important resource to obtain a sustainable competitive advantage (Grant, 1996). The KBV recognizes that knowledge is maintained by individuals, not by organizations, and can take the form of either tacit or explicit knowledge (1996). **Tacit knowledge**, or 'knowing how,' is understood through its transferability across individuals and time, which is not as easily transferable as **explicit knowledge** or 'knowing about (what)' facts

and written down or codified information. Knowledge transfer is a critical component, heavily reliant on the *absorptive capacity* of the recipient, which is the ability to assimilate new knowledge into existing knowledge bases (Cohen & Levinthal, 1990).

Integrating specialized knowledge within an organization can be achieved through various mechanisms, such as sequencing, decision support systems, rules and directives, collaborative problem-solving, and knowledge transfer (Grant, 1996). Spender (1996) further defines four heuristics for organizational knowledge: interpretive flexibility, boundary management, recognition of institutional influences, and differentiation between systemic and component features.

Building upon these concepts and theories, the Knowledge Management Capabilities (KMC) framework by Gold et al. (2001) emphasizes the significance of leveraging existing knowledge and creating new knowledge to competitively position firms. The KMC stresses the development of an organization's absorptive capacity, assimilating both tacit and explicit knowledge. This is done through robust Knowledge Management (KM) infrastructure capabilities; technical, structural, and cultural, and KM processes capabilities; acquisition, conversion, application and protection to efficiently capture, reconcile, transfer knowledge throughout the organization and maximize social capital.

Knowledge Infrastructure Capabilities (KIC) in the KMC framework include *technology*, which is vital for enabling knowledge flows; *structure*, which should facilitate knowledge sharing and collaboration; and *culture*, which underpins interactions that foster innovation and knowledge transfer. Knowledge Process Capabilities (KPC) within the KMC framework include *acquisition* processes which focus on gathering new knowledge or generating it from existing knowledge through collaboration; *conversion* processes to make existing knowledge usable by organizing and integrating it within the firm's framework; a*pplication* processes that involve the effective use of knowledge, storing and retrieving it efficiently, and sharing it to gain strategic insights; and *protection* processes to ensure that knowledge is safeguarded against theft or misuse. Figure 2 presents the original KMC framework developed by Gold et al. (2001).

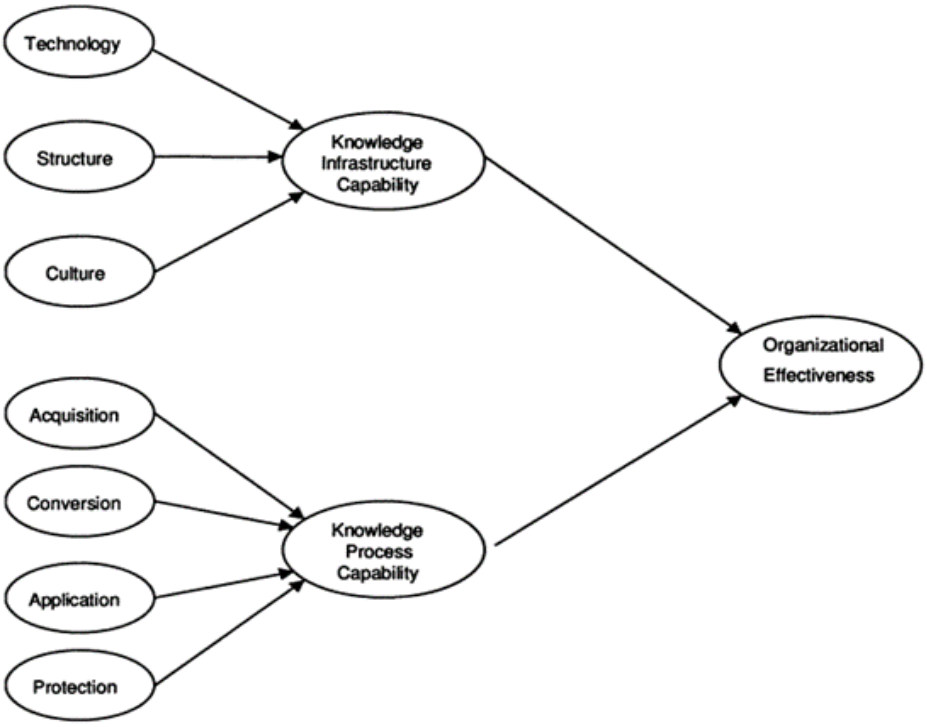


Figure 2. *The Knowledge Management Capabilities Framework* (Gold et al., 2001)

While both KIC and KPC support the assimilation of tacit and explicit knowledge, i.e. absorptive capacity. KIC may focus more on tacit knowledge and KPC more on explicit knowledge. The cultural and structural aspects of KIC emphasize interaction, trust, and flexibility, which are essential for tacit knowledge exchange.

Social capital, fostered by these infrastructures, facilitates the flow of tacit knowledge through relationships and networks. While technological infrastructure also strongly supports explicit knowledge management, collaboration and distributed learning technologies within KIC specifically enable tacit knowledge sharing by connecting individuals across the organization. Thus, KIC, through its emphasis on culture and structure, provides a stronger focus on tacit knowledge. In contrast, KPC is more focused on explicit knowledge. Its processes - acquisition, conversion, application, and protection - are designed to systematically handle knowledge in a structured manner. These processes involve capturing, organizing, and applying knowledge in ways that are more suitable for explicit knowledge, which can be codified, documented, and easily transferred within the organization.

3.2 KNOWLEDGE MANAGEMENT CAPABILITIES AND SUSTAINABILITY REPORTING

Knowledge management relies on multiple capabilities that play an important role when it comes to SR practices. The following sections details the role of knowledge management capabilities in the context of CSRD compliant SR.

3.2.1 Knowledge Process Capabilities

3.2.1.1 KMC Acquisition

Knowledge-acquisition capabilities are defined by the methods and systems a company uses to collect information and develop new knowledge (Gold et al., 2001; Jantunen, 2005). For companies engaged in SR compliant with the CSRD, establishing various processes for acquiring knowledge from both internal and external sources is essential. Externally, this includes meeting disclosure obligations of the CSRD, acquiring stakeholder perceptions, information throughout the value chain, scientific information on sustainability to identify significant risks and opportunities. Hence, all relies on the firm's proficiency in gathering pertinent external information. The comprehensive disclosure requirements mandated by the CSRD, as detailed in the theoretical background section, particularly emphasize the need for companies to engage with external sources of knowledge. Additionally, as highlighted by Gittell et al. (2012) and the ESRSs, the internal collection of information to assess the company's impact is an additional crucial aspect of the SR process. While these internal and external sources of knowledge can be defined as 'explicit knowledge', the 'tacit' knowledge of knowing how to acquire these sources of information and how to combine them to work out e.g. a double materiality analysis and efficiently collect sustainability information is another crucial source of knowledge which could be acquired either internally or externally. Supporting this notion, KPMG (2023) underscores the identification and sourcing of raw data is at the root of SR. This highlights that knowledge acquisition of both explicit sustainability data and tacit sustainability reporting know-how knowledge is an essential capability in the SR process.

3.2.1.2 KMC Conversion

Processes in knowledge management that focus on conversion are aimed at making existing knowledge functional and applicable (Gold et al., 2001). These include a firm's capabilities to organize, integrate, combine, structure, coordinate, and distribute knowledge (T. Davenport et al., 1998; T. H. Davenport & Klahr, 1998; Miller et al., 1984; Moore, 1996). Under the CSRD, companies are required to gather knowledge on many different topics such as mentioned earlier (see ESRSs). Conversion capabilities to make the sustainability data knowledge organized, useful and compliant with CSRD standards are imperative in the SR process. As KPMG (2023) notes, central KPI navigation (setting priorities, definitions, units, scopes) and sustainability reporting workflows are crucial systems and process likely to be affected to comply with the CSRD.

3.2.1.3 KMC Application

Processes focused on knowledge application are directed towards the utilization of knowledge (Gold et al., 2001). Efficient mechanisms for storing and retrieving this knowledge ensure its quick and convenient accessibility. Utilizing this knowledge can enable companies to solve new problems, improve efficiency and adjust strategic direction. As the CSRD mandates for identified material topics, additional to policies metrics and targets, actions must be developed and reported accordingly. Building on this, as (Gittell et al., 2012) notes, for successful sustainability reporting merely having the best data collection systems and processes in place to just produce a report is insufficient. Companies must be able to integrate the collected information into management decision-making processes to drive sustainable development, efficiency and ultimately competitive advantages. KPMG (2023) states that data / KPI governance (instructions, access management,

compliance, and quality control), sustainability management workflows, and tailored analytics are systems and processes likely to be affected by the CSRD within organizations.

3.2.1.4 KMC Protection

Because knowledge management processes focused on protection and security are developed to safeguard an organization's knowledge from unauthorized or improper usage or theft (Gold et al., 2001), protection is not recognized as an essential capability for implementing CSRD-compliant reporting. Instead, it is considered an important trait for ensuring proper knowledge and data handling, complementing effective sustainability reporting. Consequently, KMC protection is **not** explored in this study.

3.2.2 Knowledge Infrastructure Capabilities

3.2.2.1 KMC Technology

Technology is crucial for mobilizing social capital and creating new knowledge in organizations (Gold et al., 2001). It integrates information flows and breaks down communication barriers. Key aspects include business intelligence, collaboration, knowledge discovery and mapping, and opportunity generation (Duncan, 1972; Teece, 1998). In the light of SR under the CSRD, knowledge discovery technologies to find new knowledge, sustainability data, internal or external to the firm, and knowledge mapping technologies to effectively track sources of data and create a catalogue of sustainability data, can play a crucial role. Additionally, knowledge application and opportunity generation technologies could allow firms to use the existing sustainability data and exploit opportunities. KPMG (2023) highlights that the technical system architecture, configuration, and functionality are imperative systems and processes that will be affected when engaged in sustainability reporting and CSRD compliance.

3.2.2.2 KMC Structure

Organizational structure is crucial for effective knowledge management, with traditional structures often hindering cross-organizational collaboration and knowledge sharing (Gold et al., 2001; O'Dell & Grayson, 1998). Optimizing knowledge sharing within one area might limit sharing across the entire organization or supply chain (1998). Therefore, organizational structures should be designed for flexibility to foster sharing and collaboration both internally and along the supply chain. This notion resonates with the requirements of the CSRD, as ESRS 1 states that organizations need to disclose internal and material information related to their entire value chain. Two effective structures are the modular organizational design, enhancing coordination and flexibility, and the hypertext organization, blending formal and informal elements for efficient knowledge creation (Nonaka & Takeuchi, 1995; Sanchez & Mahoney, 1996). Additionally, reward and incentive systems should motivate knowledge generation and sharing across divisions (Leonard-Barton, 1995). The overall knowledge management structure combines these elements with the formal organizational framework. Furthermore, KPMG (2023) also notes that the organization and governance model, such as roles and ownership responsibilities, are likely to be affected during SR and CSRD compliance.

3.2.2.3 KMC Culture

Organizational culture is of centric importance for effective knowledge management (T. Davenport et al., 1998; T. H. Davenport & Klahr, 1998). Key elements include fostering interactions and dialogues among employees to facilitate innovation and the transfer of tacit knowledge into explicit knowledge at the organizational level (Nonaka, 1990, 1994). In the context of SR, this relates to fostering interaction between individuals, organizational departments and other stakeholders to transfer explicit and tacit sustainability knowledge. Additionally, a clear and communicated corporate vision/strategy, along with a set of organizational values emphasizing trust and openness are integral components of culture and essential for effective knowledge management (D'Aveni & Gunther, 1995; Kanter et al., 1992; Leonard-Barton, 1998). These elements not only guide the organization towards its goals but also encourage knowledge-related activities and create a sense of involvement among employees (Davenport et al., 1996). Effective communication of these values and vision across the organization is crucial for successful knowledge management (Ikujirō Nonaka & Hirotaka Takeuchi, 1995). Complying with the CSRD requires extensive collaboration within an organization, with the parties in the value chain and other affected stakeholders. Communicating the purpose of these collaborating activities proposes to be imperative during sustainability reporting. Furthermore, effective communication and change management (culture & literacy) are proposed by KPMG to play an essential role during CSRD compliance (KPMG, 2023).

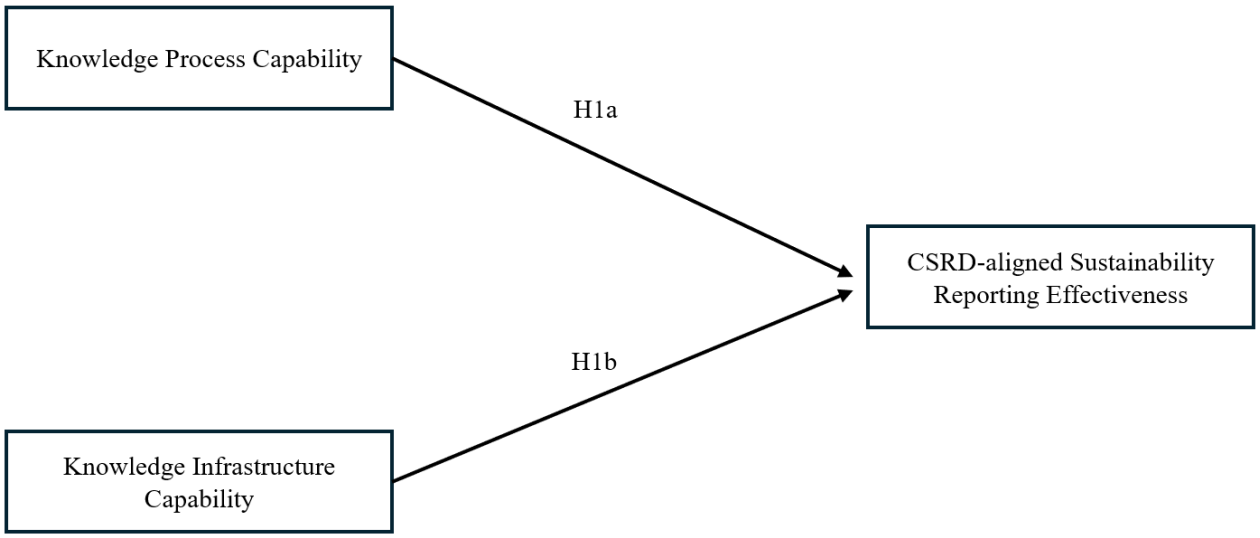


Figure 3. *Model 1 – Theoretical model of the relationships between Knowledge Process & Infrastructure Capability and CSRD-aligned Sustainability Reporting Effectiveness*

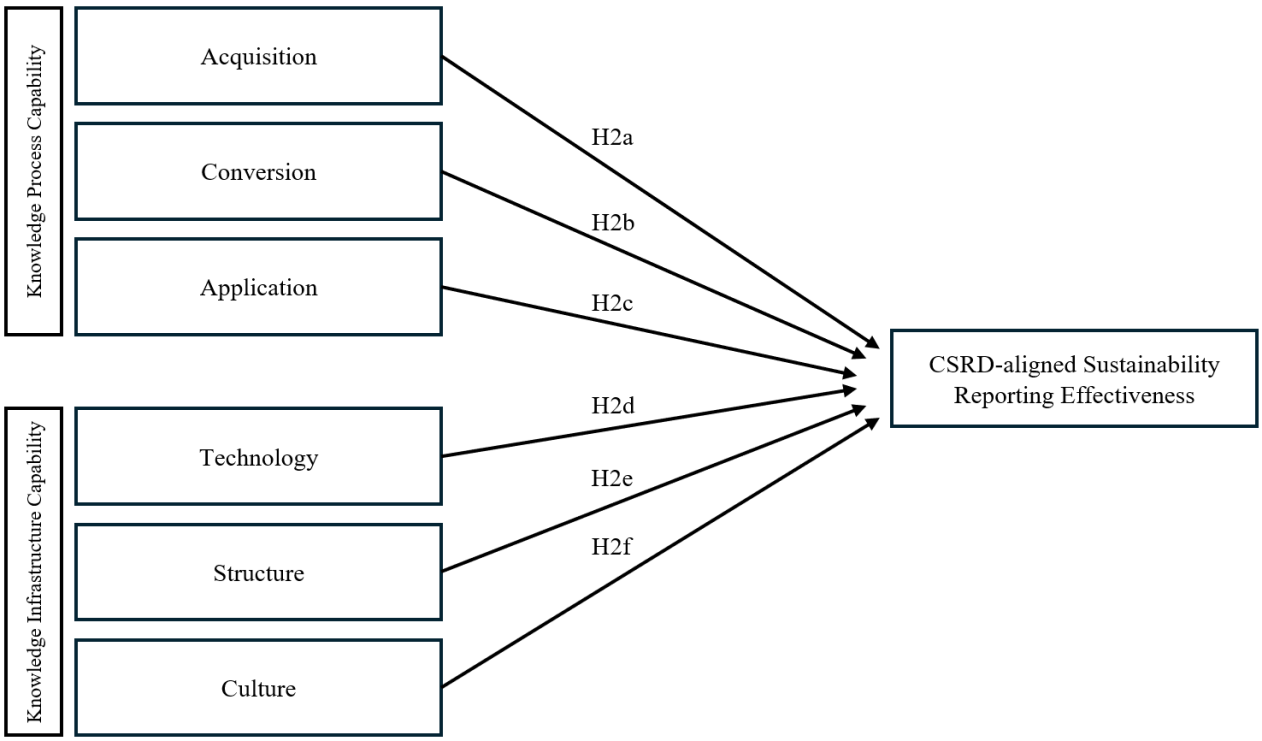


Figure 4. *Model 2 – Theoretical model of the relationships between the sub-KMCs and CSRD-aligned Sustainability Reporting Effectiveness*

3.2.2.4 Hypotheses

Based on the literature review and theoretical framework, theoretical models 1 & 2 are developed (See Figures 3 & 4) and the following hypotheses are proposed to investigate the relationship between Knowledge Management Capabilities and CSRD-compliant sustainability reporting effectiveness:

Model 1:

Knowledge Process Capability

- **H1a:** There is a positive relationship between Knowledge Process Capability and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(1a):** There is no relationship between Knowledge Process Capability and CSRD-aligned Sustainability Reporting Effectiveness

Knowledge Infrastructure Capability

- **H1b:** There is a positive relationship between Knowledge Infrastructure Capability and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(1b):** There is no relationship between Knowledge Infrastructure Capability and CSRD-aligned Sustainability Reporting Effectiveness.

Model 2:

KMC Acquisition

- **H2a:** There is a positive relationship between KMC Acquisition and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(2a):** There is no relationship between KMC Acquisition and CSRD-aligned Sustainability Reporting Effectiveness.

KMC Conversion

- **H2b:** There is a positive relationship between KMC Conversion and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(2b):** There is no relationship between KMC Conversion and CSRD-aligned Sustainability Reporting Effectiveness

KMC Application

- **H2c:** There is a positive relationship between KMC Application and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(2c):** There is no relationship between KMC Application and CSRD-aligned Sustainability Reporting Effectiveness.

KMC Technology

- **H2d:** There is a positive relationship between KMC Technology and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(2d):** There is no relationship between KMC Technology and CSRD-aligned Sustainability Reporting Effectiveness.

KMC Structure

- **H2e:** There is a positive relationship between KMC Structure and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(2e):** There is no relationship between KMC Structure and CSRD-aligned Sustainability Reporting Effectiveness

KMC Culture

- **H2f:** There is a positive relationship between KMC Culture and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(2f):** There is no relationship between KMC Culture and CSRD-aligned Sustainability Reporting Effectiveness.

3.3 DYNAMIC CAPABILITIES

The concept of Dynamic Capabilities (DC) was first brought up by Teece et al. (1997) as a response to the limitations of static strategic models like the RBV (J. Barney, 1991; Grant, 1991) in environments of rapid change. The RBV focuses internally on idiosyncratic and difficult-to-imitate (i.e. VRIN/VRIO) resources as the origin of competitive advantage, compared to models like the Market-Based View (MBV), i.e. Porter's five forces (Porter, 1997), which focuses on the external environment as the origin of competitive advantage. In an attempt to combine the two views, the concept of DCs was developed. DC entails a focus on distinctive processes, specific asset positions, path dependencies, and the continuous honing of internal processes to identify and exploit new opportunities (Teece et al., 1997). This approach highlights the importance of adaptability, innovation, and efficient organization in maintaining competitive advantage and creating wealth in dynamic environments (Teece et al., 1997). As such, DC is defined as: *"The ability of an organization and its management to integrate, build, and reconfigure internal and external competences to address rapidly changing environments"* (Teece et al., 1997, p. 516)

Dynamic capabilities therefore represent an organization's capacity to attain new and innovative forms of competitive advantage, considering its path dependencies and market positions (Leonard-Barton, 1992). This distinguishes a firm's dynamic capabilities from its ordinary (operational) capabilities, which encompass traditional approaches and the routine activities required to maintain the status quo in stable and certain environments (Schilke & Helfat, 2018). As such, in environments that are becoming increasingly volatile, uncertain, complex and ambiguous (VUCA), organizations must find ways beyond their ordinary capabilities to sustain competitive advantage, be effective and deliver value; through dynamic capabilities.

Currently, the traditional concept of dynamic capabilities is understood as three distinct yet interconnected and partially overlapping capabilities: *Sensing*, *Seizing*, and *Transforming* (Teece, 2007). The micro-foundations of dynamic capabilities - comprising specific skills, processes, procedures, organizational structures, decision rules, and disciplines - support an organization's ability to sense, seize, and reconfigure (Teece, 2007).

3.3.1 DC Sensing

The sensing dynamic capability involves a company's ability to scan and interpret markets, regulatory changes and technological advancements to identify changes, opportunities and threats. This capability necessitates significant investments in research, tracking regulatory and technological trends, analyzing customer needs anticipating industry shifts, and predicting competitor and supplier reactions. Organizations must continuously gather data from diverse sources, including market signals, technological advancements, and competitor actions, supported by extensive R&D activities (Cohen & Levinthal, 1990). Understanding explicit and latent regulatory and customer needs is crucial as firms must predict how these needs will evolve and how technological advancements can meet them (Day, 1994). Developing sensing capabilities requires robust knowledge acquisition and learning at both organizational and individual levels, involving synthesizing information from various stakeholders to anticipate future trends. Effective sensing relies on knowledge management processes to formalize these activities, reducing dependency on individual experiences and creating an analytical framework for continuous knowledge articulation and insight updating (Teece, 2007) . Embedding scanning, interpretative, and creative processes within the firm reduces vulnerability and enhances sensing capabilities (Helfat et al., 2007). Additionally, sensing includes identifying dysfunctional internal routines and opportunities for improvement, ensuring the firm adapts to external changes while continuously improving its internal operations (Teece, 2007). This comprehensive approach enables firms to identify and exploit emerging opportunities and changes while mitigating threats, navigating the complexities of technological change and market evolution to ensure long-term success and resilience (Eisenhardt & Martin, 2000; Teece, 2007; Zollo & Winter, 2002a).

3.3.2 DC Sensing

Seizing involves mobilizing resources to capture opportunities and adapt effectively to the changes identified through the sensing process. This capability requires firms to develop and implement strategies to exploit these opportunities effectively (Teece, 2007). Key aspects of seizing include committing to developing new processes, services or products that address identified opportunities and changes, often involving significant investments in technology development, innovation and commercialization (Pisano, 1990). The design and selection of an appropriate business model, structure and culture are crucial, as this should align with the firm's

strategic objectives and involve decisions about strategic direction, organizational mobilisation, and value propositions (Chesbrough & Rosenbloom, 2002). Additionally, firms must overcome internal resistance and reconfigure resource allocation processes to support new strategic direction, requiring robust decision-making processes, investment strategies, and organizational structures that promote innovation and strategic agility (Henderson & Clark, 1990).

3.3.3 DC Transforming

Transforming, or reconfiguring, involves continuously renewing and reconfiguring the firm's resources and capabilities to maintain competitiveness and effectiveness as the environment changes (Teece, 2007). This capability emphasizes asset orchestration, where firms must realign and redeploy their assets to respond to evolving opportunities and threats, necessitating flexibility and the ability to integrate and reconfigure internal and external resources (Teece & Augier, 2009). Organizational change is often required, involving significant adjustments to structures, processes, and cultures. Firms must manage change effectively, fostering a culture of continuous improvement and adaptation (Eisenhardt & Martin, 2000). Furthermore, ongoing learning and capability development are essential, as firms need to invest in building new competencies and upgrading existing ones to stay ahead of competitors (Zollo & Winter, 2002). The micro-foundations of transforming include knowledge management, organizational learning processes, leadership and mechanisms for managing change and innovation (Teece, 2007).

In conclusion, the dynamic capabilities framework, as articulated by Teece (2007) provides a comprehensive understanding of how firms can achieve and sustain competitive advantage in dynamic environments. Sensing, seizing, and transforming are interconnected capabilities that enable firms to adapt to and shape their environments. By investing in these capabilities, firms can navigate the complexities of technological change, market evolution and regulatory changes, ensuring long-term success and resilience. This framework not only emphasizes the importance of internal processes and structures but also highlights the need for continuous learning and adaptation, which are critical in today's rapidly changing global economy (Eisenhardt & Martin, 2000; Teece, 2007; Zollo & Winter, 2002a). Figure 5 presents an overview of the micro-foundations of dynamic capabilities.

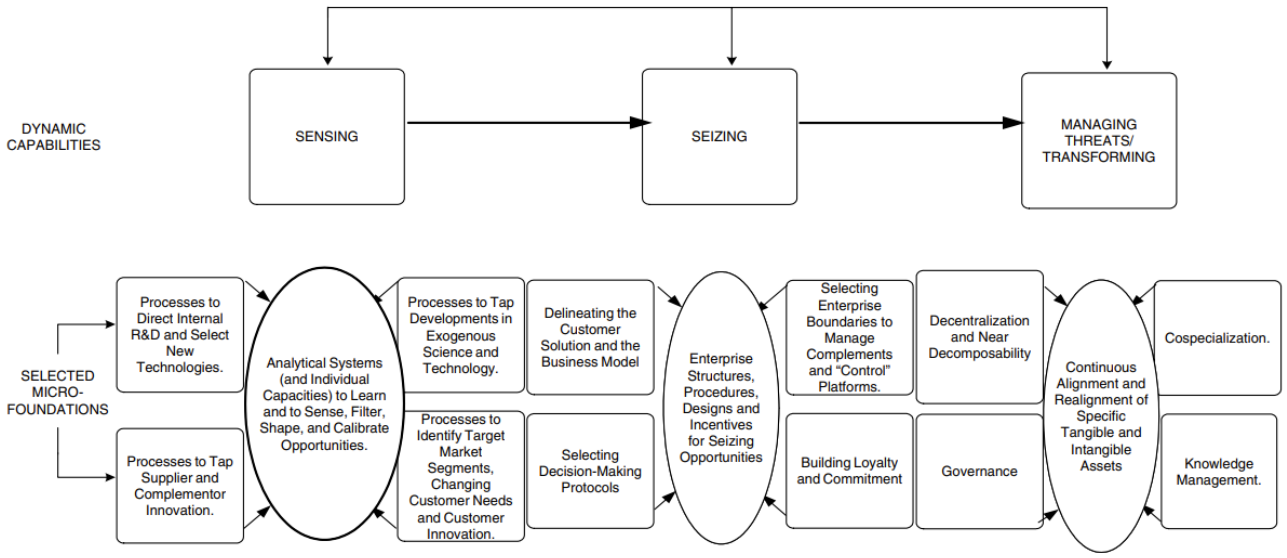


Figure 5. *Foundations of dynamic capabilities and business performance* (Teece, 2007)

3.4 DYNAMIC CAPABILITIES AND SUSTAINABILITY REPORTING

As the CSRD is embedded in the dynamically evolving sustainability agenda of the EU, Dynamic Capabilities theory aligns well with the context of sustainability reporting. Sustainability inherently requires adaptability as environmental and social conditions change, demanding that corporate practices evolve accordingly. Additionally, advancements in research, science, and sustainability knowledge continuously reshape approaches to sustainability, contributing to an evolving ESG regulatory environment. The CSRD represents

a significant shift in sustainability reporting, compelling companies to drastically adapt. It offers a formal, internal incentive for companies to address corporate sustainability, fostering awareness and establishing routines for integrating sustainability-related information into business operations (Herzig & Schaltegger, 2011). Specifically, the CSRD mandates organizations to sense and assess impacts, risks, and opportunities (IROs) and respond effectively to emerging and evolving opportunities and threats. Furthermore, the anticipated effect of the CSRD is to accelerate sustainable transformation by driving sustainable finance, thereby increasing the pace of economic change. DC theory provides a framework to address the challenges of SR regulation and its potential benefits, helping companies remain effective and competitive in these dynamic conditions. The following sections detail the role of dynamic capabilities – sensing, seizing and transforming – in the context of CSRD-compliant SR.

3.4.1 Sensing

Dynamic Capabilities Sensing plays a pivotal role in sustainability reporting by facilitating systematic information gathering and knowledge generation from both internal and external sources. A study conducted by Deloitte (2022) underscores the importance of sensing capability for sustainability transformations. (Jantunen, 2005) highlights that knowledge-acquisition capabilities encompass procedures and mechanisms essential for this process. Companies implementing SR must develop robust knowledge acquisition processes to understand the detailed CSRD requirements, gather sustainability data and identify material impacts, risks and opportunities. The CSRD underscores the necessity for companies to engage with external knowledge- and stakeholders to satisfy disclosure standards, such as parties (suppliers, distributors and customers) in the value chain. Additionally, acquiring internal information is crucial for gathering the required sustainability data and identifying developments, opportunities and insufficiencies within the firm (Babelytė-Labanauskė & Nedzinskas, 2017; Hodgkinson & Healey, 2011). In this regard, Internal information gathering links organizational processes for knowledge acquisition to the discovery of opportunities and threats, thereby involving sensing capabilities.

Furthermore, other knowledge management structures, such as technology, are essential for formalizing sensing activities and ensuring they remain independent of individual employees' experiences. Such systems enable the recurrent synthesis and updating of insights, thereby fostering sensing capabilities (Teece, 2007). Storing and integrating this information effectively is critical, and specialized technology for data collection and structuring has become increasingly relevant (Elbashir et al., 2022). As such, the utilization of technology for effective knowledge and data acquisition regarding sustainability reporting involves sensing capability.

3.4.2 Seizing

In the context of sustainability reporting, seizing capabilities are crucial for translating the information gathered through sensing into CSRD-compliant reporting and actionable strategies. Effective seizing involves implementing the necessary changes imposed by the CSRD within the organization to capitalize on the opportunities and challenges. This can require firms to integrate new technologies and processes that can enhance their sustainability reporting effectiveness. For instance, implementing specialized technology and data management systems can help organizations better understand, manage and act upon sustainability data according to the CSRD. (Basten & Haamann, 2018) indicate that organizational memory systems used for information storage, access, and structuring improve absorptive capacity and organizational learning, which is linked to seizing capability (Zahra et al., 2002). As such, technology to increase absorptive capacity is essential for firms to effectively assimilate the required knowledge to implement the CSRD and utilize sustainability-related information.

Furthermore, the cultural and structural elements of an organization play a vital role in facilitating and supporting the adaptation to the CSRD-related identified changes and opportunities that foster seizing capability(Chesbrough & Rosenbloom, 2002; Cohen & Levinthal, 1990; Henderson & Clark, 1990). A culture that encourages flexibility, engagement, innovation and knowledge sharing is essential, i.e. to overcome internal resistance, leading to effective seizing capabilities (Cohen & Levinthal, 1990; Henderson & Clark, 1990). Organizational structures should support the seizing attributes fostering cross-organizational communication, collaboration, and efficient and aligned allocation of resources (Chesbrough & Rosenbloom, 2002). Companies that cultivate such a culture and structure are better equipped to develop and implement strategies that address the challenges and opportunities posed by the CSRD (J. B. Barney, 1986). In conclusion,

DC seizing is vital for successful sustainability reporting, enabling firms to mobilize resources, develop effective strategies, and integrate new technologies to address the CSRD requirements. Aligning cultural and structural elements within the organization supports this adaptation, ensuring effectiveness in the dynamic environment of sustainability reporting.

3.4.3 Transforming

Implementing formal knowledge management structures is found to foster dynamic capabilities specifically transforming DCs (Reijsen et al., 2014; Teece, 2007). These structures affect transformation capabilities, as they help to ensure that organizations and their workforce are equipped with the required knowledge to adapt to the CSRD accordingly. Further, Implementing knowledge management conversion practices, such as articulating, codifying, and distributing, impacts how companies transform experience and information into tacit and explicit knowledge (Eriksson, 2014). In this regard, the effective distribution of sustainability reporting related knowledge within the organization and converting it to usable information are transforming attributes that are crucial for effective sustainability reporting.

Additionally, to effectively implement the CSRD, organizations need to undergo significant organizational changes, including adjustments to structures, processes, and cultures (Belak & Ušljebrka, 2017; Gutterman, 2023). This includes fostering a culture of continuous improvement and adaptation, which is essential for managing change effectively (Eisenhardt & Martin, 2000). Firms must cultivate ongoing learning and capability development to build new competencies and upgrade existing ones, fostering internal organizational alignment and ensuring effectiveness in meeting sustainability reporting standards and goals (Zollo & Winter, 2002b). Organizational alignment supports the continuous synthesis and updating of sustainability-related knowledge, ensuring that insights gained from SR are effectively integrated into the firm's strategic and operational frameworks (Teece, 2007). Moreover, the CSRD requires organizations to apply the gained insights by developing policies, metrics leading to targets, and actions to address the identified IROs (European Commission, 2023c). The disclosure content necessitates that the material sustainability data is to be integrated into decision-making (2023c). Therefore, being able to implement new sustainability practices and adjust strategic direction accordingly is an essential part of the organizational transforming ability that is driven by CSRD implementation.

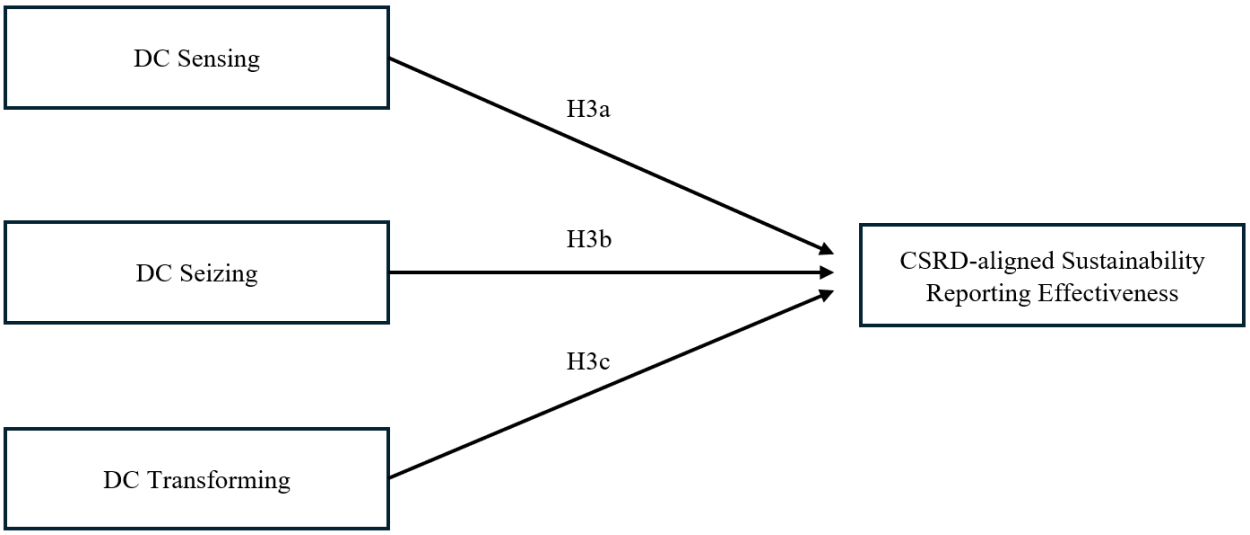


Figure 6. *Model 3 - Theoretical model of relationships between Dynamic Capabilities and CSRD-aligned Sustainability Reporting Effectiveness.*

3.4.4 Hypotheses

Based on the literature review and theoretical framework, theoretical model 3 (figure 6) is developed and the following hypotheses are proposed to investigate the relationship between dynamic capabilities and CSRD-compliant sustainability reporting:

DC Sensing

- **H3a:** There is a positive relationship between Dynamic Capability Sensing and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(3a):** There is no relationship between Dynamic Capability Sensing and CSRD-aligned Sustainability Reporting Effectiveness

DC Seizing

- **H3b:** There is a positive relationship between Dynamic Capability Seizing and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(3b):** There is no relationship between Dynamic Capability Seizing and CSRD-aligned Sustainability Reporting Effectiveness.

DC Transforming

- **H3c:** There is a positive relationship between Dynamic Capability Transforming and CSRD-aligned Sustainability Reporting Effectiveness.
- **H0(3c):** There is no relationship between Dynamic Capability Transforming and CSRD-aligned Sustainability Reporting Effectiveness.

3.5 CSRD-ALIGNED SUSTAINABILITY REPORTING EFFECTIVENESS (SRE)

Every undertaking in the scope of the CSRD has to report on different topics based on their materiality assessment and industry and has to adhere to varying standards based on their size. Therefore, determining an organization its CSRD-aligned sustainability reporting effectiveness is assessed mostly based on ESRS 1 – General Requirements. It is expected that these requirements and principles are at the foundation of sustainability reporting under the CSRD, irrespective of company size, industry or materiality assessment. This includes an organization its ability to perform a double materiality assessment, to engage its stakeholders, to acquire material sustainability data throughout its value chain, and to present the sustainability information according to the qualitative characteristics. Additionally, the ESRS 2 – General Disclosures is to be disclosed irrespective of the undertaking's materiality assessment, size and industry as well. As such, an organization's ability to integrate material sustainability data into decision-making to develop metrics and targets and undertake actions accordingly is assessed. Lastly, the company's complete understanding of the CSRD requirements and ability to adapt, streamline, and trust in compliance readiness will be assessed additionally.

4 METHODOLOGICAL FRAMEWORK

4.1 RESEARCH DESIGN

This study adopts an *exploratory mixed-methods* research design, with a dominant (primary) cross-sectional quantitative design, using self-completion questionnaires, taking a deductive approach (Creswell & Clark, 2017). General theory on sustainability reporting, CSRD compliance, knowledge management and dynamic capabilities serve as a foundation to quantitatively explore the relationships between the dimensions within the KMC & DC frameworks (Gold et al., 2001; Teece, 2007) and CSRD compliance effectiveness. This is supplemented and compared with additional quantitative insights from a questionnaire conducted by PwC and qualitative insights based on PwC's professional experiences, taking a more inductive approach (Creswell & Clark, 2017).

The quantitative nature of this research serves as a foundation for a broader, objectivistic and positivistic understanding of the relationship between the dimensions of the KMC & DC frameworks and CSRD compliance (Clark et al., 2021). A cross-sectional research design is used as it involves the collection of data on more than one case, at a single point in time, in order to collect quantitative data in connection to the variables in the KMC & DC frameworks and CSRD compliance which are then examined to detect patterns of association (Clark et al., 2021). The additional quantitative and qualitative information from PwC complements the results of the primary data for a more nuanced, interpretivist and constructivist understanding as it can capture the subjective experiences and underlying processes within the process of sustainability reporting and ideally within the key variables of the KMC & DC framework in relation to CSRD compliance (Clark et al., 2021). As such, the integration of multiple sources of data, both quantitative and qualitative,

allows for *triangulation* which improves the validity, reliability and overall **credibility** of this study's findings and provides a more comprehensive understanding of the field of research (Clark et al., 2021).

In this study, the unit of analysis are organizations that fall within the scope of the CSRD between 2024 and 2028. More specifically, the focus is on the organizational elements and practices within the KMC & DC frameworks in relation to CSRD compliance effectiveness.

4.2 SAMPLING STRATEGY

For the quantitative self-completion questionnaire, stratified random sampling is used as the goal is to ensure an equal representation of different organizations that fall within the scope of the CSRD throughout 2024 and 2028, based on Table 1 (Clark et al., 2021). This allows for the examination of different organizations and industries which supports generalizability. The sample will be identified through a sales engagement platform; 'Apollo.io', and intelligent prospecting software; Crunchbase.com. Both platforms hold databases of organizations within the EU and allow one to filter on industry, company type, location, job titles, employees, and revenue. This enables the identification of organizations that fall within the scope of the CSRD between 2024 and 2028.

The global CSRD survey by PwC, utilizes a purposive sampling strategy as PwC's questionnaire is distributed among the sustainability managers and executives responsible for CSRD compliance of their clients (Clark et al., 2021).

4.3 DATA COLLECTION

The method used for the primary data collection will be (web) surveys in the form of self-completion questionnaires (Clark et al., 2021). This method allows for the quantitative exploration of the dimensions within the KMC and DC frameworks in relation to CSRD compliance effectiveness. Additionally, it enables to cost- and time efficiently collect data from a large amount of respondents. Thereafter, it allows for standardization to ensure consistency, replicability, and comparability. The self-completion questionnaires are developed using 'Qualtrics.com' and sent to the identified sample by e-mail which can be retrieved from Apollo.io, Crunchbase.com, and other platforms such as LinkedIn.com and the client base from PricewaterhouseCoopers. The self-completion questionnaire questions are added to the Appendix (see Appendix A).

For the secondary PwC-related data, an existing database collected and analyzed by PwC is utilized. This database encompasses a combination of quantitative and qualitative information, allowing for an in-depth exploration of the practices, procedures, perspectives, and experiences related to CSRD compliance effectiveness.

4.4 OPERATIONALIZATION

For the primary part of this research, "CSRD-aligned Sustainability Reporting Effectiveness" (SRE) is the dependent variable and is defined by effective sustainability reporting processes and the general CSRD requirements outlined in the theoretical framework. The variable focuses on the respondent's trust and opinion since the research was conducted in 2024, a time ex-ante the publication period of CSRD-compliant reports. The multiple items measured are based on the chapter 'CSRD-aligned sustainability reporting effectiveness' of the theoretical framework section. For the detailed operationalization of the dependent SRE variable, see Appendix A.

Knowledge Infrastructure Capability (KIC) is composed of three subdimensions: technology, structure, and culture. Knowledge Process Capability (KPC) includes the subdimensions of acquisition, conversion, and application. Both KIC and KPC, along with all subdimensions of the Knowledge Management Capability framework, serve as independent variables. These are measured based on the operational foundation established by Gold et al. (2001) to ensure construct validity. As such, the individual item measures are closely aligned with those constructed by Gold et al. (2001), but they have been further refined to suit the context of CSRD-aligned sustainability reporting, as detailed in the chapter 'Knowledge Management Capabilities and Sustainability Reporting' of the theoretical framework section. For the detailed operationalization of the KMC variables, see Appendix B.

The KMC framework shares significant overlap and similarities with the DC framework, which justifies using the same item measures for both. Utilizing the operational individual item measures from the KMC framework to construct the dynamic capabilities ensures conceptual consistency and methodological rigour, as discussed in the chapter 'Dynamic Capabilities and Sustainability Reporting' of the theoretical framework. This approach not only maintains the integrity of the constructs but also simplifies the survey process. By reducing the number of items in the self-completion questionnaire and thus reducing the time to complete the survey, this operationalization strategy aims to enhance the response rate and increase the sample size, thereby improving the reliability and validity of the collected data. For the detailed operationalization of the dynamic capability variables, see Appendix A.

Multiple-item measures are generally considered to enhance the accuracy of assessing the organizational constructs of this study and offer better consistency in variable measurement (Clark et al., 2021). Therefore, most variables in this study employ multiple-item measures to strengthen the reliability and validity of these assessments. Additionally, an ordinal seven-point Likert scale is utilized for measuring most of the variables, providing the benefit of standardization and the ability to quantify relative effects based on the sample's opinion (Clark et al., 2021).

To isolate the effect of the independent variables on the dependent variable, control variables are used. These control variables include demographics such as: "company employee amount"; "revenue amount in 2023"; "industry type"; "years of sustainability reporting experience". By holding these control variables constant or accounting for their influence, the effect on "CSRD compliance effectiveness" is more likely to be causally related to the KMC dimensions. This improves the accuracy and validity of the results (Clark et al., 2021).

4.5 DATA ANALYSIS

This research's primary data analysis is entirely conducted using IBM SPSS Statistics software. The analysis commences with a comprehensive descriptive statistics approach to summarize and explore the dataset. This includes examining frequency distributions for each variable and calculating measures of central tendency (mean, median, mode) and dispersion (standard deviation, skewness and kurtosis). Following this, general assumptions for further analysis are rigorously tested, including normality, linearity, reliability, validity, and multicollinearity. Additionally, a correlation analysis is conducted to gain an initial understanding of the relationships between variables. Subsequently, the effects of demographic variables on SRE are assessed using ANOVA and correlation analysis.

Following the initial descriptive statistics, linear regression analysis is utilized as the primary analytical method. This approach is appropriate given the numerical nature of the Likert scale data, which allows the outcome categories to be treated as continuous variables for analysis purposes. The analysis involves examining model fit, explanatory power (R^2), significance, and coefficient values, with significance assessed at the 0.05 level. The interpretation focuses on the regression coefficients to describe the change in the dependent variable "SRE" for a one-unit change in the independent variables (KMC & DC dimensions). Model diagnostics, including assessments of multicollinearity, outlier identification, and sensitivity analyses by including and excluding control variables, are conducted to evaluate the fit and robustness of the model. This two-stage analytical approach, starting with descriptive statistics and followed by linear regression analysis, is designed to test the hypotheses outlined in Chapter 3 and provide a detailed and nuanced understanding of the data.

For the secondary dataset, the existing database with the analyzed results is interpreted for analysis. Since the quantitative data from the PwC survey and qualitative insights from PwC's experience are integrated and jointly documented in the database, no coding strategy is required. The qualitative information is relatively minimal and already connected to the related quantitative data.

Next, to identify relevant patterns, concepts, and processes in the data, triangulation is applied in the discussion section (Clark et al., 2021). The results from all data sources – literature, the primary dataset, and PwC's secondary dataset – are compared and discussed to achieve a more nuanced understanding of the findings in both theoretical and practical contexts. This approach strengthens the robustness and validity of this research's overall conclusions.

4.6 RESEARCH QUALITY INDICATORS

The choices made in each of the previous sections of this research influence the quality of the study and its findings. To improve the validity and reliability of this study, the following measures are taken additionally:

To increase the inter-rater reliability, external validity and relevance in the quantitative data collection, a focus lays on senior corporate sustainability managers or senior executive managers (responsible for sustainability reporting) to ensure stable, consistent and relevant results (Clark et al., 2021). These respondent profiles are considered high quality because they can assess both the infrastructural components and the processes within the organization, as well as their current state of CSRD compliance. To strengthen the construct- and convergent validity of the measurements of the variables, the operationalization is based on the studies by Gold et al. (2001) and Teece (2007), and key informants (e.g. professors at Utrecht University) will be used to ensure and validate that the operationalization used accurately represents the phenomenon and concepts this study intends to measure and theorize (Cooper & Schindler, 2014). Additionally, the survey questions are asked in a specific order to reduce bias in the respondents' answers. Moreover, to increase the response rate and improve data collection, the questionnaire is piloted and iterated based on the feedback received. Lastly, considering the role as researcher and the influence of bias and perceptions (Sinkovics & Alfoldi, 2012), a reflexive attitude is maintained throughout the entire research.

4.7 ETHICS

All data collected through surveys was handled anonymously to protect the privacy of respondents. Informed consent was obtained from all participants, ensuring they were aware of the purpose of the research and their rights. Data management practices adhered to GDPR regulations, ensuring that all data was securely stored and processed. This approach ensured the confidentiality and integrity of the data throughout the research.

5 RESULTS 1.0 – PRIMARY DATASET & HYPOTHESIS TESTING

This section presents the results of the SPSS-analysed survey data, addressing the research question: *To what extent do organizational knowledge management and dynamic capabilities influence effective CSRD-aligned sustainability reporting, and what best practices can organizations adopt?*

5.1 DATA CLEANING AND PREPARATION

Before proceeding with the analysis, the dataset was cleaned to ensure the integrity of the results. Incomplete responses were removed, and missing values were replaced with the mean values of the respective items. This preprocessing step ensured that the dataset was ready for accurate analysis. Furthermore, the framework dimension variables were computed by averaging the aggregated items, creating the respective dimension values.

5.2 DESCRIPTIVE STATISTICS

The dataset comprises responses from 30 organizations. The following subsections detail the demographic characteristics of the sample:

- **Organizational age**: The age of the organizations ranged from 3 to 300 years, with a mean value of 77.9 years. This wide range reflects the diversity in the maturity of the organizations surveyed.
- **Sustainability reporting experience**: Experience in sustainability reporting varied from 0 to 30 years, with an average of 6.4 years. This indicates that while some organizations are relatively new to sustainability reporting, others have extensive experience.
- **Employee count**: The number of employees was categorized into four groups. Notably, 18 out of 30 companies had more than 500 employees, indicating a predominance of large organizations in the sample.
- **Organizational turnover (2023)**: Turnover for 2023 was also categorized. None of the companies fell into the lowest turnover category (€700,000-€12,000,000), and 27 out of 30 companies reported a turnover greater than €40,000,000, underscoring the large sizes of organizations within the sample.
- **Industry type**: The respondents represented 10 different industries, with the highest representations in Manufacturing and Construction, and Financial Services and Real Estate (each with 6 companies), followed by Wholesale & Retail (5 companies) (see Figure X).

Table 2. Descriptive statistics of all categorical variables

		Value Label	N
Employee amount	1	10-50	1
	2	51-250	5
	3	251-500	6
	4	>500	18
Organizational turnover (2023)	2	€12.000.000-€40.000.000	3
	3	>€40.000.000	27
Industry type	1	Oil, Gas and Mining	1
	2	Transportation and Logistics	2
	3	Agriculture, Farming and Fisheries	3
	4	Hospitality, Food and Beverages	2
	5	Manufacturing and Construction	6
	6	Financial Services and Real Estate	6
	7	Energy Production and Utilities	1
	8	Technology	2
	9	Wholesale & Retail	5
	10	Professional Services	2

Table 3. Descriptive statistics of all variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Organizational age	30	3.0	300.0	77.857	69.0655	1.767	.427	3.841	.833
Employee amount	30	1	4	3.37	.890	-1.140	.427	.167	.833
Organizational turnover (€ in 2023)	30	2	3	2.90	.305	-2.789	.427	6.231	.833
Industry type	30	1	10	5.87	2.515	-.006	.427	-.850	.833
Years of sustainability reporting experience	30	0.0	30.0	6.399	6.7074	2.228	.427	5.487	.833
CSRD-aligned sustainability reporting effectiveness	30	2.86	6.43	4.8000	.88589	-.049	.427	-.051	.833
KMC Acquisition	30	2.33	6.67	5.0444	.98934	-.783	.427	.491	.833
KMC Conversion	30	2.80	6.60	4.9728	.92440	-.502	.427	-.388	.833
KMC Application	30	3.50	6.75	5.0269	.78053	.294	.427	-.443	.833
KMC Technology	30	1.67	6.00	3.9004	1.47563	.070	.427	-1.399	.833
KMC Structure	30	2.50	6.75	4.3628	.96518	.291	.427	-.044	.833
KMC Culture	30	3.33	6.67	5.3359	.81665	-.523	.427	-.017	.833
Knowledge Process Capability	30	3.53	6.34	5.0147	.78115	-.105	.427	-.939	.833
Knowledge Infrastructure Capability	30	2.89	6.47	4.5330	.93630	.269	.427	-.858	.833
DC Sensing	30	2.86	6.14	4.6524	.92862	-.236	.427	-.862	.833
DC Seizing	30	2.33	6.83	4.5627	1.03707	.219	.427	-.307	.833
DC Transforming	30	3.78	6.78	5.0358	.75079	.240	.427	-.492	.833
Valid N (listwise)	30								

Tables 2 and 3 present the descriptive statistics that provide a detailed overview of the sample characteristics, which is essential for understanding the context of the subsequent analyses.

The sample comprises a diverse set of large organizations with varying ages, sizes, and industry backgrounds. This diversity in organizational characteristics enhances the sample's representability, suggesting that the findings may be generalizable across various sectors and large organizations. Overall, this robust sample offers a comprehensive foundation for analysing the impact of Knowledge Management Capabilities and Dynamic Capabilities on CSRD-aligned sustainability reporting effectiveness.

5.3 NORMALITY AND LINEARITY

To confirm the suitability of the dataset for parametric statistical analysis, the normality of the dependent variable, CSRD-aligned sustainability reporting effectiveness, was assessed. The Kolmogorov-Smirnov and Shapiro-Wilk tests were employed for this purpose. Both tests yielded p-values greater than 0.05 (see Table 4), indicating that the distribution of the dependent variable did not significantly deviate from normality. Additionally, a visual inspection of the histogram (see Figure 7) supported this conclusion, showing a distribution closely approximating the normal curve.

Table 4. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CSRD-aligned sustainability reporting effectiveness	.125	30	.200*	.966	30	.430

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

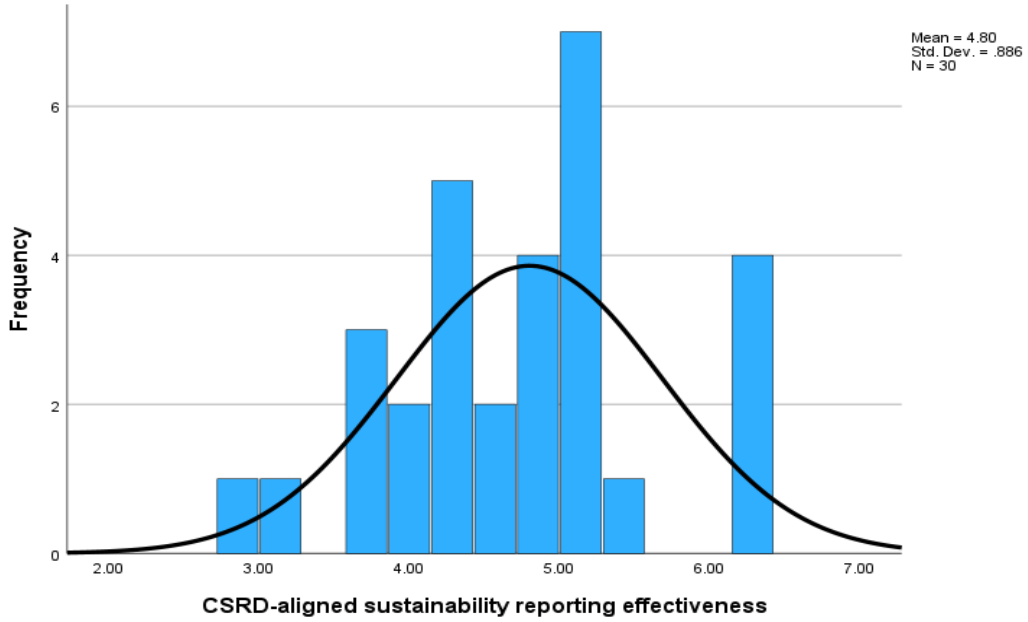
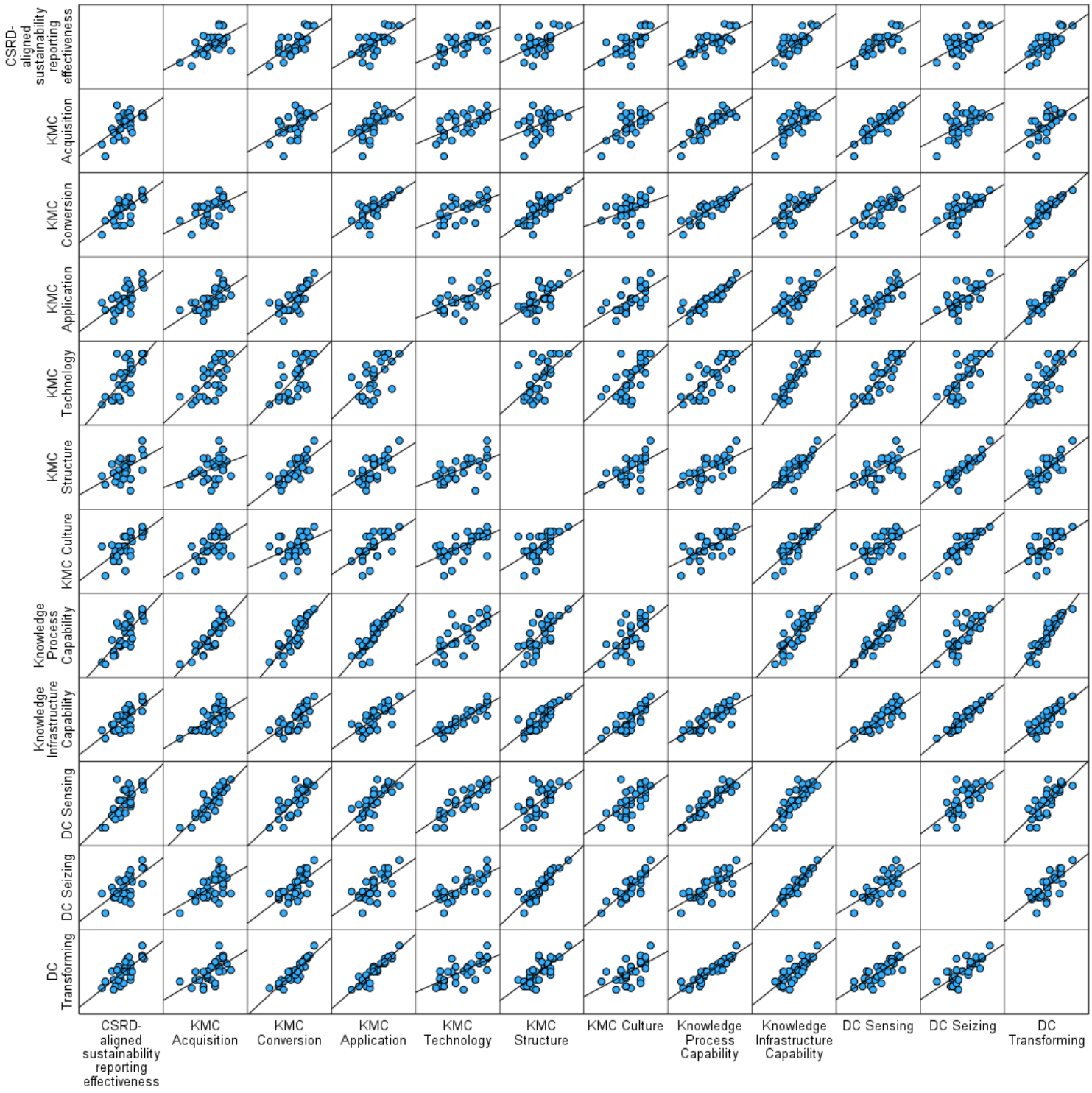


Figure 7. *Histogram with Normal Distribution Curve for CSRD-aligned sustainability reporting effectiveness*

The linearity between the dependent and independent variables was assessed using scatterplot matrices (see Figure 8). The scatterplots indicated strong linear relationships between CSRD-aligned sustainability reporting effectiveness and the key independent variables: Knowledge Process Capability (Acquisition, Conversion and Application), Knowledge Infrastructure Capability (and Technology, Structure and Culture), and the Dynamic Capabilities (Sensing, Seizing, and Transforming). This linearity supports the validity and reliability of the subsequent regression analyses, ensuring that the assumptions for linear regression were adequately met.

Figure 8. Scatterplot matrix between all variables to assess linearity



5.4 RELIABILITY AND VALIDITY

To ensure the internal consistency of the constructs within the Knowledge Management Capabilities (KMC) and Dynamic Capabilities (DC) frameworks, Cronbach's Alpha was calculated for each construct. This measure assesses the degree to which items within a construct are correlated, thereby indicating its reliability.

All constructs demonstrated Cronbach's Alpha values greater than 0.7, with most exceeding 0.8, indicating high internal consistency and reliable measurement of the underlying constructs (see Appendix C). As such, the high values of Cronbach's Alpha suggest that the items within each construct measure the same underlying concept, ensuring the reliability of the data collected.

Construct validity was evaluated through Exploratory Factor Analysis (EFA) using Principal Component Analysis (PCA) (see Appendix D). This analysis determines whether the items within each construct load onto the expected factors, thereby validating the constructs used in the study.

The factor loadings for all constructs were greater than 0.4, confirming that the items within each construct loaded onto the expected factors.

- **Knowledge Management Capabilities**: All dimensions (Process and Infrastructure) and subdimensions (Acquisition, Conversion, Application, Technology, Structure, Culture) loaded strongly onto their respective factors, confirming one-dimensionality.
- **Dynamic Capabilities**: Initial analysis suggested that DC variables might be two-dimensional. However, further inspection revealed that each DC variable was effectively unidimensional, with negligible secondary dimensions.

The high factor loadings and the unidimensional nature of the constructs support the validity of the measures used in this study. Additionally, the CSRD-aligned sustainability reporting effectiveness variable was found to be three-dimensional; however, for practical purposes, it was treated as unidimensional, as all sub-item measures loaded significantly onto the first dimension.

These findings ensure the constructs are reliable and valid, providing a solid foundation for the subsequent regression analyses.

5.5 MULTICOLLINEARITY

Multicollinearity was assessed to ensure that the independent variables in the regression models are not highly correlated, which could distort the results and affect the reliability of the regression coefficients. Two key diagnostics were used for this purpose: Variance Inflation Factor (VIF) and Tolerance.

- **Knowledge Process & Infrastructure Capability**: VIF values for the main KMC dimensions ranged from 1.056 to 2.937, with all values being well below the threshold of 10. Tolerance values were all above 0.1, indicating acceptable levels of multicollinearity.
- **Knowledge Management Capabilities**: VIF values for the KMC sub-dimensions ranged from 1.293 to 4.084 with all values being well below the threshold of 10. Tolerance values were all above 0.1, indicating acceptable levels of multicollinearity.
- **Dynamic Capabilities**: Similar to KMC, the VIF values for the DC subdimensions ranged from 1.077 to 3.471, and Tolerance values were all above 0.1, again indicating acceptable levels of multicollinearity.

The diagnostics indicate that multicollinearity is not a significant concern when variables are analysed within the same framework and dimension level. However, when variables from different frameworks or dimension levels are combined, multicollinearity values become an issue. In such combined analyses, VIF values exceed the threshold of 10, and Tolerance values fall below 0.1, indicating significant multicollinearity. As such, the subsequent regression analysis are done per framework and dimension level, ensuring that the regression coefficients are reliable and the statistical inferences drawn from the regression analyses are valid.

5.6 CORRELATION

The correlation matrix provides an overview of the relationships between the dependent variable, CSRD-aligned sustainability reporting effectiveness, and the independent variables from the Knowledge Management Capabilities (KMC) and Dynamic Capabilities (DC) frameworks (see Table 5). Pearson correlation coefficients were calculated to assess the strength and direction of these relationships.

The correlation matrix reveals significant positive correlations between CSRD-aligned sustainability reporting effectiveness and all the independent variables, with p-values indicating strong statistical significance (**$p < 0.01$). The strongest correlations are observed with Knowledge Process Capability ($r = 0.763$), Knowledge Infrastructure Capability ($r = 0.745$), and Dynamic Capability Sensing ($r = 0.747$). These high correlation coefficients suggest that higher levels of these capabilities are associated with greater effectiveness in CSRD-aligned sustainability reporting.

Furthermore, strong intercorrelations among the independent variables were observed, within and between the frameworks. For instance, Knowledge Process Capability is highly correlated with its subdimensions (Acquisition, Conversion, Application) as well as with Knowledge Infrastructure Capability. Similarly, Dynamic Capability Sensing shows strong correlations with Seizing and Transforming capabilities. The presence of these high intercorrelations underscores the importance of considering multicollinearity diagnostics when conducting regression analyses, as discussed previously.

Table 5. Correlation matrix

		(CSRD) SRE	KMC Acquisition	KMC Conversion	KMC Application	KMC Technology	KMC Structure	KMC Culture	KPC	KIC	DC Sensing	DC Seizing	DC Transforming
CSRD-aligned SRE	Pearson Correlation	--											
	N	30											
KMC Acquisition	Pearson Correlation	.627**	--										
	Sig. (1-tailed)	<.001											
	N	30	30										
KMC Conversion	Pearson Correlation	.705**	.544**	--									
	Sig. (1-tailed)	<.001	<.001										
	N	30	30	30									
KMC Application	Pearson Correlation	.663**	.662**	.715**	--								
	Sig. (1-tailed)	<.001	<.001	<.001									
	N	30	30	30	30								
KMC Technology	Pearson Correlation	.706**	.625**	.644**	.634**	--							
	Sig. (1-tailed)	<.001	<.001	<.001	<.001								
	N	30	30	30	30	30							
KMC Structure	Pearson Correlation	.528**	.397*	.750**	.641**	.585**	--						
	Sig. (1-tailed)	.001	.015	<.001	<.001	<.001							
	N	30	30	30	30	30	30						
KMC Culture	Pearson Correlation	.661**	.624**	.410*	.636**	.638**	.577**	--					
	Sig. (1-tailed)	<.001	<.001	.012	<.001	<.001	<.001						
	N	30	30	30	30	30	30	30					
Knowledge Process Capability (KPC)	Pearson Correlation	.763**	.857**	.862**	.895**	.729**	.677**	.637**	--				
	Sig. (1-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001					
	N	30	30	30	30	30	30	30	30				
Knowledge Infrastructure Capability (KIC)	Pearson Correlation	.745**	.646**	.715**	.738**	.912**	.819**	.824**	.801**	--			
	Sig. (1-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001				
	N	30	30	30	30	30	30	30	30	30			
DC Sensing	Pearson Correlation	.747**	.866**	.748**	.763**	.863**	.601**	.622**	.915**	.841**	--		
	Sig. (1-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001			
	N	30	30	30	30	30	30	30	30	30	30		
DC Seizing	Pearson Correlation	.652**	.559**	.680**	.649**	.749**	.888**	.837**	.720**	.942**	.684**	--	
	Sig. (1-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001		
	N	30	30	30	30	30	30	30	30	30	30	30	
DC Transforming	Pearson Correlation	.749**	.632**	.908**	.922**	.709**	.752**	.589**	.932**	.802**	.787**	.733**	--
	Sig. (1-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	
	N	30	30	30	30	30	30	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

5.7 EFFECTS OF DEMOGRAPHIC VARIABLES

Before delving into the detailed correlation analysis, it is essential to assess the effects of key demographic variables on CSRD-aligned sustainability reporting effectiveness. This section examines how organizational age, years of sustainability reporting experience, employee count, organizational turnover for 2023, and industry type influence the dependent variable.

Older organizations are likely to have established processes and structures that facilitate the effective implementation of new reporting standards. Over time, they accumulate knowledge and expertise that enhance their sustainability reporting practices. Research shows that organizational experience correlates positively with improved reporting practices due to better internal resources, capabilities and refined processes (Baret & Helfrich, 2019; Bouten & Hoozée, 2015). Similarly, it is expected that organizations with more years of sustainability reporting experience are better equipped to navigate CSRD compliance complexities, having developed and honed their reporting mechanisms (De Micco et al., 2020).

As such, the effects of organisational age and sustainability reporting experience on CSRD-aligned SR effectiveness have been assessed through a correlation analysis fitting their numerical measurement style (see Table 6). The correlation analysis reveals that neither organizational age nor years of sustainability reporting experience have significant effects on CSRD-aligned sustainability reporting effectiveness ($r = -0.015$ and $r = -0.069$, respectively). This suggests that the length of time an organization has been operating or involved in sustainability reporting does not substantially impact the effectiveness of its sustainability reporting in alignment with CSRD requirements.

Table 6. Correlation analysis of organizational age & sustainability reporting experience

		CSRD-aligned SRE	Organizational age	Years of sustainability reporting experience
CSRD-aligned sustainability reporting effectiveness	Pearson Correlation	--		
	N	30		
Organizational age	Pearson Correlation	-.024	--	
	Sig. (1-tailed)	.451		
	N	30	30	
Years of sustainability reporting experience	Pearson Correlation	-.071	.196	--
	Sig. (1-tailed)	.354	.150	
	N	30	30	30

To further assess the impact of organizational size and financial performance on CSRD-aligned sustainability reporting effectiveness, we conducted ANOVA tests for categorical demographic variables such as employee count and organizational turnover for 2023 (see Table 7 & 8). Homogeneity of variances was present.

The ANOVA results indicate that neither employee count nor turnover amount significantly impact CSRD-aligned sustainability reporting effectiveness ($p > 0.05$ for both). This suggests that the size of the organization, in terms of both employees and financial performance, does not play a crucial role in determining the effectiveness of their sustainability reporting practices. Since organizational size determines the required reporting date, there is no significant difference between organizations that must report in FY2025 and those required to report in subsequent years. Based on Figures 9 & 10, a slightly negative effect can even be observed, nevertheless insignificant.

Table 7. ANOVA result for effect of organizational turnover
CSRD-aligned sustainability reporting effectiveness

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.011	1	.011	.013	.909
Within Groups	22.748	28	.812		
Total	22.759	29			

Figure 9. *Line graph of the effect of organizational turnover*

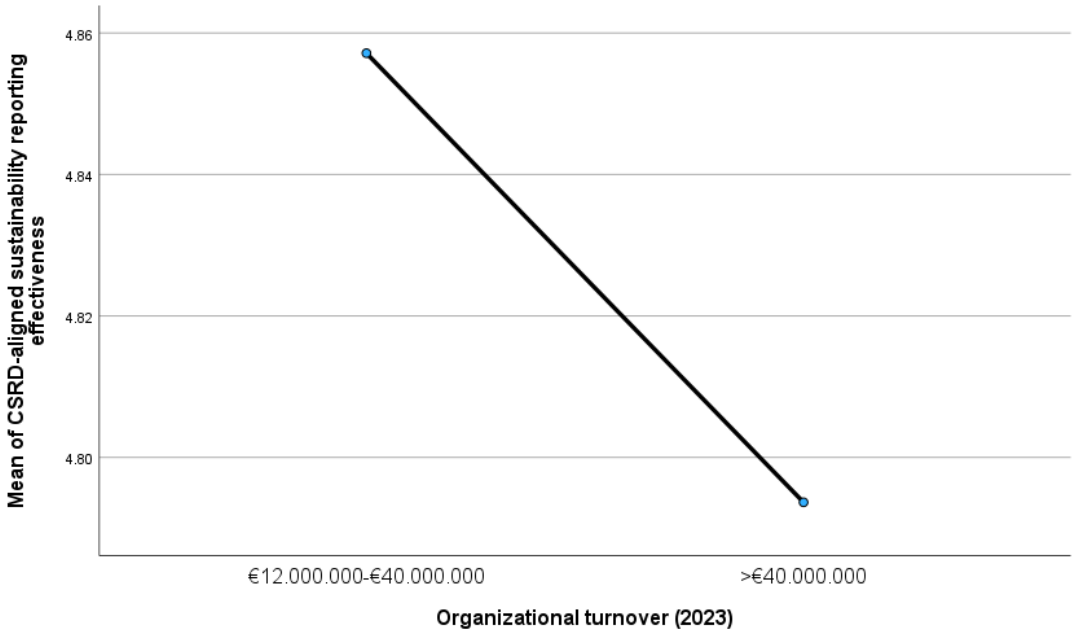
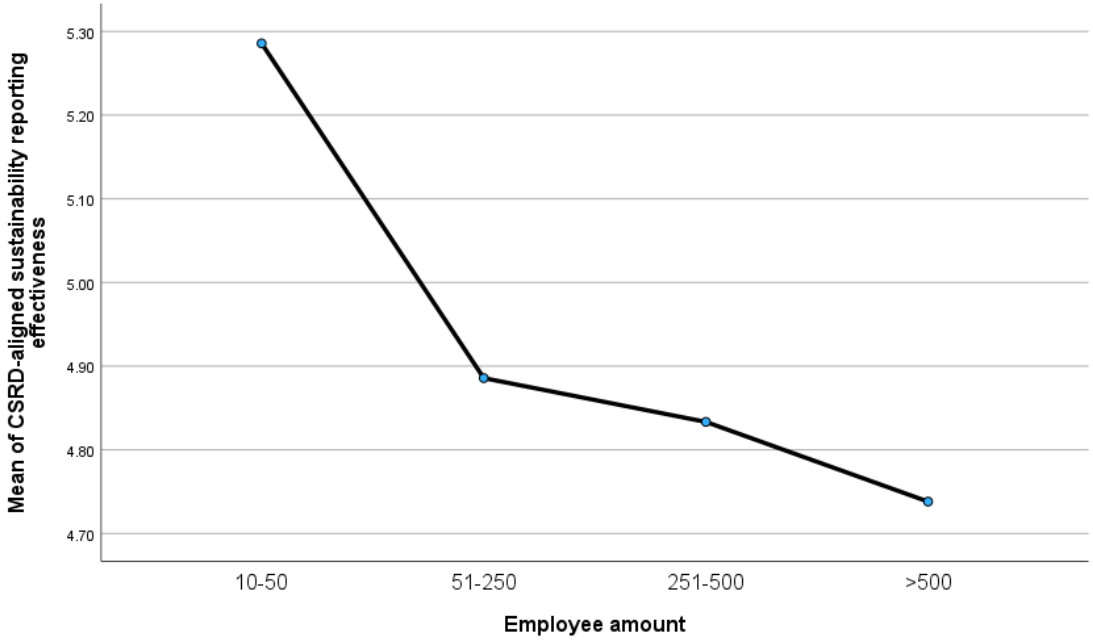


Table 8. ANOVA result for effect of Employee amount
CSRD-aligned sustainability reporting effectiveness

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.348	3	.116	.135	.938
Within Groups	22.411	26	.862		
Total	22.759	29			

Figure 10. *Line graph of the effect of employee amount*



Additionally, An ANOVA test was also conducted to determine if the industry type has any significant effect on CSRD-aligned sustainability reporting effectiveness (see Table 9).

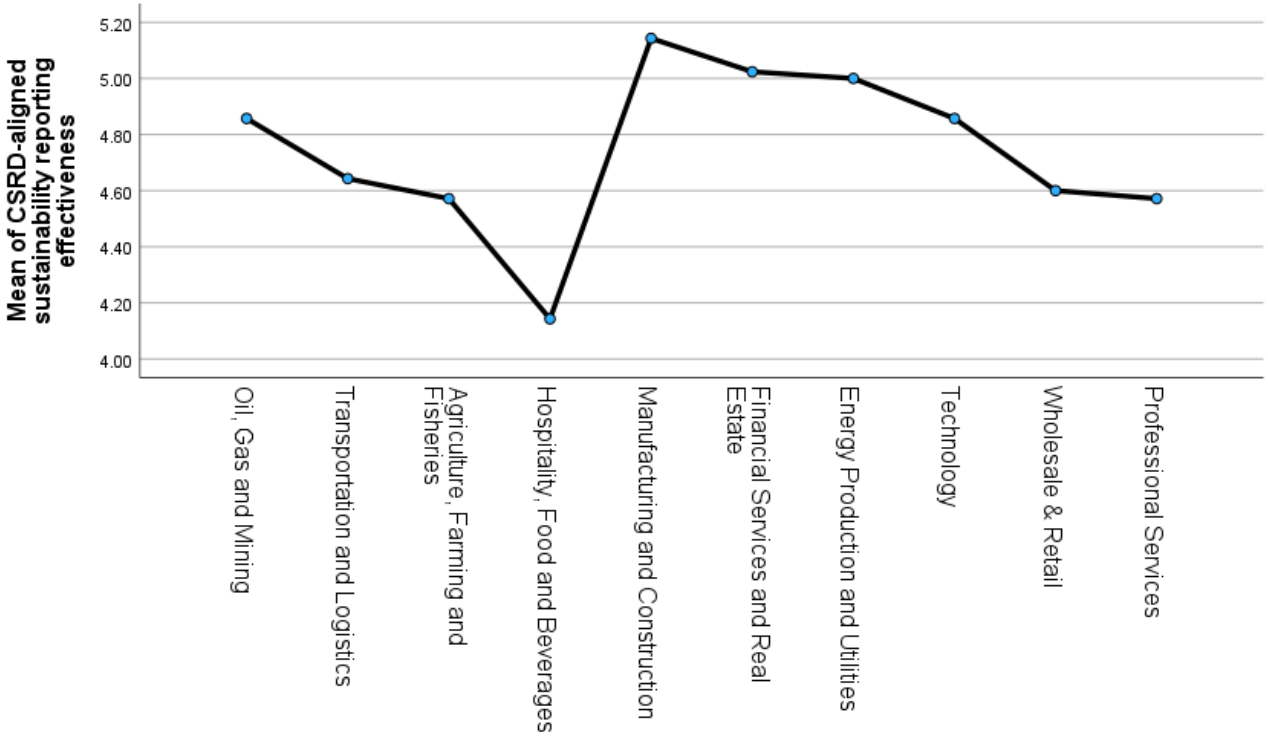
The results show that industry type does not significantly affect CSRD-aligned sustainability reporting effectiveness ($p > 0.05$). This indicates that the effectiveness of sustainability reporting aligned with CSRD requirements is consistent across different industries, without significant variations. Figure 11 indicates the average sustainability reporting effectiveness per industry type.

Table 9. ANOVA results for industry type

CSRD-aligned sustainability reporting effectiveness

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.430	9	.270	.266	.977
Within Groups	20.329	20	1.016		
Total	22.759	29			

Figure 11. *Average sustainability reporting effectiveness values per industry type*



Lastly, the interaction effects between the demographic variables on CSRD-aligned SR effectiveness have been assessed through a two-way ANOVA test. The results indicated that none of the main or interaction effects are statistically significant, suggesting that these factors and their interactions do not significantly impact sustainability reporting effectiveness.

5.7.1 Main takeaways

In conclusion, all these findings suggest that **demographic factors such as organizational age, sustainability reporting experience, size, financial performance, and industry type do not significantly impact the effectiveness of CSRD-aligned sustainability reporting**. This sets a neutral demographic context for exploring the core capabilities' impacts on sustainability reporting.

5.8 HYPOTHESES TESTING – REGRESSION ANALYSES

This section tests the hypothesized relationships through regression analyses, focusing on the dependent variable, CSRD-aligned Sustainability Reporting Effectiveness (SRE). Despite the insignificant correlation of organizational age and sustainability reporting experience with SRE, these demographic variables are included as control variables to account for potential confounding effects. Including them ensures unbiased estimates of the effects of the main independent variables.

Table 10 assesses the effects of just the control variables in a regression analysis. These results indicate that organizational age and sustainability reporting experience do not significantly affect SRE. Thus, their inclusion as control variables does not strongly bias the estimates of the primary independent variables.

Table 10. **Regression analysis only including control variables**

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.869	.284		17.121	<.001
	Organizational age	.000	.003	-.010	-.051	.960
	Years of sustainability reporting experience	-.009	.026	-.069	-.355	.725

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

5.8.1 Knowledge Management Capabilities

The effects of the Knowledge Management Capabilities' main dimensions, Knowledge Process Capability (KPC) and Knowledge Infrastructure Capability (KIC), are assessed collectively and separately, including and excluding control variables.

Table 11 assesses the KPC & KIC collectively, including the control variables. The model explains 59.9% of the variance in SRE (Adjusted $R^2 = 0.599$) and is statistically significant ($p < 0.001$). The effects and significance of the dependent variables are as follow:

- **Knowledge Process Capability**: Significant positive effect on SRE ($\beta = 0.433$, $p = 0.039$). *Therefore, the null hypothesis H0(1a) is rejected, and H1a is supported.*
- **Knowledge Infrastructure Capability**: Significant positive effect on SRE ($\beta = 0.420$, $p = 0.047$). *Therefore, the null hypothesis H0(1b) is rejected, and H1b is supported.*

Both Knowledge Process Capability and Knowledge Infrastructure Capability have significant positive effects on SRE.

The results remain consistent when the independent variables are evaluated separately, excluding the control variables, ensuring that this model's conclusions remain valid (see Appendix E).

Table 11. Regression analysis – Effect of KPC and KIC

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.809[a]	.655	.599	.56081

a. Predictors: (Constant), Knowledge Infrastructure Capability, Organizational age, Years of sustainability reporting experience, Knowledge Process Capability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.896	4	3.724	11.841	<.001[b]
	Residual	7.863	25	.315		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), Knowledge Infrastructure Capability, Organizational age, Years of sustainability reporting experience, Knowledge Process Capability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.695	.693		1.003	.326		
	Organizational age	-.001	.002	-.047	-.388	.701	.933	1.072
	Years of sustainability reporting experience	-.018	.016	-.135	-1.119	.274	.947	1.056
	Knowledge Process Capability	.491	.226	.433	2.176	.039	.348	2.870
	Knowledge Infrastructure Capability	.398	.191	.420	2.086	.047	.341	2.937

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Thereafter, the effects of the sub-dimensions of KPC and KIC were assessed collectively and separately, both including and excluding control variables.

Table 12 assesses the sub-dimension variables collectively, including the control variables. The model explains 69.1% of the variance in SRE (Adjusted $R^2 = 0.691$) and is highly significant ($p < 0.001$). The effects and significance of the independent variables are as follows:

- **KMC Acquisition**: Insignificant negative effect on SRE ($\beta = -0.184$, $p = 0.320$). *Therefore, the null hypothesis H0(2a) is accepted, and H2a is not supported.*
- **KMC Conversion**: Significant **positive effect** on SRE ($\beta = 0.704$, $p = 0.003$). *Therefore, the null hypothesis H0(2b) is rejected, and H2b is supported.*
- **KMC Application**: Insignificant positive effect on SRE ($\beta = 0.078$, $p = 0.680$). *Therefore, the null hypothesis H0(2c) is accepted, and H2c is not supported.*
- **KMC Technology**: Insignificant positive effect on SRE ($\beta = 0.277$, $p = 0.120$). *Therefore, the null hypothesis H0(2d) is accepted, and H2d is not supported.*
- **KMC Structure**: Significant **negative effect** on SRE ($\beta = -0.441$, $p = 0.032$). *Therefore, the null hypothesis H0(2e) is rejected, and H2e is not supported because a negative effect was found.*
- **KMC Culture**: Significant **positive effect** on SRE ($\beta = 0.551$, $p = 0.009$). *Therefore, the null hypothesis is rejected H0(2f), and H2f is supported.*

Excluding the control variables only affected the significance of the negative effect of KMC Structure, with a p-value of 0.103, indicating the effect was insignificant. The other variables' effects remained consistent, confirming the robustness of the other findings (see Appendix E).

Table 12. Regression analysis – Effect of KMC sub-dimensions

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.881[a]	.777	.691	.49209

a. Predictors: (Constant), KMC Culture, Years of sustainability reporting experience, Organizational age, KMC Conversion, KMC Acquisition, KMC Technology, KMC Application, KMC Structure

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.674	8	2.209	9.123	<.001[b]
	Residual	5.085	21	.242		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), KMC Culture, Years of sustainability reporting experience, Organizational age, KMC Conversion, KMC Acquisition, KMC Technology, KMC Application, KMC Structure

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.078	.820		.095	.925		
	Organizational age	-.002	.002	-.143	-1.172	.254	.717	1.395
	Years of sustainability reporting experience	-.027	.015	-.204	-1.738	.097	.773	1.293
	KMC Acquisition	-.165	.162	-.184	-1.019	.320	.327	3.061
	KMC Conversion	.674	.200	.704	3.375	.003	.245	4.084
	KMC Application	.088	.211	.078	.418	.680	.308	3.248
	KMC Technology	.166	.103	.277	1.620	.120	.363	2.752
	KMC Structure	-.405	.176	-.441	-2.295	.032	.288	3.466
	KMC Culture	.597	.207	.551	2.879	.009	.291	3.438

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

5.8.2 Detailed analysis of KMC sub-dimensions

To further understand the effects of KMC, all sub-dimensions were analysed separately, including and excluding control variables (see Appendix E). This analysis clarifies their individual contributions to SRE without multicollinearity interference. All analyses showed Standardized Coefficients Beta values >0.60 with p-values <0.05, **indicating that isolating KMCs positively and significantly affects SRE**.

Table 13. Regression analysis of individual item measures of KMC Culture

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	.369	.981		.376	.710		
	Organizational age	-.003	.002	-.234	-1.528	.139	.874	1.144
	Years of sustainability reporting experience	-.005	.020	-.040	-.261	.797	.870	1.150
	1. My organization . . . - Its board and senior management effectively support the role of sustainability and CSRD compliance	.261	.135	.359	1.934	.065	.594	1.683
	2. My organization . . . - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated	.194	.133	.257	1.458	.158	.656	1.525
	3. My organization . . . - Expects high levels of participation and learning in the process of sustainability reporting	.426	.179	.371	2.378	.026	.840	1.191

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

To gain an even deeper understanding, individual item measures of KMC Conversion, Structure, and Culture were assessed due to their significant effects on SRE when analysed collectively (see Table 13 & Appendix F). The effects and significance of the individual item measures of the KMCs are as follows:

- **The individual items of KMC Conversion** all showed positive but insignificant effects ($\beta > 0.15$, $p > 0.05$).
- **The individual items of KMC Structure** all showed positive but insignificant effects ($\beta > 0.13$, $p > 0.05$), contradicting the collective negative effect.
- **The individual items of KMC Culture** showed strong significant positive effects, with item 3 having a significant p-value (<0.026), item 1 being nearly significant (<0.065), and item 2 insignificant.

This deeper analysis underscores the importance of collective and individual contributions of KMC sub-dimensions. **Specifically, board and senior management support, and high levels of participation and learning are crucial for enhancing SRE (KMC Culture).**

5.8.3 Main takeaways

The findings of this study underscore the critical role of Knowledge Management Capabilities (KMC) in enhancing CSRD-aligned sustainability reporting effectiveness (SRE). The main takeaways of the analysis are as follows:

- **KPC & KIC:** Both Knowledge Process Capability and Knowledge Infrastructure Capability emerged as significant predictors of SRE, indicating that organizations with robust processes for knowledge acquisition, conversion, and application, supported by a strong culture, technology-enhanced infrastructure, and an effective organizational structure, are more successful in their sustainability reporting efforts.
- **KMC sub-dimensions:** Specifically, KMC Conversion and KMC Culture showed strong positive effects, emphasizing the importance of effective knowledge transformation and conversion, as well as a supportive organizational culture with top management involvement and high levels of participation and learning. Interestingly, the KMC Structure variable initially demonstrated a significant negative effect, suggesting that while structural aspects of knowledge management are essential, misaligned structures (i.e. with other capabilities) may hinder effective sustainability reporting. Therefore, careful attention must be given to organizational structure and governance to ensure effective sustainability reporting.

Overall, the study indicates that fostering knowledge management capabilities, particularly along process and infrastructure, can significantly enhance the effectiveness of CSRD-aligned sustainability reporting.

5.8.4 Dynamic capabilities

This section presents the results of the regression analyses examining the impact of Dynamic Capabilities (DC) on CSRD-aligned Sustainability Reporting Effectiveness (SRE). The demographic variables, organizational age and years of sustainability reporting experience, are included as control variables to account for potential confounding effects and excluded.

Table 14 (model 1) analyses the effects of the three main dimensions of Dynamic Capabilities: Sensing, Seizing, and Transforming including control variables. The model explains 59.1% of the variance in SRE (Adjusted $R^2 = 0.591$) and is statistically significant ($p < 0.001$). The effects and significance of the independent variables are as follows:

- **DC Sensing**: Insignificant positive effect on SRE ($\beta = 0.338$, $p = 0.106$).
- **DC Seizing**: Insignificant positive effect on SRE ($\beta = 0.122$, $p = 0.514$).
- **DC Transforming**: Near-significant positive effect on SRE ($\beta = 0.424$, $p = 0.067$)

Table 14. Regression Analysis – Effects of Dynamic Capabilities (including control variables)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.662	.591	.56647

a. Predictors: (Constant), DC Transforming, Organizational age, Years of sustainability reporting experience, DC Seizing, DC Sensing

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.058	5	3.012	9.385	<.001[b]
	Residual	7.701	24	.321		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), DC Transforming, Organizational age, Years of sustainability reporting experience, DC Seizing, DC Sensing

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.468	.730		.641	.528		
	Organizational age	.000	.002	-.021	-.171	.866	.928	1.077
	Years of sustainability reporting experience	-.022	.017	-.165	-1.315	.201	.895	1.117
	DC Sensing	.322	.192	.338	1.680	.106	.348	2.870
	DC Seizing	.104	.157	.122	.662	.514	.416	2.406
	DC Transforming	.500	.261	.424	1.915	.067	.288	3.471

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 15 assesses the independent variables collectively, excluding the control variables. The model shows an Adjusted R Square value of 0.592, indicating that this model explains 59.2% of the variance in SRE and is highly significant. The effects and significance of the independent variables are as follows:

- **DC Sensing**: Near-significant positive effect on SRE ($\beta = 0.378$, $p = 0.069$)
- **DC Seizing**: Insignificant positive effect on SRE ($\beta = 0.135$, $p = 0.461$)
- **DC Transforming**: Insignificant positive effect on SRE ($\beta = 0.353$, $p = 0.110$)

Table 15. Regression Analysis – Effects of Dynamic Capabilities (excluding control variables)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.796[a]	.634	.592	.56581

a. Predictors: (Constant), DC Transforming, DC Seizing, DC Sensing

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	14.435	3	4.812	15.030	<.001[b]
	Residual	8.324	26	.320		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), DC Transforming, DC Seizing, DC Sensing

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
2	(Constant)	.503	.717		.701	.490		
	DC Sensing	.360	.190	.378	1.899	.069	.356	2.811
	DC Seizing	.115	.154	.135	.749	.461	.433	2.310
	DC Transforming	.416	.252	.353	1.654	.110	.310	3.231

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

5.8.4.1 Comparison of models 1 & 2 – conclusion

Model 2, which excludes the control variables, explains slightly more variance in SRE compared to Model 1. In both models, Seizing has an insignificant positive effect on SRE. However, Transforming has a near-significant positive effect in Model 1, while Sensing shows a near-significant positive effect in Model 2. The effects of Sensing and Transforming are nearly significant in either model, which suggests that these capabilities are likely important, but their impact may be nuanced and context-dependent.

Based on the near-significant effects observed in the two models, the following conclusion are warranted:

- **DC Sensing**: Although Sensing is not significant in Model 1, it approaches significance in Model 2, suggesting that the control variables account for part of the ability to sense and acquire sustainability-related knowledge. This near-significant effect in Model 2 underscores the importance of Sensing. With a larger sample size, it is plausible that this effect might reach full significance. *Therefore, the null hypothesis H0(3a) is rejected in Model 2 and supports H3a.*
- **DC Seizing**: Seizing consistently shows an insignificant positive effect in both models. This suggests that while the seizing capability positively correlates with SRE, its impact is not strong enough to be significant in the current models. Further analysis is needed to understand the conditions under which seizing might become significant. *Therefore, the null hypothesis H0(3b) is not rejected; further analysis is required.*
- **DC Transforming**: Transforming shows a near-significant effect in Model 1 but becomes insignificant in Model 2. This suggests that the control variables explain part of an organization's capability to transform in response to new sustainability knowledge. This near-significant effect in Model 1 underscores the importance of Transforming. With a larger sample size, it is plausible that this effect might reach full significance. *Therefore, the null hypothesis H0(3c) is rejected in Model 1 and supports H3c.*

5.8.4.2 Detailed analysis of Dynamic Capabilities

To investigate the differences in p-values between the collective models 1 & 2, both including and excluding control variables (Table 14 & 15), the impact of organizational age and sustainability reporting experience on the sensing and transforming capabilities has been assessed through correlation and regression analyses. The results indicated no significant effects or interactions of organizational age and sustainability reporting experience on dynamic capabilities sensing and transforming.

To deepen the understanding of the effects of Dynamic Capabilities on CSRD-aligned Sustainability Reporting Effectiveness, each dimension was assessed separately, including and excluding control variables (See Appendix F). The analysis aims to clarify their individual contributions to SRE without interference from multicollinearity. **All variables demonstrated significant positive effects on SRE when assessed individually (at the 0.001 level).** Sensing and Transforming exhibited the strongest positive effects, indicated by the highest Standardized Coefficient Beta values. This finding supports the notion that separating the DCs positively affects SRE. The exclusion of the control variables did not significantly alter the results.

To gain an even deeper understanding, individual item measures within each DC dimension were analysed. Table 16 assesses the effects of the individual item measures of DC Sensing. The following conclusions are warranted:

- **Processes for acquiring sustainability knowledge/data throughout the value chain** has a significant positive effect on SRE as individual item in the Sensing DC ($\beta = 0.485$, $p = 0.035$).
- **Using specialized technology that measures and thacks sustainability product, service, and process knowledge significantly** has a near-significant positive effect on SRE in the Sensing DC ($\beta = 0.409$, $p = 0.075$).

Table 16. Regression analysis – Individual items of DC Sensing[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	3.310	1.014		3.264	.004		
	Organizational age	.001	.002	.044	.291	.774	.716	1.397
	Years of sustainability reporting experience	-.028	.020	-.209	-1.409	.174	.734	1.363
	My organization . . . - Has processes for acquiring knowledge about sustainability reporting and the CSRD	-.183	.159	-.212	-1.149	.264	.474	2.111
	My organization . . . - Has processes for acquiring sustainability knowledge throughout its value chain	.344	.152	.485	2.268	.035	.353	2.830
	My organization . . . - Has processes for acquiring sustainability related knowledge from its stakeholders	-.019	.206	-.026	-.090	.929	.199	5.020
	My organization . . . - Has processes for filtering and categorizing sustainability knowledge	-.009	.178	-.012	-.051	.960	.299	3.347
	My organization . . . - Its structure facilitates the discovery and creation of new sustainability (reporting) knowledge	-.049	.155	-.051	-.317	.755	.632	1.581
	My organization . . . - Uses specialized technology that allows it to measure and track sustainability knowledge about its products, services and processes	.212	.113	.409	1.875	.075	.340	2.940
	My organization . . . - Uses technology that allows it to search for new sustainability (reporting) knowledge	.161	.122	.268	1.324	.200	.393	2.542

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 17 assesses the effects of the individual item measures of DC Seizing. The following conclusions are warranted:

- **Using specialized technology to store and manage sustainability data** has a near-significant positive effect on SRE in the Seizing DC (β = 0.406, p = 0.066).
- **Board and senior management support for sustainability and CSRD compliance** has a near-significant positive effect on SRE in the Seizing DC (β = 0.371, p = 0.089).

Table 17. Regression analysis – individual items of DC Seizing[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.402	.783		3.067	.006		
	Organizational age	-.001	.002	-.110	-.644	.527	.783	1.277
	Years of sustainability reporting experience	-.014	.024	-.108	-.603	.553	.711	1.407
	My organization . . . - Has standardized incentive systems for sharing sustainability knowledge and CSRD compliance cooperation	.062	.115	.109	.538	.596	.557	1.796
	My organization . . . - Encourages employees to go where they need for sustainability knowledge regardless of structure	.027	.138	.038	.193	.849	.583	1.715
	My organization . . . - Its structure facilitates the transfer of sustainability knowledge across structural and functional boundaries	-.003	.136	-.004	-.020	.984	.498	2.008
	My organization . . . - Uses specialized technology that allows it to store and manage its sustainability knowledge	.202	.104	.406	1.943	.066	.522	1.917
	My organization . . . - Its board and senior management effectively support the role of sustainability and CSRD compliance	.270	.152	.371	1.781	.089	.524	1.908
	My organization . . . - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated	-.006	.172	-.009	-.037	.970	.435	2.300

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 18 assesses the effects of the individual item measures of DC Transforming. The following conclusions are warranted:

- **High levels of participation and learning in sustainability reporting processes** has a significant positive effect on SRE in the Transforming DC (β = 0.441, p = 0.014).

Table 18. Regression analysis – Individual items of DC Transforming

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-.551	.967		-.570	.576		
	Organizational age	.001	.002	.071	.494	.628	.754	1.326
	Years of sustainability reporting experience	-.034	.020	-.255	-1.645	.117	.642	1.557
	My organization . . . - Has processes for distributing sustainability (reporting) knowledge throughout the organization	-.058	.168	-.078	-.349	.731	.309	3.238
	My organization . . . - Expects high levels of participation and learning in the process of sustainability reporting	.506	.186	.441	2.717	.014	.586	1.706
	My organization . . . - Has processes for using sustainability (reporting) knowledge in the development of new reporting approaches	-.066	.238	-.067	-.277	.785	.261	3.830
	My organization . . . - Has processes to mutually align sustainability reporting with existing practices	.281	.163	.391	1.730	.101	.301	3.318
	My organization . . . - Has processes for replacing outdated reporting knowledge	.262	.177	.368	1.479	.157	.249	4.021
	My organization . . . - Has processes for converting sustainability knowledge into usable information and plans of action	.121	.152	.160	.796	.436	.383	2.612
	My organization . . . - Has processes for using sustainability knowledge into the design of new products/services	.000	.147	-.001	-.003	.997	.417	2.400
	My organization . . . - Is able to locate and apply sustainability knowledge to changing competitive conditions	.012	.216	.014	.054	.957	.245	4.080
	My organization . . . - Uses sustainability knowledge to adjust its strategic direction	.037	.175	.040	.210	.836	.424	2.357

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

5.8.4.3 Main takeaways

The findings of this study highlight the near-significant role of Dynamic Capabilities (DC) in enhancing CSRD-aligned sustainability reporting effectiveness. The main takeaways of the analyses are as follows:

- **DC Sensing**: This capability demonstrated a near-significant positive effect on SRE. Particularly important elements within this dimension were processes for acquiring knowledge throughout the value chain and using specialized technology to measure and track sustainability information. These elements suggest that organizations proficient in these areas are better equipped to meet CSRD reporting requirements effectively.
- **DC Seizing**: While DC Seizing showed a positive effect, it was not statistically significant. Key elements within this dimension included the use of specialized technologies to store and manage sustainability data, and strong support from senior management/board for sustainability reporting. The consistent positive trend in this capability suggests that these aspects could become more significant under different conditions or with a larger sample size.
- **DC Transforming**: This capability also showed near-significant positive effects on SRE. High levels of participation and learning during sustainability reporting were critical contributors to this dimension. These elements emphasize the importance of engaging the entire organization and a learning approach in CSRD-aligned sustainability reporting efforts.

Overall, the study indicates that fostering dynamic capabilities mainly related to sensing and transforming ability can play an important role in enhancing the effectiveness of CSRD-aligned sustainability reporting.

5.9 SUMMARY OF HYPOTHESIS TESTING RESULTS

Table 19 presents an overview of the hypotheses tested in this study, showing the relationships between various organizational capabilities and CSRD-aligned sustainability reporting effectiveness, along with the outcomes of these tests.

Table 19. Summary of hypothesis testing results

Hypothesis	Relationship	Result
H1a	There is a positive relationship between Knowledge Process Capability and CSRD-aligned SRE.	Confirmed
H1b	There is a positive relationship between Knowledge Infrastructure Capability and CSRD-aligned SRE.	Confirmed
H2a	There is a positive relationship between KMC Acquisition and CSRD-aligned SRE.	Not confirmed
H2b	There is a positive relationship between KMC Conversion and CSRD-aligned SRE.	Confirmed
H2c	There is a positive relationship between KMC Application and CSRD-aligned SRE	Not confirmed
H2d	There is a positive relationship between KMC Technology and CSRD-aligned SRE.	Not confirmed
H2e	There is a positive relationship between KMC Structure and CSRD-aligned SRE.	Not confirmed
H2f	There is a positive relationship between KMC Culture and CSRD-aligned SRE.	Confirmed
H3a	There is a positive relationship between Dynamic Capability Sensing and CSRD-aligned SRE.	Confirmed
H3b	There is a positive relationship between Dynamic Capability Seizing and CSRD-aligned SRE.	Not confirmed
H3c	There is a positive relationship between Dynamic Capability Transforming and CSRD-aligned SRE.	Confirmed

5.10 KNOWLEDGE MANAGEMENT & DYNAMIC CAPABILITIES AND THEIR INTERACTIONS

Due to multicollinearity issues (VIF values >10), the Knowledge Management Capabilities (KMC) and Dynamic Capabilities (DC) frameworks, along with their respective dimensions, cannot be assessed collectively within the same model. Additionally, analysing the interactions within the same framework at the same dimension level also presents multicollinearity issues. This multicollinearity arises because identical individual item measures are used in different combinations to create the constructs/dimensions of both frameworks (see Appendix H). **Consequently, no interaction effects were detected, and due to the high multicollinearity values, the potential interactions could not be comprehensively analysed**.

5.11 INDEPENDENCE

The ability of organisations to independently, without external support, achieve CSRD compliance by the required reporting date was assessed through two survey questions:

1. *"My organisation is able to independently identify **what** the CSRD requires us to do without external support (such as professional services, etc)."*
2. *"My organization is able to know **how** to independently manage for effective sustainability reporting aligned with the CSRD without external support (such as professional services, etc)."*

The analysis of these questions provided insights into the level of dependency companies have on external support for CSRD-compliant reporting.

Table 20 assesses the mean scores for the respective items. The results show that Question 1 has a mean value of 3.50 (on a scale of 1-7), while Question 2 has a mean value of 4.17 (on a scale of 1-7). These findings suggest that companies are less capable of independently identifying **what** the CSRD requires them to report compared to **how** to manage effective CSRD-aligned sustainability reporting. Nevertheless, the mean values for both questions, which fall in the middle range (1-7), indicate that **most companies still rely on external support for CSRD-compliant reporting**.

Table 20. Descriptive Statistics - Dependency

	N	Minimum	Maximum	Mean	Std. Deviation
1. My organization . . . - Is able to independently identify what the CSRD requires us to do without external support (professional services, etc)	30	1	7	3.50	1.796
2. My organization . . . - Is able to know how to independently manage for effective sustainability reporting aligned with the CSRD without external support (professional services, etc)	30	1	6	4.17	1.683
Valid N (listwise)	30				

432

A two-way ANOVA analysis was conducted for both questions to further investigate which types of companies might be more or less dependent on external support, incorporating all demographic variables (see Appendix I). The results were insignificant for both models, indicating no significant effect of the demographic variables or their interactions on the responses to Questions 1 and 2. The interaction effects of organizational age and sustainability reporting experience also showed no significant impact.

6 RESULTS 2.0 – PWC GLOBAL CSRD SURVEY

This section of the paper will present the results gathered from the survey conducted by PwC, augmented by qualitative insights from their professional experiences. During April and May 2024, PwC surveyed 547 executives and senior professionals from over 30 countries and territories. Approximately one-third of the respondents occupy C-suite positions, while the rest are senior professionals working in various business functions such as sustainability, finance, and risk. Sixty per cent of the companies represented are headquartered in the European Union, and over half of these companies have annual revenues exceeding US$1 billion. The sectors represented in the survey include manufacturing (25%), financial services (21%), technology, media, and telecommunications (18%), consumer and retail (14%), energy, utilities, and resources (13%), and healthcare (7%). Among all respondents, 57% indicated that they will be filing under the CSRD for the first time in the 2025 financial year, using data from FY2024.

6.1 THE ORGANIZATIONAL VALUE THROUGH THE CSRD

Figure 12 assesses to what extent organizations think the CSRD will benefit them along different dimensions. **Better environmental performance**, **improved engagement with stakeholders (internal & external)** and **risk mitigation**, are the three most experienced and expected benefits flowing from sustainability reporting under the CSRD. Even financial-related benefits are anticipated. What is remarkable is that the organizations having to report in FY2025 are more optimistic and convinced of the expected benefits compared to the organizations having to report in FY2026.

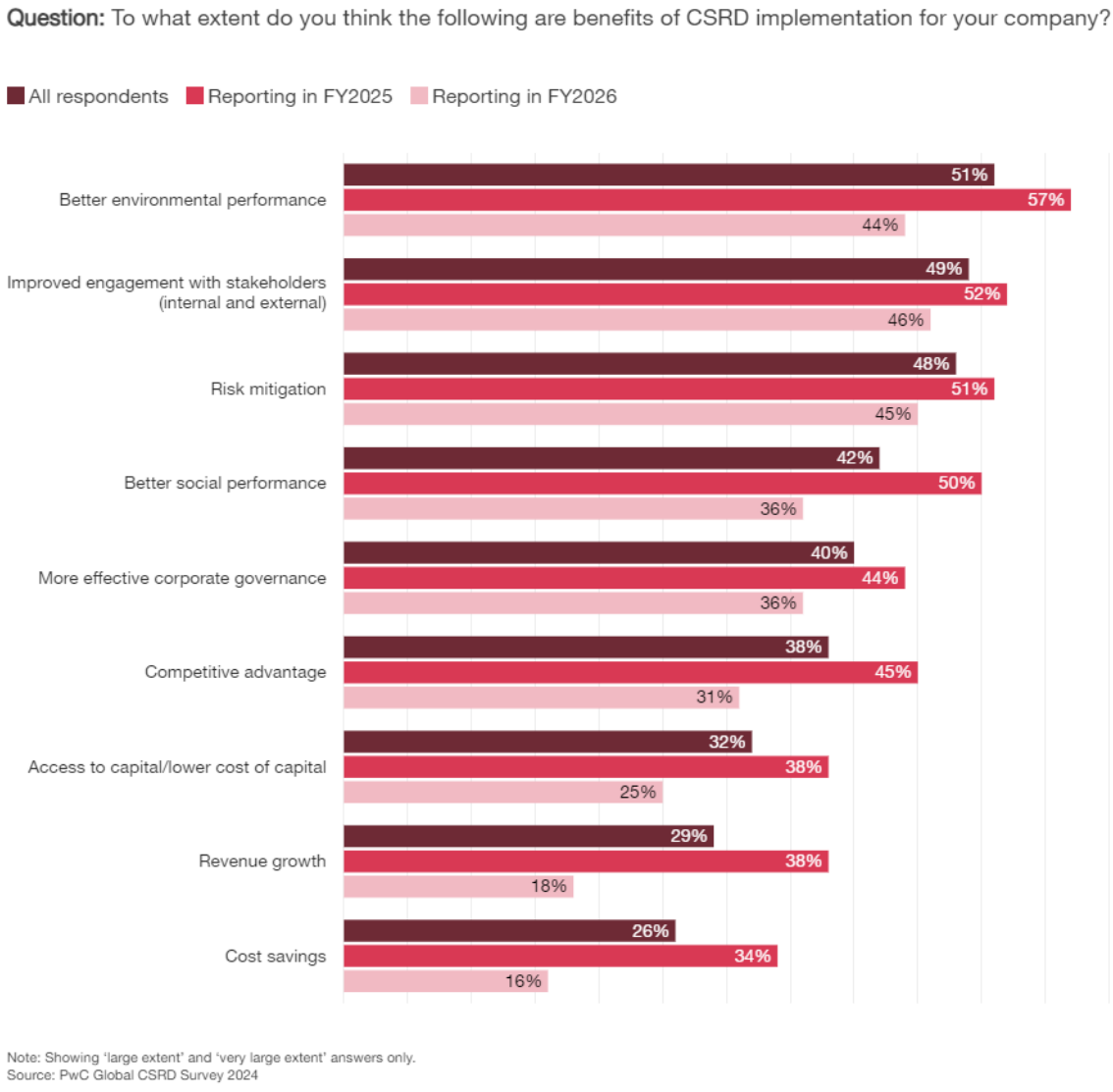


Figure 12. *Organizations see numerous business benefits arising from sustainability reporting under CSRD.*

6.2 ORGANIZATIONAL CONFIDENCE

Figure x assesses the organization's confidence in their readiness to report under the CSRD by the required date. The vast majority of survey respondents are at least somewhat assured of their readiness to report under the CSRD by the required date. Among those anticipating filing in FY2025, only 3% indicate they are not confident, compared to 7% those filing in FY 2026 (see figure x).

Figure 13. *Most organizations are confident in their readiness to report under the CSRD.*

However, when shifting to ESRS level, confidence levels varies widely both among companies and across the different topics specified in the reporting standards. Respondents are highly confident in their ability to report on commonly disclosed areas such as own workforce, business conduct, and climate change. In contrast, there is much lower confidence regarding their ability to address newer or less familiar areas, such as biodiversity, workers in the value chain, affected communities and circularity (see figure X).

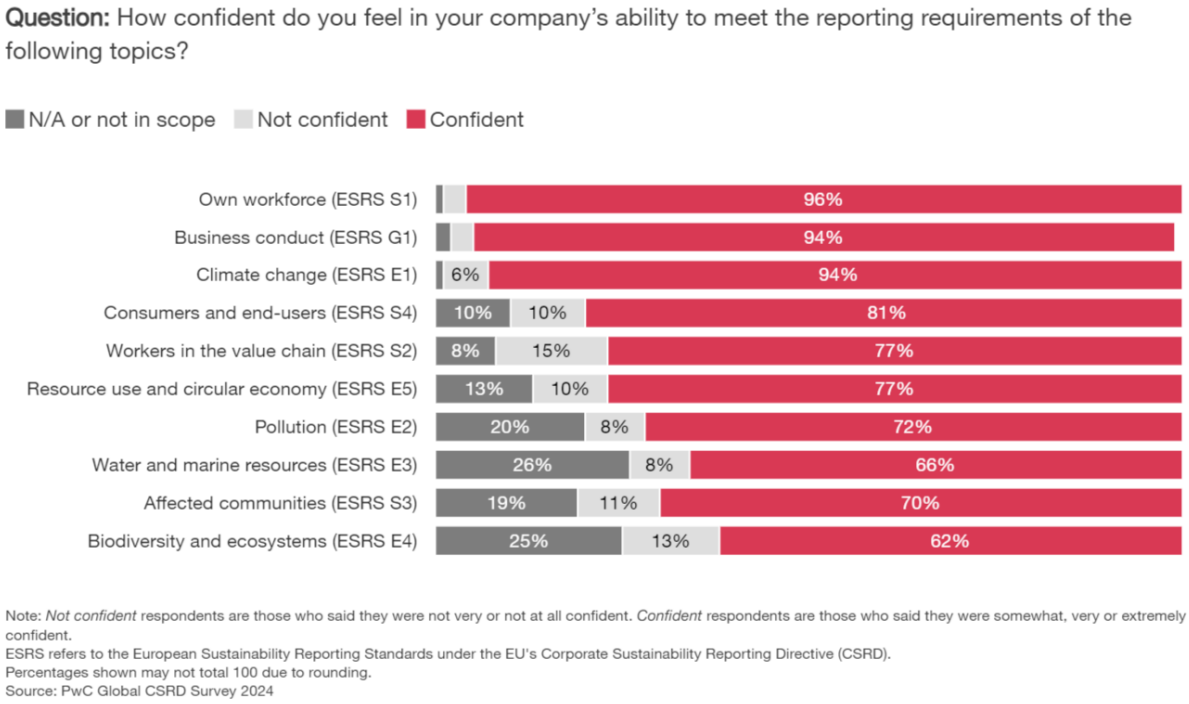


Figure 14. *Organizations exhibit greater confidence when reporting on topics typically covered in previous sustainability reports.*

6.3 PROGRESSION

Furthermore, a small percentage of organizations have completed initial scoping activities such as legal scoping, double materiality assessments and gap analysis, even among those set to report in FY2025 (see figure 15). The survey results indicate that progressing with scoping activities enhances confidence. For instance, over one-third of the most confident organizations have finalized confirming reporting options and exceptions, conducted

double materiality assessments, and completed disclosure gap analyses. Conversely, organizations still having to start with these steps and finalize the scoping process tend to be less confident.

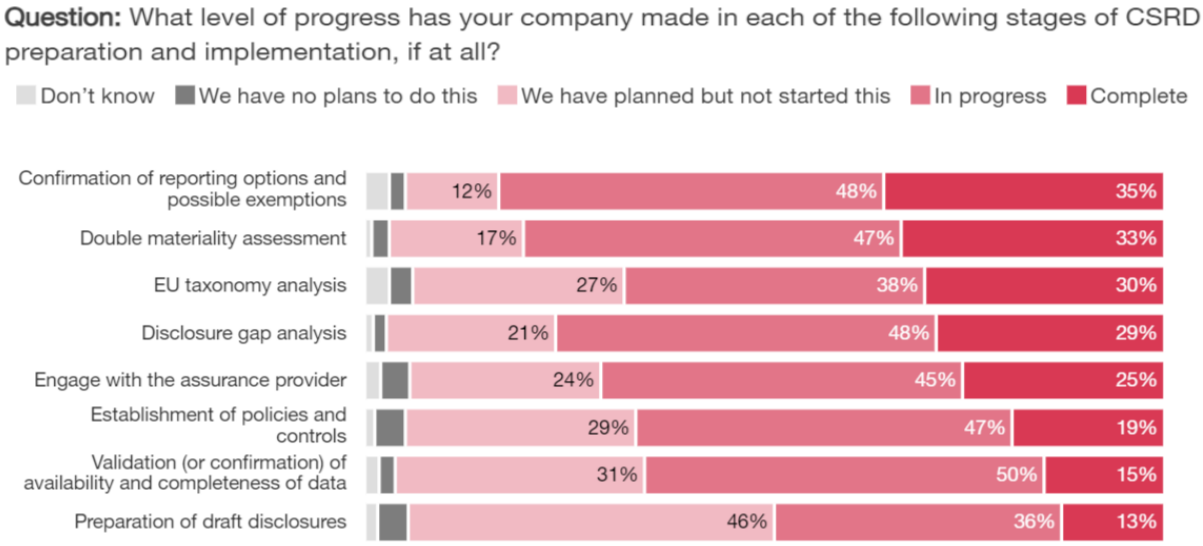
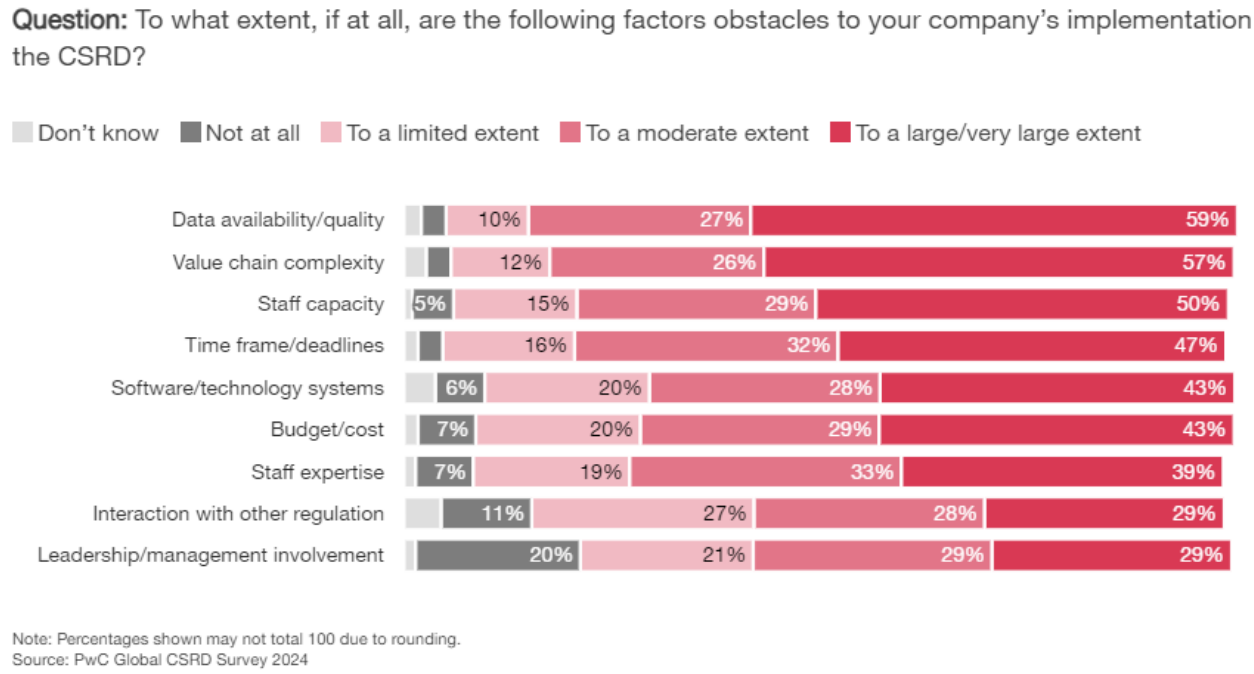


Figure 15. *Among organizations reporting in FY2025 & 2026, only a small percentage have finalized upfront scoping activities.*

6.4 CHALLENGES ORGANIZATIONS FACE

Figure X assesses the biggest obstacles organizations face when undergoing the process of CSRD-compliant reporting. The biggest challenges encountered are the lack of data availability/quality, followed by value chain complexity, inefficient staff capability and tight time frame/deadlines.



Note: Percentages shown may not total 100 due to rounding.
Source: PwC Global CSRD Survey 2024

Figure 16. *The biggest obstacles organizations face to become CSRD compliant are data availability/quality and value chain complexity.*

6.5 ORGANIZING FOR THE CSRD

Based on PwC's experience, addressing the CSRD's broad scope and complexity requires a significant **cross-functional effort** supported by **senior leaders** within organizations (de Lange et al., 2024). Survey respondents indicate that, on average, eight business functions and departments are or will be involved in their implementation efforts. These typically include sustainability, finance, operations, procurement, legal and technology (see Figure 17).

Executive committees or boards are engaged in CSRD implementation at over 70% of companies, with this figure increasing to nearly 80% for those set to report in FY2025 (see figure 17). Within executive committees, chief financial officers (CFOs) and chief information officers (CIOs) are crucial in supporting chief sustainability officers (CSOs), who have typically guided sustainability reporting efforts so far (de Lange et al., 2024). CFOs, with their expertise in financial reporting, understand the standards required for investor-level reporting. PwC's experience suggests that when CSOs involve the finance team, they can more effectively focus on their specialized roles: driving sustainability initiatives and managing related risks.

Although most respondents intend to involve the technology function, less than 60% have done so. Early involvement of technology teams is beneficial, allowing them to integrate emerging requirements into plans for new or upgraded systems (de Lange et al., 2024). Leveraging existing cloud and ERP systems, are essential for efficient reporting and incorporating sustainability data into enterprise decision-making (2024).

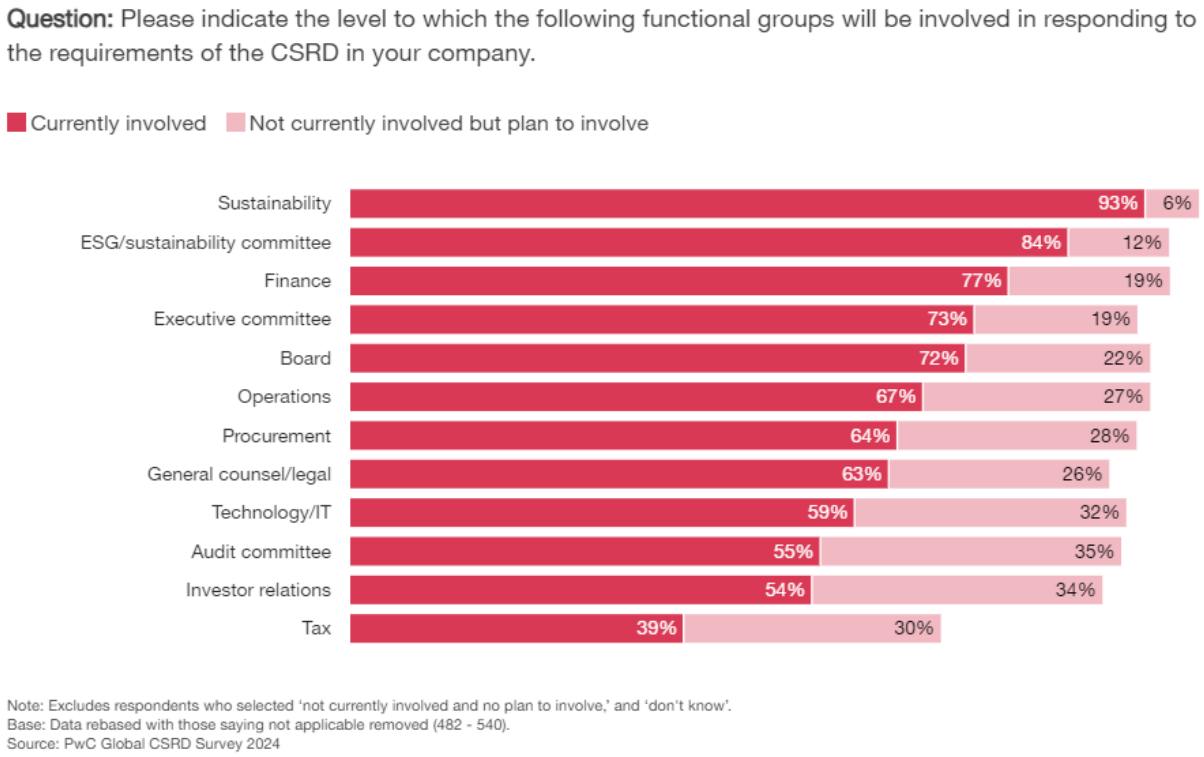


Figure 17. *Most organizations are approaching CSRD implementation as a wide-ranging cross-functional initiative that extends well beyond the sustainability department.*

Figure 18 assesses the types of technology/tools currently used by organizations for sustainability reporting. Over 90% of survey respondents report that they are currently using or planning to use spreadsheets for sustainability reporting. This percentage is significantly higher than those utilising advanced/specialized technologies like carbon calculation tools, sustainability disclosure management solutions, and artificial intelligence (AI).

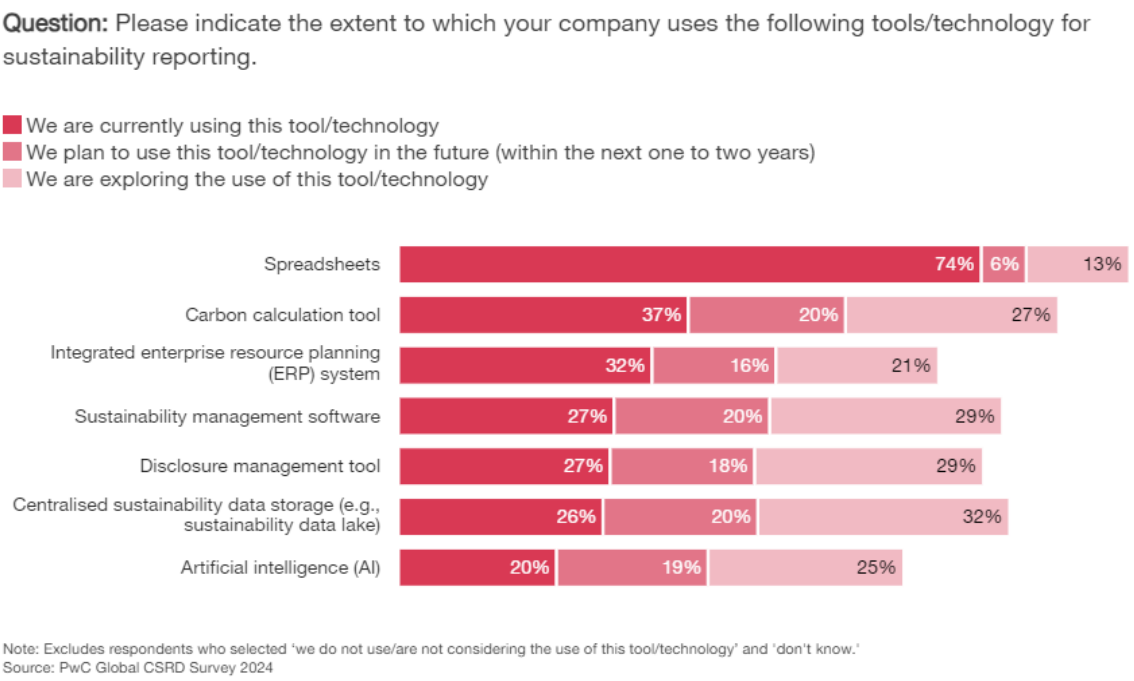


Figure 18. *A relatively small number of organizations are employing specialised tools and technology for sustainability reporting.*

PwC anticipates a significant shift in these results over the coming years as more companies invest in solutions that enable efficient, repeatable reporting and integrate sustainability-related data into business decision-making processes (de Lange et al., 2024). Additionally, PwC expects a substantial increase in the number of respondents using AI tools for sustainability reporting (2024).

6.6 MAIN TAKEAWAYS

Based on PwC's experience and PwC's Global CSRD Survey 2024 results, three main takeaways have been identified that enable CSRD readiness and enhance the integration of sustainability into the broader strategy (de Lange et al., 2024):

- **Act now to define and understand the organization's scope while acknowledging the progress already made.** Though the CSRD and ESRS are new, many organizations have been disclosing sustainability information for years under various mandates and standards. Activities like stakeholder engagement and materiality analysis, along with established data collection processes, can be leveraged for CSRD compliance. Companies yet to complete their initial CSRD scoping should expedite this process to fully grasp the challenge and make concrete plans. Engaging with industry peers and partners can also shed light on how to approach less familiar aspects of the new standards, such as double materiality.
- **Establish data processes and systems for the long-term.** The survey shows that few respondents currently store sustainability information in central systems. While the survey didn't inquire about the use of central systems in other business areas, these systems are commonly used in finance, customer management, product tracking, and human capital areas where reliable information is crucial for decision-making and external reporting. Savvy executives understand that sustainability information must also be accessible, accurate, and audit-ready on an ongoing basis, not just once. They are investing in data and systems similar to those used for financial reporting.
- **Get the organization's top managers and executives involved.** Cross-functional collaboration for CSRD readiness is becoming standard practice. Leading companies ensure this collaboration occurs at the highest level, forming a key team of the CFO, CIO, and CSO to lead CSRD implementation. With support from their teams, CFOs contribute expertise in information management and decision-making, CIOs oversee the deployment of data systems and software, and CSOs provide knowledge of sustainability issues and CSRD-specific processes like double materiality assessment. This blend of skills is crucial for meeting compliance requirements and integrating sustainability into the company's operational and business model discussions.

7 DISCUSSION

This discussion critically examines the study's findings' theoretical and practical implications, evaluates the methodological limitations, and proposes avenues for future research to advance the understanding of effective CSRD-aligned sustainability reporting within organizational contexts.

7.1 THEORETICAL AND PRACTICAL IMPLICATIONS

7.1.1 Effects of demographics

The analysis of demographic variables, including organizational age, size, financial performance, sustainability reporting experience, and industry type, revealed that these factors did not significantly impact CSRD-aligned sustainability reporting effectiveness. This finding challenges the conventional wisdom that larger, older, and more experienced organizations would naturally be more effective in sustainability reporting due to their more significant resources, capabilities, and experience. The lack of significant effects suggests that demographic characteristics alone do not determine the effectiveness of sustainability reporting. Instead, it emphasizes the importance of internal capabilities and processes over mere demographic attributes, highlighting a shift from traditional views towards more capability-driven models of effectiveness in sustainability practices.

This notion is further supported by PwC's survey, which assesses organizations' confidence in their readiness to report under the CSRD by the required date. Larger and more experienced organizations, which must report in FY2025, showed a 97% confidence in their readiness compared to 93% for smaller organizations reporting in FY2026. Both categories indicate high confidence and there's a negligible difference between their confidence levels.

This phenomenon can be attributed to the substantial differences between the CSRD's requirements and earlier sustainability reporting initiatives, such as the NFRD. The extensive scope and complexity of the CSRD necessitate that even larger and more experienced companies significantly refine or adjust their sustainability reporting approaches. Furthermore, the larger a company and its operations and supply chains, the more data it needs to collect, which adds to the complexity. This additional complexity may offset the advantages conferred by their existing sustainability reporting experience, thereby balancing out their effectiveness.

7.1.2 Knowledge Management Capabilities

This study aimed to investigate the impact of knowledge management capabilities on the effectiveness of CSRD-aligned sustainability reporting. The findings provide critical insights into how these capabilities influence organizations' ability to meet the sustainability reporting requirements under the CSRD framework.

The positive effects of Knowledge Management Capabilities (KMC), particularly Knowledge Process Capability (KPC) and Knowledge Infrastructure Capability (KIC), on SRE, underscore the critical role of knowledge management in organizational sustainability reporting practices. Effective CSRD-compliant reporting requires both **tacit and explicit** knowledge. The significant effects of KPC and KIC on SRE support the theory that effective process capabilities - knowledge acquisition, conversion, and application - and infrastructure capabilities - technology, structure, and culture - are collectively essential for successful sustainability reporting.

When each KMC sub-dimension was analysed separately, the results indicated strong and significant positive effects for each sub-dimension on CSRD-aligned SRE, demonstrating robust predictive power. These findings remained consistent regardless of the inclusion or exclusion of control variables, underscoring the robustness of each KMC sub-dimension's individual contribution to SRE. However, when all KMC sub-dimensions were included together in a collective regression model, the results were mixed. While KMC Conversion and KMC Culture showed significant positive effects on SRE, other sub-dimensions such as KMC Acquisition, KMC Application, and KMC Technology were not significant. Interestingly, KMC Structure exhibited a significant negative effect in the combined model.

These differences can be attributed to and interpreted through the lens of multicollinearity and overlapping effects, as the VIF values in the combined model were moderate. Multicollinearity occurs when multiple predictors in a regression model are highly correlated, making it challenging to isolate their individual effects, potentially inflating standard errors and rendering some predictors insignificant or even negative. Overlapping contributions suggest that each KMC sub-dimension, such as KMC Acquisition, KMC Application, and KMC

Technology, may contribute to SRE, but their combined inclusion can lead to redundancy, diluting their individual impacts. Analysing each KMC sub-dimension separately reveals their unique contributions to SRE without the interference of multicollinearity, highlighting strong individual effects. In contrast, the collective analysis exposes their overall impact and reveals interactions and potential redundancies among them. The significant negative effect of KMC Structure in the combined model suggests potential conflicts or inefficiencies in how these dimensions interact within the organization, indicating that while structural elements are essential, they may inadvertently hinder the effectiveness of other KMC dimensions.

The strong positive impact of KMC Conversion and KMC Culture highlights the importance of effective knowledge handling and a supportive organizational culture. These findings align with existing literature on knowledge management while providing new insights by emphasizing the impactful sub-dimensions of KMC. KMC Conversion did not highlight any single effective practice; rather, their synergies and collective effects positively impact SRE. Thus, processes to filter, categorize and distribute sustainability data within an organization, continuous alignment with existing practices, and evaluation of the relevance of sustainability knowledge (tacit/explicit) have a strong positive effect on SRE. KMC Culture identified specific effective practices, particularly involving senior management and the board in supporting sustainability reporting and encouraging high levels of participation and learning. Clear communication of values and goals also positively contributes to SRE. Given the extensive scope of the CSRD and the required engagement with stakeholders and organizational mobilization, elements of a facilitating and supportive culture are expected to strongly contribute to SRE. Utilizing conversion and cultural capabilities best for effective sustainability reporting warrants further research.

Notably, the KMC Structure variable demonstrated an initially significant negative effect, which was unexpected. This suggests that while structural aspects of knowledge management are crucial, there may be complexities or misalignments within organizational structures that can hinder effective sustainability reporting. No particular KMC Structure item was found to have a significant negative effect. On the contrary, when analysed separately, all individual items had slight positive effects. The study's KMC Structure encompassed an organization's ability to transfer sustainability knowledge across structural and functional boundaries, discover and create sustainability knowledge, allow employees to access sustainability knowledge regardless of structure, and incentivise the sharing of sustainability knowledge. This could suggest that an overly open and explorative structure might not be effective for sustainability reporting at large scales such as CSRD implementation. However, working in silos would also be ineffective as CSRD implementation requires extensive cross-functional collaboration and stakeholder engagement (de Lange et al., 2024; European Commission, 2023b). As such, a balanced structure that combines openness with some rigidity may positively affect the complexity of CSRD-compliant sustainability reporting.

In conclusion, the mixed results in the combined model indicate that organizations need a balanced approach to knowledge management. Focusing excessively on one dimension at the expense of others might lead to inefficiencies. The strong individual effects highlight areas where targeted improvements can yield significant benefits. Enhancing KMC Conversion and KMC Culture are priorities to increase CSRD compliance effectiveness strongest. Furthermore, the negative effect of the KMC Structure in the combined model indicates that organizational structure warrants further exploration. Certain structural elements could be hindering the effective implementation of other KMC dimensions. Addressing these structural issues is crucial for optimizing overall knowledge management for effective CSRD compliance.

This study extends the Knowledge-Based View (KBV) and Resource-Based View (RBV) by demonstrating the critical role of knowledge management capabilities in CSRD compliance for sustainability reporting. By empirically establishing the significance of both Knowledge Process Capabilities (KPC) and Knowledge Infrastructure Capabilities (KIC) in achieving CSRD-aligned Sustainability Reporting Effectiveness (SRE), the research underscores the necessity of robust knowledge management systems for both explicit and tacit knowledge to meet the CSRD standards. This work contributes to the ESG literature by highlighting effective knowledge management as a key determinant of CSRD compliance effectiveness. By integrating knowledge management frameworks with sustainability reporting, this study offers a novel and innovative perspective that advances both theoretical understanding and practical applications in sustainable business practices.

7.1.3 Dynamic Capabilities

This study also aimed to investigate the impact of dynamic capabilities on the effectiveness of CSRD-aligned sustainability reporting. The findings offer valuable insights into the role of these capabilities in enabling organizations to fulfil the sustainability reporting requirements mandated by the CSRD framework.

When each dynamic capability was analysed separately, the results indicated strong and significant positive effects for each dimension on CSRD-aligned SRE, demonstrating robust predictive power. These findings remained consistent regardless of the inclusion or exclusion of control variables, underscoring the robustness of each KMC sub-dimension's individual contribution to SRE. However, when all dynamic capabilities were included together in a collective regression model, the results were mixed.

The results of the collective models indicate that dynamic capability sensing showed an insignificant positive effect in Model 1, including control variables, but this effect became near-significant in Model 2, excluding control variables. This suggests that the ability to sense and acquire sustainability-related information is crucial for effective sustainability reporting and partly being affected by demographic variables such as age and SR experience. However, the correlation and regression analysis did not show significant results of the impacts of these demographic variables, indicating that their influence on sensing capability requires further exploration. In essence, organizations that excel in gathering sustainability data from diverse sources, and employ specialized technologies for acquiring this data are better equipped to meet CSRD requirements. Assessing individual elements within the sensing dimension reveals that processes for acquiring sustainability knowledge throughout the value chain and the use of specialized technology to measure and track sustainability information are significant contributors. These findings underscore the importance of investing in robust knowledge acquisition processes and technological infrastructure to enhance sensing capabilities, thereby improving sustainability reporting effectiveness.

Dynamic capability seizing consistently showed a positive but statistically insignificant effect on sustainability reporting effectiveness across both models (including & excluding control variables). Despite the lack of statistical significance, the positive trend indicates that seizing capabilities, which involve organizational mobilization and implementing strategies to capitalize on identified opportunities and changes, are relevant. Key elements within this dimension include the use of specialized technology to store and manage sustainability data and strong support from senior management and the board for sustainability initiatives. The near-significant effects of using specialized technology and senior management support suggest that these aspects could become significant under different conditions or with a larger sample size.

The findings suggest that while seizing capabilities are not currently strong predictors of sustainability reporting effectiveness, they hold considerable potential value. The seizing capability encompasses cultural and structural knowledge management elements, which are crucial for effective sustainability reporting, as indicated by the KMC-related results. A supportive culture is essential, and organizational structure significantly impacts SRE. Although individual cultural and structural elements did not exhibit strong negative effects within the seizing capability context, aligning and organizing these elements effectively could enhance the positive impact of seizing capabilities. The insignificant effect observed can also be attributed to multicollinearity and overlapping effects, as indicated by moderate VIF values in the combined model. Dynamic capabilities - sensing, seizing, and transforming - are inherently distinct yet interconnected and partially overlapping. This overlap suggests that while each capability contributes to SRE, their combined inclusion may lead to redundancy, diluting their individual impacts. Overall, the findings indicate a positive trend for seizing capability's effect on SRE, warranting further exploration to better understand its effective utilization in sustainability reporting.

Dynamic capability transforming exhibited a near-significant positive effect in Model 1, which included control variables, but this effect became insignificant in Model 2, which excluded control variables. This suggests that the ability to transform accordingly is crucial for effective sustainability reporting and partly being affected by demographic variables such as age and SR experience. However, the correlation and regression analysis did not show significant results of the impacts of these demographic variables, indicating that their influence on transforming capability requires further exploration. In essence, organizations that excel in transforming and reconfiguring their sustainability reporting approach, in line with the rest of the organization, are more effective in meeting the CSRD’s requirements. Assessing individual elements within the transforming dimension reveals that high levels of participation and learning within the sustainability reporting process significantly contribute to transforming capability. This emphasizes the importance of fostering a culture of continuous improvement, learning and engagement to enhance sustainability reporting effectiveness.

In conclusion, the findings highlight the near-significant role of dynamic capabilities, particularly sensing and transforming, in enhancing CSRD-aligned sustainability reporting effectiveness. The near-significant effects observed for these capabilities suggest that their impact may be nuanced and context-dependent, influenced by factors such as organizational demographics. Nevertheless, further research is needed to understand the context-dependency and optimal utilization of sensing and transforming practices within the context of sustainability reporting. Organizations that focus on improving their sensing capabilities through robust knowledge acquisition and technology implementation, and fostering a culture of participation and continuous learning to enhance their transforming capabilities, increase their sustainability reporting effectiveness. Although seizing capabilities showed a positive trend, further research is needed to fully understand their potential under varying conditions.

This study extends the Dynamic Capabilities framework by demonstrating the role of dynamic capabilities in achieving CSRD compliance for sustainability reporting. By empirically establishing the relevance and near-significance of sensing and transforming capabilities in aligning with CSRD standards for Sustainability Reporting Effectiveness, the research underscores the effective utilization of dynamic capabilities to meet evolving sustainability requirements. This work contributes to the ESG literature by highlighting specific dynamic capabilities, organizational elements and practices, as possible key determinants of effective CSRD compliance. By integrating the DC framework with sustainability reporting, this study offers a novel and innovative perspective that advances both theoretical understanding and practical applications in sustainable business practices.

7.1.4 Independence & Confidence

The descriptive statistics indicate that, on a scale of 1 to 7, the mean value of CSRD-aligned Sustainability Reporting Effectiveness (SRE) for organizations is 4.8 (Min = 2.86, Max = 6.43, see Table X). This suggests that organizations are already moderately to well-prepared for CSRD-aligned sustainability reporting. This finding aligns with PwC's Global CSRD Survey, which reports that at least 93% of companies required to report by FY25 and FY26 are confident in their reporting readiness by the required date.

However, this study also reveals that most companies still rely on external support for CSRD-compliant reporting, particularly in independently determining the requirements of the CSRD ("what"), as opposed to managing effective CSRD-aligned reporting ("how"). This reliance is likely due to identified obstacles (Figure 16) for organizations and the complexity of the standards and scoping activities, such as identifying which entities must report, specifying material topics and determining the specific information that needs to be disclosed. All of these pose significant challenges for many companies and, as such, often necessitate external assistance.

Additionally, the PwC survey assessed organizations' confidence in their ability to address individual material ESRSs and found much lower confidence in areas such as workers in the value chain (ESRS S2) , biodiversity (ESRS E4) , affected communities (ESRS S3) and circularity (ESRS E5) compared to other ESRSs. This highlights the specific areas where organizations could benefit from additional support to effectively manage reporting on these topics.

7.1.5 PwC's Global CSRD Survey and Experience – A Comparative Discussion

The dataset's sample from the PwC Global CSRD Survey aligns closely with the other dataset's sample used in this study. Most companies in both datasets are scheduled to report for the first time in 2025, reflecting similar levels of financial performance and sustainability reporting experience. The survey respondents were predominantly C-suite executives or other senior professionals in sustainability-related roles, similar to the other dataset. Furthermore, the industry-representation diversity in both datasets is comparable. Therefore, the results of the PwC Global CSRD Survey are well-suited for augmentation and comparison with the other findings of this research.

7.1.5.1 Challenges

The Global PwC Survey data highlights several obstacles organizations face while implementing the CSRD. The most significant challenges are data availability/quality and value chain complexity, underscoring the need for robust processes to acquire sustainability data throughout the value chain, consistent with findings related to Knowledge Management Capabilities (KMC) and Dynamic Capabilities (DC) frameworks. Additionally, the

limited use and capabilities of software and technology systems hinder organizations' Sustainability Reporting Effectiveness (SRE), emphasizing the importance of utilizing appropriate technology/tools, which also aligns with earlier findings regarding KMC and DC frameworks. The findings indicated that spreadsheets were the most commonly used type of technology/tool, while only a minority utilised tools such as carbon calculators, sustainability management software or AI.

Another notable hurdle is the tight timeframe for achieving CSRD compliance. Despite this, most companies are still confident they will meet their reporting deadlines, although this may contribute to a reliance on external support. Furthermore, a lack of staff expertise is a common obstacle, highlighting the necessity of comprehensive knowledge management to ensure organizations possess the knowledge and expertise required for CSRD compliance.

Moreover, a significant barrier is the lack of leadership and management involvement. This resonates with earlier findings that highlight the importance of engaging senior management and the board. Increasing top leaders' understanding of the CSRD's intent and the opportunities it offers for value creation – such as improved environmental and social performance, enhanced stakeholder engagement, and risk mitigation – could help in this regard. As such, organizations that know how to ensure leadership and senior management involvement are better equipped to implement the CSRD.

7.1.5.2 Organising for the CSRD

Based on PwC's experience, a major cross-functional effort, supported by top leaders, is needed to address CSRD's complexity and implement it effectively. This also supports the importance of having the proper organizational structure and governance model to facilitate effective cross-functional collaboration for CSRD implementation.

The survey results indicate that, on average, several business functions and departments are or will be involved in their implementation efforts. These typically include sustainability, finance, operations, procurement, technology, legal and the executive committee / board. PwC advices that executive committee members, chief financial officers (CFOs) and chief information officers (CIOs) should play central roles in supporting chief sustainability officers (CSOs). CFOs, with their expertise in financial reporting, can help ensure investor-grade disclosures, while CSOs can focus on leveraging sustainability opportunities and mitigating risks more effectively by engaging the finance function.

Additionally, early involvement of technology colleagues is beneficial, allowing them to incorporate emerging requirements into plans for new or upgraded systems. Building on existing cloud and ERP foundations, are essential for efficient long-term reporting and integrating sustainability data into enterprise decision-making. This resonates with the earlier findings underscoring the importance of utilizing technological infrastructure.

These insights provide guidance for developing effective organizational structures and governance for sustainability reporting in line with the CSRD. Nevertheless, future research is needed to gain a deeper understanding of a comprehensive effective structure and governance approach.

7.1.5.3 PwC's key action points for implementing CSRD (main takeaways)

Based on insights from the PwC Global CSRD Survey and their extensive experience, PwC outlines three key action points for organizations implementing the CSRD. Firstly, they advise organizations to act promptly by understanding their reporting scope as early as possible, which will enhance clarity and facilitate effective management of reporting deadlines. Secondly, PwC recommends establishing robust data processes and systems to support long-term sustainability reporting. This advice aligns with the research findings that emphasize the importance of processes for acquiring sustainability data across the value chain and leveraging specialized technology to acquire, track, and manage sustainability data. Lastly, PwC underscores the crucial role of involving top executives in the process. This recommendation strongly resonates with earlier findings that highlight the importance of senior management and board involvement, as well as fostering a culture of participation and continuous learning in sustainability reporting. By adhering to these action points, organizations can significantly enhance their readiness and effectiveness in meeting CSRD requirements.

7.1.6 Proposed Sustainability Reporting Capabilities Framework

Based on all the findings and insights of this paper, this research proposes a visualized overview that demonstrates how the influential interconnected capabilities from the explored frameworks work together and link to each other for effective sustainability reporting. Additionally, the most influential practices within these capabilities have been included, providing valuable insights into their micro-foundations and operationalization (see Figure 19).

The model illustrates three core processual organizational capabilities – Sensing, Conversion, and Transforming – supported by an enabling and facilitating Technological, Cultural, and Structural infrastructure. These capabilities have been proven to play an important role in effective sustainability reporting.

Future research is needed to validate the effectiveness of this model and to further understand the detailed micro-foundations of these capabilities. By refining and testing this model, or specific capabilities included, organizations can better operationalize their sustainability reporting approach, increasing CSRD-aligned sustainability reporting effectiveness.

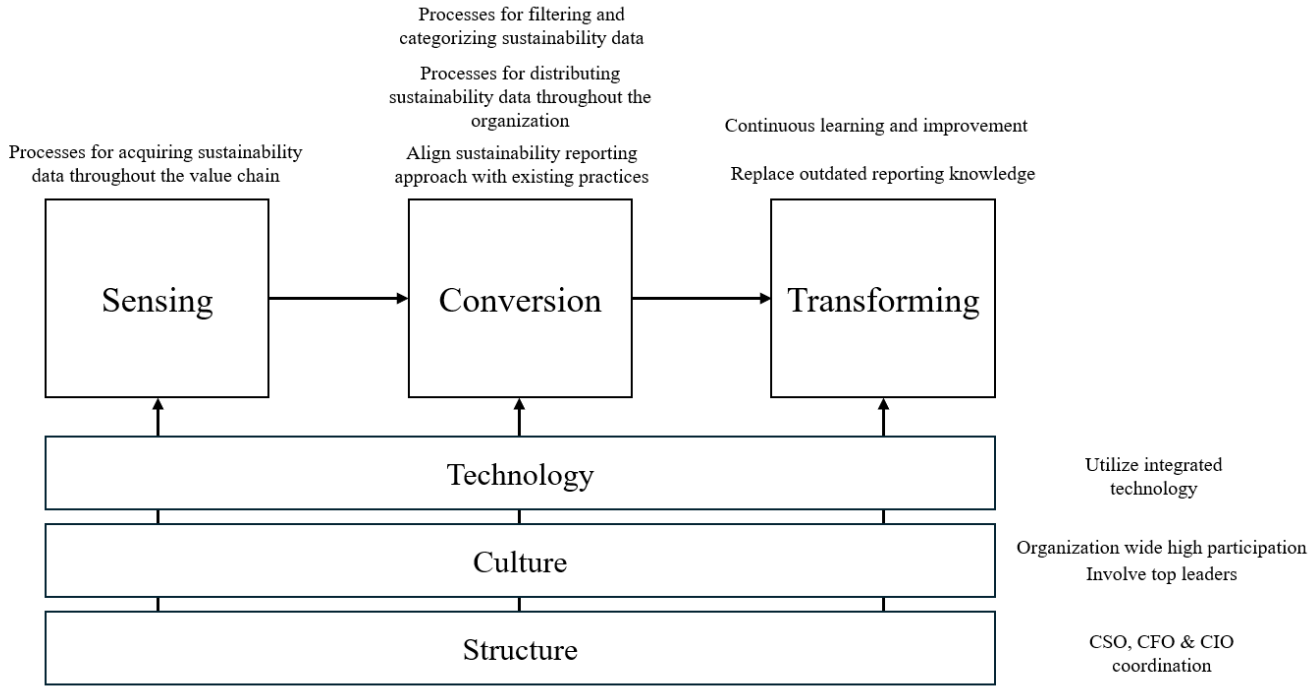


Figure 19. *An organizational capabilities overview for effective CSRD implementation*

7.2 LIMITATIONS

While this study provides valuable insights, several limitations should be acknowledged. Firstly, the sample was limited to a total of 30 respondents, which reduced the ability to generalize findings and conduct detailed analyses of certain effects. This constraint highlights the need for larger sample sizes in future research to achieve more conclusive and generalizable results. The near-significant findings for DC Sensing and DC Transforming suggest that with a larger sample, more definitive conclusions could be drawn regarding their impact on sustainability reporting effectiveness. Nonetheless, to mitigate this limitation, care was taken to ensure that all respondents were of excellent quality, primarily consisting of senior sustainability managers or executives responsible for CSRD compliance, thereby enhancing the reliability and relevance of the data.

Secondly, in addition to the relatively small sample size, the sample predominantly consisted of large organizations, which may also limit the generalizability of the findings to smaller organizations or those in different sectors. Future research should include a more size-diverse sample to validate these results across various organizational contexts and enhance the robustness of the findings. Nevertheless, the inclusion of large organizations, which traditionally lead in sustainability reporting, highlights the pioneering practices and strategies adopted to meet the new CSRD standards. As such, this focus on prominent organizations provides a

critical understanding of how sustainability reporting leaders are navigating these changes, offering valuable insights that can inform smaller entities and different sectors about potential challenges and strategies for compliance.

Additionally, the study relied on self-reported data, which may be subject to biases such as social desirability bias. This could affect the accuracy of the measured constructs and outcomes. To minimize this bias, questions were strategically ordered to reduce the likelihood of respondents providing socially desirable answers. Future studies could further mitigate this issue by incorporating objective measures of sustainability reporting effectiveness, knowledge management capabilities, and dynamic capabilities, providing a more accurate and comprehensive assessment.

Moreover, the composition of the dependent variable, CSRD-aligned sustainability reporting effectiveness, is based on a self-constructed dimension of effectiveness. This might not entirely reflect the actual effectiveness of sustainability reporting, potentially leading to an incomplete understanding of the observed effects and relationships. To enhance the accuracy and reliability of this scale, it was carefully developed in consultation with professionals from Utrecht University and PwC. Despite this effort, future research should consider employing more established and validated measures of CSRD-aligned sustainability reporting effectiveness to ensure a more comprehensive assessment.

Furthermore, this study's cross-sectional approach is a limitation because it captures data at a single point in time, which restricts the ability to observe changes and developments over time. This approach does not account for the dynamic nature of sustainability practices and the evolving impact of CSRD compliance. Consequently, it limits the understanding of how organizations develop and adapt their sustainability reporting processes and capabilities in response to regulatory changes and emerging challenges. Future research should consider conducting a longitudinal study that would address this limitation by tracking the same organizations over an extended period to assess the long-term effects.

Lastly, the limited item measures per construct and the use of the same individual item measures for both the Dynamic Capabilities and Knowledge Management Capabilities frameworks restrict the depth of analysis. This limitation also prevents a thorough examination of the interaction effects between the frameworks within a single model as multicollinearity issues arise. Future studies should employ more comprehensive and distinct measures for each construct to explore the interactions between the different frameworks better.

7.3 AVENUES FOR FUTURE RESEARCH

Additionally to the proposed suggestions for future research in the ‘Limitation’ section, this section provides new avenues for future research to deepen the understanding of contributors to effective sustainability reporting.

The study highlights the critical importance of technology in sustainability reporting. Future research could focus on identifying specific technologies that enhance data collection (especially throughout the value chain), management/conversion, analysis and reporting processes. Investigating how and which specialized technology systems - such as integrated ERP systems, AI, and specialized sustainability reporting software - improve CSRD compliance can provide practical guidance for organizations. By examining the impact and effective utilization of these technologies on reporting efficiency and data accuracy, future studies can offer insights into the best practices for leveraging technology to meet sustainability reporting standards. Understanding the role of technology will also help organizations make informed decisions about technology investments that facilitate comprehensive and reliable sustainability reporting.

Furthermore, the results underscore the significance of senior management/board involvement and overall organizational culture in driving effective sustainability reporting. Future studies should explore how leadership engagement and a supportive culture influence the successful implementation of CSRD requirements. Research could examine strategies for increasing senior leaders' involvement and understanding of the CSRD's intent and the opportunities it offers for value creation. Additionally, understanding how a culture of continuous improvement and participation in the context of sustainability reporting is fostered will give more practical roadmaps to effective SR. These research directions could offer insights into fostering organizational mobilization and commitment to sustainability, ensuring that leadership and culture are aligned with sustainability goals and overall corporate strategy.

Another important avenue for future research is understanding the organising of a supportive and aligned organizational structure for effective sustainability reporting. Future studies could investigate how organizational structures can promote and govern cross-functional collaboration and integration across various departments - such as sustainability, finance, operations, procurement, technology, and legal – best for effective sustainability reporting. Research could explore how cross-functional governance and ways of knowledge management enhance the implementation of sustainability practices and reporting. Additionally, examining how organizational structures interact with other knowledge management- and dynamic capabilities provides crucial insight as the results indicated that inefficient structures can impede sustainability reporting effectiveness. A well-aligned structure with other elements of the organization can promote a cohesive and effective approach to sustainability reporting.

This study establishes a foundational framework for future research by demonstrating the applicability of Knowledge Management Capabilities (KMC) and Dynamic Capabilities (DC) frameworks in the context of sustainability reporting. The findings validate the use of KMC and DC as effective lenses to understand and improve sustainability reporting practices, identifying the most impactful organizational elements and capabilities and their micro-foundations. Future studies can build on this foundation by exploring further *how* to approach sustainability reporting most effectively within each influential capability and dimension. Additionally, examining the interplay between these capabilities and other organizational factors or adopting a qualitative approach can provide deeper insights into how companies can leverage their internal capabilities to meet sustainability standards. This research opens avenues for investigating the dynamic adaptation of sustainability practices over time and the role of knowledge management in sustaining long-term sustainability reporting, thereby offering a comprehensive approach to advancing sustainability reporting scholarship.

By addressing these avenues, future research can significantly advance the understanding of CSRD-aligned sustainability reporting. This will offer valuable insights and practical recommendations for organizations aiming to enhance their sustainability practices and ensure compliance with evolving reporting regulatory standards.

8 CONCLUSION

This research confirms that implementing the CSRD is a difficult endeavour, with companies often relying on external assistance to become CSRD-ready due to a lack of in-house expertise, resources, and capabilities. Aiming to address the gap in both literature and practice regarding the relationships between organizational capabilities and effective CSRD compliance, this study specifically examined how organizational knowledge management and dynamic capabilities contribute to effective CSRD-aligned sustainability reporting. By utilizing the Knowledge Management Capabilities framework by Gold et al. (2001) and the Dynamic Capabilities framework by (Teece, 2007), the study employed a mixed-methods approach that integrated quantitative data and qualitative insights from PwC's professional experience. This approach aimed to answer the research question: *To what extent do organizational knowledge management and dynamic capabilities influence effective CSRD-aligned sustainability reporting, and what best practices can organizations adopt?*

Through comprehensive quantitative data analysis, this study has demonstrated that robust knowledge management capabilities significantly influence CSRD-aligned sustainability reporting. In particular, the importance of Knowledge Process Capability and Knowledge Infrastructure Capability underscores the necessity of a dual-faceted knowledge-based approach for effective CSRD implementation. This finding highlights the need for organizations to prioritize both processes and the embedding infrastructure, facilitating the assimilation of both explicit and tacit knowledge essential for effective CSRD-aligned sustainability reporting.

As such, organizations need a balanced approach to knowledge management. However, KMC Conversion and KMC Culture have been demonstrated to be the most influential. Additionally, the negative effect of KMC Structure suggests that certain structural elements may hinder the effective implementation of other KMC dimensions. Therefore, addressing these structural issues is crucial for optimizing overall knowledge management for effective CSRD compliance. Optimizing the operationalization of these capabilities necessitates further research.

Furthermore, this study has shown that robust dynamic capabilities significantly influence CSRD-aligned sustainability reporting as well. In particular, the influential impact of Dynamic Capability Sensing and Dynamic Capability Transforming underscores the necessity of a proactive and adaptive approach for effective CSRD implementation. Although Dynamic Capability Seizing exhibited a positive trend, further research is needed to fully understand its potential under varying conditions.

The demonstrated relevance of the Knowledge Management Capabilities and Dynamic Capabilities frameworks underscores their theoretical and practical significance in guiding organizations towards effective CSRD-aligned sustainability reporting. These frameworks serve as foundational tools, highlighting critical organizational elements, practices, and requirements essential for effective sustainability reporting. Specifically, utilizing a capability-based approach to CSRD compliance provides clear direction and structure for formulating effective strategies extending beyond sustainability reporting.

The quantitative and qualitative insights from PwC complement the primary findings of this research, providing a more inductive perspective and enabling data triangulation from multiple sources. These insights add valuable context to the organizational implications of implementing CSRD by highlighting perceived value, challenges, and suggested approaches for effective CSRD organization. Through a comparative analysis of the literature, primary results, and PwC's insights, several best practices for effective CSRD implementation have emerged, all of which are embedded within the KMC and DC frameworks.

Firstly, it is essential to establish robust data processes and systems for long-term, recurring annual sustainability reporting. This entails acquiring sustainability data throughout the value chain and utilizing integrated specialized technology to acquire, track, and manage large amounts of organizational non-financial data effectively. Secondly, achieving CSRD compliance necessitates extensive cross-functional collaboration and organizational mobilization. It is imperative to engage top executives and senior managers in this process. More specifically, CFOs and CIOs should play pivotal roles in supporting CSOs. With their expertise in sustainability and CSRD-specific procedures, CSOs guide CSRD compliance efforts. CFOs ensure investor-grade disclosures through their financial reporting skills, and CIOs manage the utilization of necessary technologies and systems. This synergistic collaboration not only meets compliance requirements but also supports integrating sustainability into the organization's core operations and business model. Lastly, given that CSRD implementation is a new and complex endeavour for many organizations, fostering a culture of high engagement, continuous learning, and improvement will set sustainability reporting leaders apart.

This study has highlighted several critical organizational elements and practices in the journey towards becoming CSRD-ready, specifically underscoring the importance of robust processes supported by advanced technology and systems, as well as a facilitating organizational structure and culture. Embracing the findings of this research will enable organizations to excel in sustainability reporting and more effectively implement the CSRD. While this study provides valuable guidance for organizations, it also serves as a foundational starting point, highlighting influential organizational elements and capabilities that require further exploration. Future research will be essential to understand how these can be best operationalized across diverse organizational contexts for optimal sustainability reporting. By building on and leveraging the insights and frameworks presented, organizations can foster a sustainability reporting approach that not only meets regulatory requirements but also drives long-term value and positive change. Ultimately, transparent and accurate sustainability reporting forms the cornerstone of sustainability strategies that will drive sustainable development and growth, laying a strong foundation for the journey towards a more sustainable future.

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10 APPENDIX

10.1 APPENDIX A

The following section outlines the exact order of the self-completion survey survey questions asked and rated on a scale of 1 to 7. Additionally, it presents the operationalization of the following constructs: SRE, DC Sensing, DC Seizing, and DC Transforming.

Table 21. Item Measures of CSRD Compliance Effectiveness (SRE)
My organization . . . - Has a clear process for sustainability reporting. - Has integrated sustainability reporting within its overall reporting approach. - Is familiar with- and understands the CSRD requirements. - Is able to identify CSRD requirement gaps and adapt accordingly. - Is able to do a CSRD compliant double materiality assessment (including identifying impacts, risks and opportunities). - Is able to retrieve material sustainability data throughout its value chain (upstream and downstream). - Is able to engage its stakeholders in the sustainability reporting process. - Is able to record and report the CSRD required information accurate and complete. - Integrates material sustainability data into decision-making and develop metrics, targets and actions accordingly. - Is CSRD compliant ready to record and report on all material topics.

Table 22. Item Measures of Sensing Dynamic Capability
My organization . . . - Has processes for acquiring knowledge about sustainability reporting and the CSRD - Has processes for acquiring sustainability related knowledge from its stakeholders - Has processes for acquiring sustainability data throughout its value chain - Has processes for filtering and categorizing sustainability knowledge - Its structure facilitates the discovery and creation of new sustainability (reporting) knowledge. - Uses specialized technology that allows it to measure and track sustainability knowledge about its products, services and processes. - Uses technology that allows it to search for new sustainability (reporting) knowledge.

Table 23. Individual Item measure – not part of any larger construct
My organization . . . - Is able to know *what* to do for CSRD compliance without external support (professional services etc.).

Table 24. Item Measures of Seizing Dynamic Capability
My organization . . . - Has standardized incentive systems for sharing sustainability knowledge and CSRD compliance. - Encourages employees to go where they need for sustainability knowledge regardless of structure. - Structure facilitates the transfer of sustainability knowledge across structural and functional boundaries. - Its board and senior management effectively support the role of sustainability and CSRD compliance - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated. - Uses specialized sustainability reporting technology that allows it to store and manage its sustainability data

Table 25. Individual Item measure – not part of any larger construct
My organization . . . - Is able to know *how* to internally manage for effective sustainability reporting under the CSRD without external support (professional services etc.).

Table 26. Item Measures of Transforming Dynamic Capability
My organization . . . - Has processes for distributing sustainability (reporting) knowledge throughout the organization. - Expects high levels of participation and learning in the process of sustainability reporting. - Has processes for using sustainability (reporting) knowledge in the development of new reporting approaches. - Has processes to mutually align sustainability reporting with existing practices - Has processes for replacing outdated reporting knowledge - Has processes for converting competitive sustainability knowledge into usable information and plans of action - Has processes for using sustainability knowledge into the design of new products/services. - Is able to locate and apply sustainability knowledge to changing competitive conditions. - Uses sustainability knowledge to adjust to strategic direction.

10.2 APPENDIX B

This section outlines the operationalization of the constructs within the KMC framework. These individual item measures are incorporated into the constructs of the DC framework, as detailed in the previous section. For clarity, the KMC item measures in the previous section have been underlined in colour according to the operationalization described below.

Table 27. Item Measures of Knowledge Management Acquisition Process
My organization . . . - Has processes for acquiring knowledge about sustainability reporting and the CSRD. - Has processes for acquiring sustainability-related knowledge from its stakeholders. - Has processes for acquiring sustainability data throughout its value chain.

Table 28. Item Measures of Knowledge Management Conversion Process
My organization . . . - Has processes for filtering and categorizing sustainability knowledge. - Has processes for converting competitive sustainability intelligence into plans of action. - Has processes for distributing sustainability knowledge throughout the organization. - Has processes for replacing outdated sustainability knowledge. - Has processes to mutually align sustainability reporting with existing practices.

Table 29. Item Measures of Knowledge Management Application Process
My organization . . . - Has processes for using sustainability (reporting) knowledge in the development of new reporting approaches. - Has processes for using sustainability knowledge in the development of new products/services. - Is able to locate and apply sustainability knowledge to changing competitive conditions. - Uses sustainability knowledge to adjust to strategic direction.

Table 30. Item Measures of Technological Knowledge Management Infrastructure
My organization . . . - Uses technology that allows it to measure and track sustainability knowledge about its products, services and processes. - Uses technology that allows it to search for new sustainability (reporting) knowledge. - Uses specialized sustainability reporting technology that allows it to manage its sustainability data

Table 31. Item measures of Structural Knowledge Management Infrastructure
My organization . . . - Its structure facilitates the discovery and creation of new sustainability knowledge. - Has a standardized incentive system for sharing sustainability knowledge - Encourages employees to go where they need for sustainability knowledge regardless of structure. - Structure facilitates the transfer of new sustainability knowledge across structural and functional boundaries.

Table 32. Item Measures of Cultural Knowledge Management Infrastructure
My organization . . . - High levels of participation and learning are expected in the process of sustainability reporting. - Its board and senior management effectively support the role of sustainability and CSRD compliance - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated.

Table 33. Item Measures of Knowledge Process Capability
My organization . . . - Has processes for acquiring knowledge about sustainability reporting and the CSRD. - Has processes for acquiring sustainability-related knowledge from its stakeholders. - Has processes for acquiring sustainability data throughout its value chain. - Has processes for filtering and categorizing sustainability knowledge. - Has processes for converting competitive sustainability intelligence into plans of action - Has processes for distributing sustainability knowledge throughout the organization. - Has processes for replacing outdated sustainability knowledge. - Has processes to mutually align sustainability reporting with existing practices. - Has processes for using sustainability (reporting) knowledge in the development of new reporting approaches. - Has processes for using sustainability knowledge in development of new products/services. - Is able to locate and apply sustainability knowledge to changing competitive conditions. - Uses sustainability knowledge to adjust to strategic direction.

Table 34. Item Measures of Knowledge Infrastructure Capability
My organization . . . - Uses technology that allows it to measure and track sustainability knowledge about its products, services and processes. - Uses technology that allows it to search for new sustainability (reporting) knowledge. - Uses specialized sustainability reporting technology that allows it to manage its sustainability data - Its structure facilitates the discovery and creation of new sustainability knowledge. - Has a standardized incentive system for sharing sustainability knowledge - Encourages employees to go where they need for sustainability knowledge regardless of structure. - Structure facilitates the transfer of new sustainability knowledge across structural and functional boundaries. - High levels of participation and learning are expected in the process of sustainability reporting. - Its board and senior management effectively support the role of sustainability and CSRD compliance - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated.

10.3 APPENDIX C

This section of the appendix presents the results of the reliability analysis for all constructs through Cronbach's Alpha values:

Table 35. Reliability analysis

Construct	*Cronbach's Alpha*	*N of items*
SRE	0.798	9
KMC Acquisition	0.799	3
KMC Conversion	0.83	5
KMC Application	0.766	4
KMC Technology	0.867	3
KMC Structure	0.724	4
KMC Culture	0.635	3
KPC	0.833	12
KIC	0.782	10
DC Sensing	0.83	8
DC Seizing	0.826	7
DC Transforming	0.864	9

10.4 APPENDIX D

This section of the appendix presents the results of the validity/factor analysis for all constructs:

Table 36. Factor Analysis - Component Matrix of SRE[a]

	Component		
	1	2	3
My organization . . . - Has a clear process for sustainability reporting	.505	-.394	.505
My organization . . . - Has integrated sustainability reporting within its overall reporting approach	.541	-.286	.260
My organization . . . - Is familiar with and understands the CSRD	.608	.676	.253
My organization . . . - Is able to do a CSRD compliant double materiality assessment (including identifying impacts, risks and opportunities)	.519	.588	.467
My organization . . . - Is able to retrieve material sustainability knowledge throughout its value chain (upstream and downstream)	.845	.035	-.040
My organization . . . - Is able to engage its stakeholders in the sustainability reporting process	.602	-.594	-.036
My organization . . . - Is able to record and report the CSRD required information accurate and complete	.562	.307	-.641
My organization . . . - Integrates material sustainability knowledge into decision-making and develop metrics, targets and actions accordingly	.719	-.353	-.096
My organization . . . - Is CSRD compliant ready to record and report on all material topics	.707	.066	-.434

Extraction Method: Principal Component Analysis.
a. 3 components extracted.

Table 37. Factor Analysis - Component Matrix of DC Sensing[a]

	Component	
	1	2
My organization . . . - Has processes for acquiring knowledge about sustainability reporting and the CSRD	.476	.781
My organization . . . - Has processes for acquiring sustainability knowledge throughout its value chain	.789	.278
My organization . . . - Has processes for acquiring sustainability related knowledge from its stakeholders	.913	.123
My organization . . . - Has processes for filtering and categorizing sustainability knowledge	.782	-.306
My organization . . . - Its structure facilitates the discovery and creation of new sustainability (reporting) knowledge	.565	-.524
My organization . . . - Uses specialized technology that allows it to measure and track sustainability knowledge about its products, services and processes	.832	-.080
My organization . . . - Uses technology that allows it to search for new sustainability (reporting) knowledge	.712	-.142

Extraction Method: Principal Component Analysis.
a. 2 components extracted.

Table 38. Factor Analysis - Component Matrix of DC Seizing[a]

	Component 1
My organization . . . - Has standardized incentive systems for sharing sustainabilty knowledge and CSRD compliance coöperation	.752
My organization . . . - Encourages employees to go where they need for sustainability knowledge regardless of structure	.680
My organization . . . - Its structure facilitates the transfer of sustainability knowledge across structural and functional boundaries	.737
My organization . . . - Uses specialized technology that allows it to store and manage its sustainability knowledge	.719
My organization . . . - Its board and senior management effectively support the role of sustainability and CSRD compliance	.737
My organization . . . - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated	.822

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 39. Factor Analysis - Component Matrix of DC Transforming[a]

	Component 1	Component 2
My organization . . . - Has processes for distributing sustainability (reporting) knowledge throughout the organization	.734	-.088
My organization . . . - Expects high levels of participation and learning in the process of sustainability reporting	.406	.755
My organization . . . - Has processes for using sustainability (reporting) knowledge in the development of new reporting approaches	.760	.103
My organization . . . - Has processes to mutually align sustainability reporting with existing practices	.706	-.376
My organization . . . - Has processes for replacing outdated reporting knowledge	.782	-.264
My organization . . . - Has processes for converting sustainability knowledge into usable information and plans of action	.726	-.339
My organization . . . - Has processes for using sustainability knowledge into the design of new products/services	.598	.619
My organization . . . - Is able to locate and apply sustainability knowledge to changing competitive conditions	.821	.105
My organization . . . - Uses sustainability knowledge to adjust its strategic direction	.676	-.086

Extraction Method: Principal Component Analysis.
a. 2 components extracted.

Table 40. Factor Analysis Component Matrix of Knowledge Process Capability[a]

	Component 1
KMC Acquisition	.838
KMC Conversion	.864
KMC Application	.914

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 41. Factor Analysis - Component Matrix of Knowledge Infrastructure Capability [a]

	Component 1
KMC Technology	.867
KMC Structure	.838
KMC Culture	.864

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 42. Factor Analysis - Component Matrix of KMC Acquisition[a]

	Component 1
My organization . . . - Has processes for acquiring knowledge about sustainability reporting and the CSRD	.737
My organization . . . - Has processes for acquiring sustainability knowledge throughout its value chain	.899
My organization . . . - Has processes for acquiring sustainability related knowledge from its stakeholders	.889

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 43. Factor Analysis - Component Matrix of KMC Conversion[a]

	Component 1
My organization . . . - Has processes for filtering and categorizing sustainability knowledge	.717
My organization . . . - Has processes for distributing sustainability (reporting) knowledge throughout the organization	.720
My organization . . . - Has processes to mutually align sustainability reporting with existing practices	.793
My organization . . . - Has processes for replacing outdated reporting knowledge	.827
My organization . . . - Has processes for converting sustainability knowledge into usable information and plans of action	.799

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 44. Factor Analysis - Component Matrix of KMC Application[a]

	Component 1
My organization . . . - Has processes for using sustainability (reporting) knowledge in the development of new reporting approaches	.742
My organization . . . - Has processes for using sustainability knowledge into the design of new products/services	.771
My organization . . . - Is able to locate and apply sustainability knowledge to changing competitive conditions	.847
My organization . . . - Uses sustainability knowledge to adjust its strategic direction	.710

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 45. Factor Analysis - Component Matrix of KMC Technology[a]

	Component 1
My organization . . . - Uses specialized technology that allows it to measure and track sustainability knowledge about its products, services and processes	.875
My organization . . . - Uses technology that allows it to search for new sustainability (reporting) knowledge	.917
My organization . . . - Uses specialized technology that allows it to store and manage its sustainability knowledge	.885

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 46. Factor Analysis - Component Matrix of KMC Structure [a]

	Component 1
My organization . . . - Its structure facilitates the discovery and creation of new sustainability (reporting) knowledge	.699
My organization . . . - Has standardized incentive systems for sharing sustainabilty knowledge and CSRD compliance coöperation	.810
My organization . . . - Encourages employees to go where they need for sustainability knowledge regardless of structure	.779
My organization . . . - Its structure facilitates the transfer of sustainability knowledge across structural and functional boundaries	.688

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Table 47. Factor Analysis - Component Matrix of KMC Culture[a]

	Component 1
My organization . . . - Its board and senior management effectively support the role of sustainability and CSRD compliance	.869
My organization . . . - Overall organizational values and objectives regarding sustainability and CSRD compliance are clearly communicated	.822
My organization . . . - Expects high levels of participation and learning in the process of sustainability reporting	.550

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

10.5 APPENDIX E

This section outlines the regression analysis performed with the KMC C, excluding control variables as well as individual variables.

Table 48. Regression analysis – Effect of KPC and KIC (excluding control variables)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.795[a]	.632	.605	.55663

a. Predictors: (Constant), Knowledge Infrastructure Capability, Knowledge Process Capability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.394	2	7.197	23.228	<.001[b]
	Residual	8.366	27	.310		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), Knowledge Infrastructure Capability, Knowledge Process Capability

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.557	.673		.827	.415
	Knowledge Process Capability	.528	.221	.466	2.391	.024
	Knowledge Infrastructure Capability	.352	.184	.372	1.908	.067

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 49. Regression analysis – Effect of KPC

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.771[a]	.594	.548	.59586

a. Predictors: (Constant), Knowledge Process Capability, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.528	3	4.509	12.700	<.001[b]
	Residual	9.231	26	.355		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), Knowledge Process Capability, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.523	.731		.716	.480
	Organizational age	-4.351E-5	.002	-.003	-.027	.979
	Years of sustainability reporting experience	-.014	.017	-.107	-.837	.410
	Knowledge Process Capability	.872	.142	.768	6.146	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 50. Regression analysis – Effect of KIC

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.589	.542	.59973

a. Predictors: (Constant), Knowledge Infrastructure Capability, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.408	3	4.469	12.426	<.001[b]
	Residual	9.352	26	.360		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), Knowledge Infrastructure Capability, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.695	.554		3.056	.005
	Organizational age	-.001	.002	-.085	-.663	.513
	Years of sustainability reporting experience	-.020	.017	-.152	-1.176	.250
	Knowledge Infrastructure Capability	.732	.120	.774	6.079	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 51. Regression Analysis – Effect of KMC sub-dimensions (excluding control variables)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.848[a]	.720	.647	.52665

a. Predictors: (Constant), KMC Culture, KMC Conversion, KMC Acquisition, KMC Technology, KMC Application, KMC Structure

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.380	6	2.730	9.843	<.001[b]
	Residual	6.379	23	.277		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), KMC Culture, KMC Conversion, KMC Acquisition, KMC Technology, KMC Application, KMC Structure

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.082	.855		-.095	.925
	KMC Acquisition	-.003	.155	-.004	-.021	.983
	KMC Conversion	.617	.211	.643	2.918	.008
	KMC Application	4.595E-5	.220	.000	.000	1.000
	KMC Technology	.114	.105	.190	1.091	.287
	KMC Structure	-.310	.182	-.337	-1.697	.103
	KMC Culture	.513	.203	.473	2.524	.019

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 52. Regression analysis – Effect of KMC Acquisition

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.627[a]	.393	.323	.72877

a. Predictors: (Constant), KMC Acquisition, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.944	.752		2.584	.016
	Organizational age	.000	.002	.016	.104	.918
	Years of sustainability reporting experience	.000	.021	.003	.018	.986
	KMC Acquisition	.563	.138	.628	4.078	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 53. Regression analysis – Effect of KMC Conversion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.734[a]	.539	.485	.63557

a. Predictors: (Constant), KMC Conversion, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.257	3	4.086	10.114	<.001[b]
	Residual	10.503	26	.404		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), KMC Conversion, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.372	.668		2.055	.050
	Organizational age	.001	.002	.058	.427	.673
	Years of sustainability reporting experience	-.028	.018	-.212	-1.535	.137
	KMC Conversion	.714	.130	.745	5.482	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 54. Regression analysis – Effect of KMC Application

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.684[a]	.467	.406	.68289

a. Predictors: (Constant), KMC Application, Years of sustainability reporting experience, Organizational age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.634	3	3.545	7.601	<.001[b]
	Residual	12.125	26	.466		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), KMC Application, Years of sustainability reporting experience, Organizational age

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.070	.828		1.293	.207
	Organizational age	-.001	.002	-.103	-.702	.489
	Years of sustainability reporting experience	-.015	.019	-.114	-.779	.443
	KMC Application	.782	.165	.689	4.749	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 55. Regression analysis – Effect of KMC Technology

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.741[a]	.549	.497	.62804

a. Predictors: (Constant), KMC Technology, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.504	3	4.168	10.567	<.001[b]
	Residual	10.255	26	.394		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), KMC Technology, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.248	.349		9.313	<.001
	Organizational age	.000	.002	-.026	-.196	.846
	Years of sustainability reporting experience	-.029	.018	-.223	-1.627	.116
	KMC Technology	.453	.081	.754	5.604	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 56. Regression analysis – Effect of KMC Structure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.540[a]	.291	.210	.78757

a. Predictors: (Constant), KMC Structure, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.632	3	2.211	3.564	.028[b]
	Residual	16.127	26	.620		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), KMC Structure, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.749	.698		3.938	<.001
	Organizational age	-6.428E-5	.002	-.005	-.030	.976
	Years of sustainability reporting experience	-.014	.022	-.110	-.649	.522
	KMC Structure	.492	.152	.536	3.241	.003

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 57. Regression analysis – Effect of KMC Culture

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.698[a]	.487	.427	.67037

a. Predictors: (Constant), KMC Culture, Years of sustainability reporting experience, Organizational age

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.822	.846		.972	.340
	Organizational age	-.003	.002	-.233	-1.553	.132
	Years of sustainability reporting experience	.000	.019	-.003	-.022	.983
	KMC Culture	.790	.160	.728	4.938	<.001

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

10.6 APPENDIX F

This section presents the effects of the individual item measures of KMC Structure and Conversion.

Table 58. Regression analysis – Effects of individual item measures of KMC Structure[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	3.109	.971		3.200	.004		
	Organizational age	4.764E-5	.002	.004	.020	.984	.879	1.138
	Years of sustainability reporting experience	-.016	.026	-.120	-.610	.548	.776	1.289
	My organization . . . - Its structure facilitates the discovery and creation of new sustainability (reporting) knowledge	.063	.200	.065	.317	.754	.709	1.411
	My organization . . . - Has standardized incentive systems for sharing sustainability knowledge and CSRD compliance cooperation	.212	.126	.373	1.679	.107	.610	1.639
	My organization . . . - Encourages employees to go where they need for sustainability knowledge regardless of structure	.082	.157	.117	.521	.607	.600	1.667
	My organization . . . - Its structure facilitates the transfer of sustainability knowledge across structural and functional boundaries	.086	.141	.136	.608	.549	.605	1.654

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 59. Regression analysis – Effects of individual item measures of KMC Conversion[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.566	.742		2.110	.046		
	Organizational age	.001	.002	.109	.654	.520	.712	1.405
	Years of sustainability reporting experience	-.024	.021	-.185	-1.185	.249	.817	1.224
	My organization . . . - Has processes for filtering and categorizing sustainability knowledge	.092	.154	.119	.594	.558	.492	2.033
	My organization . . . - Has processes for distributing sustainability (reporting) knowledge throughout the organization	-.019	.156	-.025	-.122	.904	.462	2.163
	My organization . . . - Has processes to mutually align sustainability reporting with existing practices	.184	.157	.256	1.171	.254	.417	2.400
	My organization . . . - Has processes for replacing outdated reporting knowledge	.252	.167	.354	1.511	.145	.361	2.767
	My organization . . . - Has processes for converting sustainability knowledge into usable information and plans of action	.172	.150	.228	1.147	.264	.505	1.980

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

10.7 APPENDIX G

This Appendix presents the effects of the individual DC constructs on SRE

Table 60. Regression analysis – Effect of DC Sensing[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.755[a]	.570	.520	.61378

a. Predictors: (Constant), DC Sensing, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.964	3	4.321	11.471	<.001[b]
	Residual	9.795	26	.377		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), DC Sensing, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.559	.598		2.608	.015		
	Organizational age	.000	.002	-.011	-.085	.933	.962	1.040
	Years of sustainability reporting experience	-.013	.017	-.102	-.775	.446	.960	1.042
	DC Sensing	.717	.123	.752	5.839	<.001	.998	1.002

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 61. Regression analysis – Effect of DC Seizing[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.666[a]	.444	.380	.69763

a. Predictors: (Constant), DC Seizing, Years of sustainability reporting experience, Organizational age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.105	3	3.368	6.921	.001[b]
	Residual	12.654	26	.487		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), DC Seizing, Years of sustainability reporting experience, Organizational age

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.363	.594		3.977	<.001		
	Organizational age	-.001	.002	-.090	-.597	.555	.948	1.054
	Years of sustainability reporting experience	-.012	.020	-.091	-.612	.546	.961	1.041
	DC Seizing	.571	.126	.668	4.530	<.001	.983	1.017

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

Table 62. Regression analysis – Effect of DC Transforming[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.778[a]	.605	.559	.58829

a. Predictors: (Constant), DC Transforming, Organizational age, Years of sustainability reporting experience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.761	3	4.587	13.254	<.001[b]
	Residual	8.998	26	.346		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), DC Transforming, Organizational age, Years of sustainability reporting experience

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.305	.749		.407	.687		
	Organizational age	-3.192E-5	.002	-.002	-.020	.984	.962	1.040
	Years of sustainability reporting experience	-.028	.017	-.213	-1.665	.108	.931	1.074
	DC Transforming	.929	.148	.787	6.279	<.001	.967	1.034

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

10.8 APPENDIX H

This Appendix presents one of the regression models assessing the interaction effects between variables. However, interactions cannot be assessed due to multicollinearity issues.

Table 63. Regression analysis – Effect of DC Interactions[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.852[a]	.726	.622	.54451

a. Predictors: (Constant), DC_SEN_SEI_TRA, Organizational age, Years of sustainability reporting experience, DC Sensing, DC Transforming, DC Seizing, DC_SEN_SEI, DC_SEN_TRA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.533	8	2.067	6.970	<.001[b]
	Residual	6.226	21	.296		
	Total	22.759	29			

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness
b. Predictors: (Constant), DC_SEN_SEI_TRA, Organizational age, Years of sustainability reporting experience, DC Sensing, DC Transforming, DC Seizing, DC_SEN_SEI, DC_SEN_TRA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-8.265	7.876		-1.049	.306		
	Organizational age	.002	.002	.183	1.105	.282	.475	2.105
	Years of sustainability reporting experience	-.036	.019	-.273	-1.906	.070	.633	1.579
	DC Sensing	3.741	2.722	3.921	1.374	.184	.002	625.017
	DC Seizing	-1.132	1.018	-1.325	-1.112	.279	.009	109.088
	DC Transforming	3.240	1.602	2.746	2.022	.056	.007	141.584
	DC_SEN_SEI	-.057	.417	-.537	-.138	.892	.001	1165.753
	DC_SEN_TRA	-.874	.497	-7.651	-1.758	.093	.001	1453.115
	DC_SEN_SEI_TRA	.059	.051	3.879	1.154	.261	.001	867.054

a. Dependent Variable: CSRD-aligned sustainability reporting effectiveness

10.9 APPENDIX I

Table 64. Two-Way ANOVA - Independence for Question 1

Dependent Variable: My organization . . . - Is able to independently identify what the CSRD requires us to do without external support (consulting services, etc)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	47.976[a]	19	2.525	.555	.871
Intercept	87.099	1	87.099	19.132	.001
AGE	.010	1	.010	.002	.964
SR_EXPERIENCE	11.055	1	11.055	2.428	.150
EMPLOYEE	9.121	3	3.040	.668	.591
TURNOVER	2.093	1	2.093	.460	.513
INDUSTRY	25.069	8	3.134	.688	.695
EMPLOYEE * TURNOVER	.000	0	.	.	.
EMPLOYEE * INDUSTRY	1.725	3	.575	.126	.942
TURNOVER * INDUSTRY	.000	0	.	.	.
EMPLOYEE * TURNOVER * INDUSTRY	.000	0	.	.	.
Error	45.524	10	4.552		
Total	461.000	30			
Corrected Total	93.500	29			

a. R Squared = .513 (Adjusted R Squared = -.412)

Table 65. Two-Way ANOVA – Independence for Question 2

Dependent Variable: My organization . . . - Is able to know how to independently manage for effective sustainability reporting aligned with the CSRD without external support (consulting services, etc)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	43.589[a]	19	2.294	.595	.841
Intercept	152.093	1	152.093	39.454	<.001
AGE	1.452	1	1.452	.377	.553
SR_EXPERIENCE	13.570	1	13.570	3.520	.090
EMPLOYEE	15.047	3	5.016	1.301	.327
TURNOVER	1.779	1	1.779	.462	.512
INDUSTRY	27.781	8	3.473	.901	.550
EMPLOYEE * TURNOVER	.000	0	.	.	.
EMPLOYEE * INDUSTRY	1.297	3	.432	.112	.951
TURNOVER * INDUSTRY	.000	0	.	.	.
EMPLOYEE * TURNOVER * INDUSTRY	.000	0	.	.	.
Error	38.550	10	3.855		
Total	604.163	30			
Corrected Total	82.139	29			

a. R Squared = .531 (Adjusted R Squared = -.361)