# CSRD READINESS IN HEALTHCARE: ANALYZING SUSTAINABILITY PERFORMANCE METRICS

Simone Philp *, Patrick Ulrich **

* *Corresponding author,* Aalen University, Aalen, Germany
Contact details: Aalen University, Beethovenstrasse 1, D-73430 Aalen, Germany
** Aalen University, Aalen, Germany; University of Bamberg, Bamberg, Germany

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## Abstract

Strategic management control is essential for ensuring sustainability, as it helps organizations align their long-term goals with environmental and social responsibilities. To achieve this alignment, organizations must implement robust management control systems that establish clear policies and procedures supporting sustainability strategies. The significance of sustainable corporate practices has increased globally in recent years, with the healthcare industry playing a crucial role. This research project examines the sustainability performance and Corporate Sustainability Reporting Directive (CSRD) readiness of leading companies in the healthcare sector. The selection of this industry is particularly relevant due to its significant societal impact and the growing demand for transparent, sustainable business practices. The central research question is: To what extent does sustainability performance for CSRD readiness differ between companies in the healthcare sector? To explore this, a comparative analysis was conducted on the datasets of sustainability reports of 14 global leaders in healthcare, spanning pharmaceuticals, medical technology, and service providers. The methodology involved analyzing publicly available reports, corporate social responsibility (CSR) reports, and relevant sustainability metrics. An inductive comparison identified patterns and differences in sustainability practices, leading to the identification of 91 sustainability key performance indicators (KPIs). The results indicate that healthcare companies are largely aligning with sustainability practices and regulatory requirements. However, there remains significant room for improvement, particularly in supply chain emissions representation. Improvements can be achieved through a holistic, strategic focus on sustainability. These findings raise questions and opportunities to explore deeper strategic approaches and motivations for sustainable practices in businesses.

**Keywords:** ESRS, Governance, Sustainability Reporting, Sustainability Controlling

**Authors' individual contribution:** Conceptualization — S.P. and P.U.; Methodology — S.P. and P.U.; Formal Analysis — S.P. and P.U.; Investigation — S.P. and P.U.; Writing — Original Draft — S.P. and P.U.; Writing — Review & Editing — S.P. and P.U.

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## 1. INTRODUCTION

Strategic management control is essential for ensuring sustainability, as it helps organizations align their long-term goals with environmental and social responsibilities. To achieve this alignment, organizations must implement robust management control systems that establish clear policies and procedures supporting sustainability strategies. These systems ensure that all departments and employees work towards common sustainability goals. Sustainability control systems (SCS) contribute to sustainable strategies in healthcare organizations by focusing on individual general employees and their values from the extra-organizational context (Johnstone, 2019). By integrating these values into the organizational framework, SCS encourage employees to adopt sustainable practices in their daily tasks, further embedding sustainability into the corporate culture. Management control systems help organizations in implementing policies and procedures that support sustainability strategies (Ghosh et al., 2019). Through regular monitoring and evaluation, these systems ensure that the sustainability initiatives are effective and continuously improved, leading to a more sustainable and responsible organization overall.

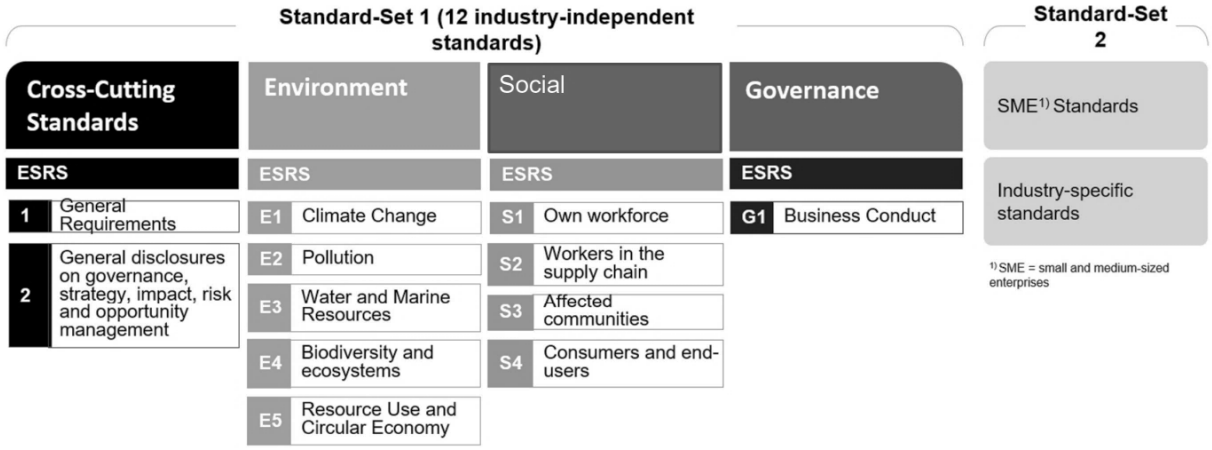
Sustainability management has transformed from a discretionary corporate decision to a crucial competitive factor (Waheed & Zhang, 2022). With stringent environmental requirements, such as the European Commission's targets for limiting global warming to 2 or preferably 1.5 degrees (Meinshausen et al., 2022), companies are increasingly obligated to transparently disclose their sustainability performance. The clear definition of the concept of sustainability is crucial for establishing a coherent foundation and a unified understanding of this term. A significant milestone in this regard was the publication of the United Nations-initiated Commission Report on Environment and Development, led by Gro Harlem Brundtland, titled "Our Common Future" (World Commission on Environment and Development, 1987) in the year 1987. The so-called Brundtland definition of sustainability emphasizes the need to meet the needs of current generations without compromising the ability of future generations to meet their own needs. It revolves around ensuring a harmonious coexistence between our present requirements and the long-term impacts on the environment and the well-being of forthcoming generations. The Brundtland definition sparked a new socio-political debate and significantly influenced the scientific discourse (Sneddon et al., 2006).

An additional crucial step towards approaching a conceptual definition of sustainability is the concept of the "Triple-Bottom-Line" (TBL), first formulated by John Elkington. The TBL concept is grounded in the idea that sustainability can only be achieved when environmental, economic, and social aspects are simultaneously and equitably considered. This approach aims to secure and enhance the ecological, economic, and social performance of a society (Alhaddi, 2015).

New sustainability regulations, such as the so-called Corporate Sustainability Reporting Directive (CSRD), build upon this comprehensive concept of sustainability consideration. In accordance with the CSRD adopted in 2023, as of January 1, 2024, all large, capital-market-oriented companies across Europe are obligated to disclose structured and comprehensive sustainability information in their management reports. The reporting requirements under the CSRD exert an influence on all areas of a company's operations and functions (Ulrich & Metzger, 2024). The reporting requirement builds upon the previous obligations under the Non-Financial Reporting Directive (Venturelli et al., 2019).

The European Sustainability Reporting Standards (ESRS) constitute the substantive framework for meeting the requirements of the CSRD. These standards encompass extensive catalogs that companies must understand and adhere to (Figure 1). The initial step towards complying with the ESRS involves the so-called materiality analysis, wherein companies identify the most relevant sustainability topics for them across the environmental, social, and governance (ESG) domains. This relatively nascent subject necessitates a comprehensive transformation process and a fundamental restructuring of business operations.

**Figure 1.** CSRD overview




*Source: Authors' elaboration.*

The introduction of the Non-Financial Reporting Directive (NFRD, Directive 2014/95/EU) in 2014 laid the foundation for more transparent corporate reporting on social and environmental issues. In 2019, the European Union (EU) Commission announced its intention to review

the NFRD as part of the strategy to strengthen the foundations for sustainable investments. For this purpose, a public consultation was launched in 2020 to obtain the views and opinions of various stakeholders regarding a revision of the NFRD. Several shortcomings were identified, including insufficient information and issues with its comparability, reliability, and relevance. Additionally, the complexity and uncertainty regarding the information to be reported, as well as the resulting effort and avoidable costs for companies, were criticized. As a result, one of the goals of the revision was to ensure that the relevance and quality of the information met the needs of all stakeholders (investors, organizations, civil society, trade unions, etc.) so that sustainability-related opportunities and risks could be better assessed and companies could be held accountable for their environmental and social impacts. The other objective was to reduce unnecessary reporting burdens on companies. In July 2020, the European Financial Reporting Advisory Group (EFRAG) was mandated to develop recommendations for possible future European non-financial reporting standards (Hahnkamper-Vandenbulcke, 2021).

To this end, EFRAG appointed a multi-stakeholder Project Task Force (PTF) to carry out this preparatory work (EFRAG, 2020). The ESRS constitute the substantive requirements of the legislative proposal for the CSRD, adopted by the European Commission in April 2021. On July 31, 2023, the European Commission adopted the Delegated Act on the first set of European Sustainability Reporting Standards (ESRS) (EFRAG, n.d.). The ESRS specify the sustainability information that companies are required to report in accordance with the CSRD. In particular, the ESRS address the material impacts, risks, and opportunities related to ESG issues. The ESRS do not require companies to provide information on the ESG topics covered by the ESRS if the company has classified the respective topic as non-material. This aims to ensure that the sustainability report does not contain superfluous information, but rather all relevant information, disclosing the significant impacts the company has on people and the environment, and how sustainability issues affect the company's development, performance, and position.

Engaging with the implementation of the ESRS is entirely novel for companies, but of crucial significance. This standard provides a clear framework for organizations to integrate environmental and social aspects into their reporting, with diverse implications for many industries.

The remainder of this paper is organized as follows. Section 2 reviews the literature. Section 3 describes the research methodology. Section 4 reports the results of the analysis. Section 5 provides a discussion of the findings. Section 6 concludes the paper and elaborates on future research directions.

## 2. LITERATURE REVIEW: SUSTAINABILITY IN THE HEALTHCARE INDUSTRY

There are several reasons why sustainability and environmental protection play a special role in the healthcare industry. On the one hand, climate change directly affects human health, and on the other hand, the healthcare sector is a major contributor to global emissions (Karliner et al., 2020; Kotcher et al., 2021). The relationship between human health and the environment is described by the concept of "planetary health", which states that human health is directly dependent on functioning natural systems (Kotcher et al., 2021). The Lancet Commission emphasizes that natural systems have been damaged to an unprecedented extent in human history and pose a direct threat. This awareness should be brought more into the political and social spotlight, and measures should be taken to protect planetary health (Whitmee et al., 2015; Menßen-Franz, 2024). The negative effects of overshooting planetary boundaries can be observed both at the individual level, for example through heat-related deaths or the faster spread of infectious diseases, and at the system level through increased use of the health care system (Romanello et al., 2022). The healthcare sector can therefore make a positive contribution to human health not only by curing and treating disease and injury, but also by reducing its emissions and environmental impact. It is currently responsible for 4.4% of global greenhouse gas (GHG) emissions (Karliner et al., 2020). In Germany, it accounts for 5.2% of national GHG emissions. Of this, 66% is attributable to the purchase of goods and services in the sector (Health & Care Management, 2021). As a result, the 125th German Medical Association (*Deutscher Ärztetag*) has set the goal of achieving climate neutrality in the German healthcare sector by 2030 (Bundesärztekammer, 2021). Furthermore, the demand for and use of disposable products and the associated waste volumes continue to increase (Health & Care Management, 2021). With 4.8 million tons of discarded material, healthcare facilities are the fifth largest producer of waste in Germany. Due to the increasing demand for raw materials for disposable medical products, it is necessary to develop new sustainability strategies and closed-loop/recycling concepts (Menßen-Franz, 2024). In this context, the healthcare sector is caught between sustainability, patient safety, and economic efficiency (Ostertag et al., 2021). For medical devices in particular, there is a trade-off between occupational health and infection control on the one hand, and sustainability, recycling, and environmental protection on the other. An example of this is the regulatory requirements: while the Closed Substance Cycle Waste Management Act (*Kreislaufwirtschaftsgesetz*, KrWG) is intended to contribute to more recycling and sustainability, this is countered by special requirements for the treatment of certain (e.g., potentially contaminated) medical waste according to the Federal/Länder Working Group on Waste (*Bund/Länder-Arbeitsgemeinschaft Abfall*, LAGA) 18 (Lorke, 2021; LAGA, 2021).

Implementing sustainable alternatives (such as the circular economy) poses a particular challenge for players in the medical and healthcare sector, as the disposal and recycling of certain products is highly regulated by law (Lotz, 2023).

In addition, other factors, such as structural problems among the various players in the industry, hinder more sustainable solutions. In the healthcare sector, the classification of waste types according to the Waste Catalogue Ordinance (*Abfall-Verzeichnis-Verordnung*, AVV) is of particular regulatory relevance. This is crucial for the designation of waste and the classification of its hazardousness, which leads to specific treatment requirements

(Bundesministerium der Justiz, 2017; Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, 2020). In areas where more sustainable options could be implemented despite these regulations, other factors lead to the use of disposable rather than reusable products. The main reasons why more sustainable solutions are not implemented in the healthcare industry differ depending on the stakeholder group. The perspectives of manufacturers, users, and disposal companies must be taken into account here.

Manufacturers cite the lack of information exchange and cooperation between other people and companies involved in the process as an obstacle. In particular, the lack of cooperation between producers is an obstacle to efficient take-back systems. Structural problems are also mentioned, such as the fact that unseparated waste disposal is too cheap. It is also criticized that users often prefer single-use products for reasons of patient safety. Other problems include competition along the supply chain, lack of financial resources, time, and rigid processes within the organization.

From the users' point of view, the lack of time and the lack of knowledge and skills of the employees regarding waste management are a challenge, especially in hospitals. Furthermore, internal waste management systems are often inadequate or have not been developed despite opportunities for improvement. There is also a lack of digital solutions for inventory management, for example, which could prevent unnecessary storage and waste. Another obstacle is packaging and product design, which often does not allow for separation into individual components and sorted collection.

From a waste management perspective, existing structures and processes play a role alongside legal requirements. For example, too little space for waste containers for separate collection, lack of time, and financial aspects play a role here. The lack of exchange and knowledge transfer is also criticized (Brauer et al., 2023).

Despite these challenges, there are pioneering approaches for using more sustainable, circular alternatives in the healthcare sector; nevertheless, there is still great potential and a need for improvement.

The ESRS offer a multitude of opportunities for healthcare companies, including pharmaceutical manufacturers, medical device companies, and healthcare service providers. These standards promote comprehensive and detailed disclosure of ESG practices, which brings numerous positive implications for the sustainability and competitiveness of these companies. One of the most significant opportunities presented by the ESRS is the enhancement of transparency and accountability. Healthcare companies are now required to publish detailed information about their sustainability practices, including data on energy consumption, water usage, waste management, and greenhouse gas emissions. This increased transparency enables stakeholders, including investors, patients, and regulators, to more accurately assess the sustainability performance of companies. This improved visibility can strengthen stakeholder trust and positively influence the companies' reputations. The ESRS also encourage the implementation of environmentally friendly practices, which can significantly reduce the ecological footprint of healthcare companies. These companies can introduce more sustainable production methods that optimize resource use and minimize pollutant emissions. For instance, pharmaceutical companies can develop processes that reduce water and energy consumption, while medical device companies can utilize eco-friendly materials and recycling methods. These measures not only contribute to environmental protection but can also lead to cost savings and increased operational efficiency. Another advantage of the ESRS is the strengthening of social responsibility. By mandating reporting on working conditions, health and safety in the workplace, as well as equality and diversity, companies are encouraged to improve their social practices. This can result in a more positive work environment, higher employee satisfaction, and increased productivity. Promoting diversity and inclusion can also introduce innovative approaches and diverse perspectives into corporate governance, enhancing the companies' innovation capacity and competitiveness. The ESRS also offer significant opportunities for technological and operational innovations. Companies that proactively adopt sustainable practices can develop new technologies and processes that are both ecologically and economically beneficial. This could include the development of new pharmaceuticals or medical devices that are more resource-efficient and produce less waste. Such innovations can provide healthcare companies with a competitive edge by reducing environmental impact while improving the efficiency and effectiveness of their production processes.

The following outlines three reasons why the implementation of the ESRS is particularly compelling in the healthcare sector:

- The application of the ESRS in the healthcare sector underscores the growing significance of sustainable practices in this industry. Healthcare is not only a vital component of social well-being but also faces challenges such as resource consumption, waste production (e.g., disposable gloves, medical utensils, and packaging materials), and social impacts. By implementing the ESRS, organizations send a clear signal of their commitment to actively contribute to sustainable development.
- Secondly, engagement with the ESRS in the healthcare sector promotes enhanced transparency and accountability. Patients, family members, employees, and other stakeholders increasingly expect healthcare organizations not only to meet high medical standards but also to act ethically and sustainably. The inclusion of environmental and social aspects in reporting builds trust and enables a more comprehensive assessment of an organization's performance.
- Thirdly, the implementation of the ESRS opens avenues for efficiency improvement and cost reduction. Through systematic analysis and optimization of environmental aspects, resources can be utilized more effectively, and waste can be minimized. This contributes not only to ecological sustainability but can also lead to cost savings, a matter of particular significance in the healthcare industry, which often grapples with limited resources.

This study ultimately focused on examining 14 world-leading companies in the healthcare industry. The central research question of this study is:

*RQ: To what extent does the sustainability performance for CSRD readiness differ between companies in the healthcare sector?*

To address this question, a comparative analysis was conducted on 14 global leaders in the healthcare industry. The chosen companies represent various segments of the healthcare industry, including pharmaceuticals, medical technology, and service-oriented enterprises. The applied methodology involved analyzing publicly available reports, corporate social responsibility (CSR) reports, and relevant sustainability metrics of the selected companies.

## 3. RESEARCH METHODOLOGY

The comprehensive analysis of publicly available sustainability reports was conducted systematically and rigorously using an inductive approach. The inductive approach is a methodology wherein specific observations or experiences are utilized to derive general principles, patterns, or theories (Azungah, 2018). In contrast to the deductive approach, which concludes from general assumptions to specific cases, the inductive approach progresses from the specific to the general. In an inductive process, data is collected, phenomena are observed, or specific cases are analyzed to draw conclusions and derive general principles.

Thus, each report underwent a meticulous review and was individually mapped to all catalogs and categories of the ESRS. Significant emphasis was placed on context-dependent presentation of numbers and information to enable comprehensive interpretation. In cases where no or no substantial information was found in the sources, the corresponding cells in the Excel file were left blank. Finally, a detailed review of categories from the ESRS catalogs was conducted. Categories were filtered out if none of the examined companies reported on them in their sustainability reports. The resulting Excel table accurately reflects the categories and information that were actually listed by the examined companies in their sustainability reports. This comprehensive approach ensures a thorough and meaningful analysis of the available data. The study was initiated in the year 2024; therefore, the examined sustainability reports are from the year 2023.

## 4. RESEARCH RESULTS

The majority of the reports examined in this study are structured around the three areas of Environment, Social, and Governance. All surveyed companies, both family-owned and non-family-owned, have defined sustainability goals, with significant variation in the timeframe and objectives. However, 91% have established these goals and derived measures based on external organizations such as the Organisation for Economic Co-operation and Development (OECD) Guidelines, the United Nations (UN) Guiding Principles, the Task Force on Climate-Related Financial Disclosure (TCFD), and the Science Based Targets[1] initiative (SBTi). Regarding reporting standards, 57% of the surveyed companies align their reports with Global Reporting Initiative (GRI) standards, with 29% already reporting according to the EU Taxonomy. Additionally, 36% adhere to the German Supply Chain Due Diligence Act. Notably, 93% of the surveyed companies undergo external scrutiny of their sustainability orientation. The following presents the initial results of the study, categorized into ESRS clusters (Environment, Social, and Governance).

*Environment:* As of 2023, only 43% of the companies have articulated specific zero-emission targets in the environmental domain, with two out of the four family-owned businesses included in this category. The goals vary significantly in scope and timeframe. While not all companies have formulated zero-emission targets, all report on their measures to reduce emissions. Moreover, 91% report on Scope 1, 2, and 3 emissions to varying depths and details. Similar variations are observed in the Energy category, where reports range from very detailed energy metrics to occasional comments about the company's electricity mix. Results pertaining to Biodiversity and Pollution clearly indicate that detailed reporting on these topics is currently limited. Only 45% of the surveyed companies have disclosed information about air, water, or soil pollution. Biodiversity reports primarily focus on sustainable resource procurement from certified and controlled renewable sources. The last two topics, Water and Marine Resources, and Resource Procurement and Circular Economy, receive greater coverage. In the Water category, the focus is mainly on water extraction and consumption, wastewater, and targeted measures in areas with water stress risks. Many of the examined companies have initiated steps towards a circular economy, placing greater emphasis on efficient resource utilization and sourcing from sustainable origins. In Waste Management, each company provides insights, albeit with varying levels of detail. Notably, each company is currently striving to minimize landfill waste as much as possible and explore alternative disposal methods in the future. Packaging has been linked to this theme, revealing a clear trend towards the use of recycled, recyclable, renewed, or renewable packaging, with a continued focus on developing innovative solutions.

*Social:* Clear trends emerge in the social category as well. Ninety-one percent of companies report on occupational safety for their employees, disclosing metrics on workplace accidents, preventive measures, and strategies. Equality, diversity, and inclusion are prevalent concerns in almost all companies. Another consistently highlighted aspect is the provision of training opportunities and talent acquisition. Reports on workers in the value chain are provided by a total of 86%, typically at a superficial level, similar to the 43% reporting on consumers and end-users. On the other hand, community engagement is extensively covered, with companies detailing various charitable programs, foundations, and donations. The two ESRS categories, S3 Influenced Communities and S4 Consumers and End-Users, were consolidated in terms of content due to the limited amount of information found in each.

*Governance:* The results from the Governance category clearly indicate that nearly every company (both family-owned and non-family-owned, with one exception) expresses its commitment to its Code of Conduct, compliance offerings, and Supplier Code of Conduct. Product safety is also a prominent topic for many of the surveyed companies. Additionally, 71% address the prevention and detection of corruption and bribery.

[1] https://sciencebasedtargets.org/

## 5. DISCUSSION OF THE RESULTS

The forthcoming sustainability reporting under the CSRD does not impose an immediate legal obligation to align corporate strategy directly with sustainability. Instead, the intention is to catalyze corporate transformation through public criticism and stakeholder reactions, potentially triggering a socio-economic process (Sharma, 2025). This process extends beyond the EU, encompassing supply chains and products from third countries imported into the EU. Companies subject to reporting face significant initial challenges in implementing CSRD requirements, presenting a substantial hurdle. However, after successful implementation, the new processes and structures not only pose challenges but also offer opportunities for comprehensive enhancements and optimizations throughout the entire supply chain, customer requirements, and product development (Häußler & Ulrich, 2023).

From the results of this study, the following conclusions can be drawn: Sustainability reporting still varies significantly from company to company. Depending on the business model and primary business activities, the focus on sustainability also varies. Nevertheless, there is an observable shift indicating that sustainability is becoming an increasingly important topic in the business context. Companies that have not yet defined clear goals, such as a zero-emission target, in their non-financial reports are aware of this. It is often mentioned that in the coming years, with the assistance of external organizations such as TCFD or SBTi, data-driven and achievable goals will be established.

A notable observation from the study is the differing levels of detail and depth in sustainability reporting. Some companies provide comprehensive and transparent disclosures, including detailed metrics on Scope 1, 2, and 3 emissions, energy usage, and waste management. In contrast, others offer only superficial insights, highlighting a need for standardized reporting frameworks that ensure consistency and comparability. This inconsistency underscores the importance of robust regulatory guidelines and industry standards that can help harmonize reporting practices across the healthcare sector.

Furthermore, the role of external verification and certification in enhancing the credibility of sustainability reports cannot be overstated. With 93% of the surveyed companies undergoing external scrutiny of their sustainability practices, it is evident that third-party verification plays a crucial role in building stakeholder trust and ensuring the accuracy of reported data. This practice not only boosts transparency but also encourages continuous improvement in sustainability performance, as companies are held accountable to independent standards and benchmarks.

On the other hand, a discernible trend is the increase in emissions or operational waste in some companies, despite their goals to reduce them. The frequently mentioned reasons include the resurgence in production following the COVID-19 pandemic and external factors affecting the economy in certain locations.

Lastly, the integration of sustainability into the corporate strategy is crucial for achieving CSRD readiness. Companies that treat sustainability as an integral part of their business model, rather than a peripheral concern, are better positioned to meet regulatory requirements and achieve meaningful improvements in their environmental and social impact. This involves not only setting ambitious targets but also embedding sustainability into decision-making processes, corporate culture, and operational practices. Future research should continue to explore how companies can effectively integrate sustainability into their core strategies and the benefits that arise from such an approach.

## 6. CONCLUSION

In this evolving study, an inductive comparison has uncovered patterns and differences in sustainability practices related to CSRD readiness in the healthcare industry, identifying a total of 91 sustainability KPIs. The findings from this research indicate that the sustainability performance for CSRD readiness among companies in the healthcare sector does not vary significantly. Companies in the healthcare sector have already made significant efforts to enhance their performance in ESG areas. Nevertheless, there is still considerable room for improvement. A major area for future focus, for example, is improving supply chain reporting. Understanding one's own supply chain enables the adequate assessment of Scope 3 emissions, which can then be addressed and improved in subsequent steps.

The insights from this research may not only be relevant for companies in the healthcare industry but also for other sectors looking to implement sustainable practices.

We recommend future research on the following topics:

- Primary drivers of sustainability: Identifying the primary drivers that motivate healthcare businesses to prioritize sustainable practices is essential for understanding how to encourage broader adoption. These drivers may include regulatory compliance, stakeholder pressure, cost savings, and competitive advantage. Additionally, intrinsic motivations, such as ethical considerations and corporate social responsibility, can also play a significant role. Future research should investigate the relative importance of these drivers and how they influence decision-making processes within different types of healthcare organizations. This knowledge can help policymakers and industry leaders develop targeted strategies to incentivize sustainable practices.
- Key sustainable strategies: Healthcare businesses implement a variety of sustainable strategies, ranging from energy-efficient practices to waste reduction and sustainable procurement. Understanding the key strategies that have been successful in different contexts can provide valuable insights for scaling or adapting these approaches across the industry. Future research should identify and analyze the most effective sustainability strategies, considering factors such as cost-effectiveness, ease of implementation, and overall impact. This can help create a repository of best practices that healthcare organizations can draw upon to enhance their sustainability efforts.
- Influence of regulatory frameworks: Regulatory frameworks play a significant role in influencing the adoption of sustainable practices and CSRD readiness within the healthcare industry. Compliance with regulations can drive improvements in sustainability reporting and

performance. However, regulatory requirements can also pose challenges, particularly for smaller organizations. Research should explore how different regulatory frameworks impact the adoption of sustainability practices, considering factors such as the clarity of requirements, the burden of compliance, and the support provided to organizations. This can help identify ways to optimize regulatory approaches to support effective and efficient sustainability reporting.

- Role of supply chain dynamics: Supply chain dynamics are critical in shaping the sustainability efforts of healthcare organizations. Effective supply chain management can lead to significant improvements in environmental and social performance. Research should examine how supply chain dynamics, such as supplier relationships, procurement practices, and logistical challenges, impact sustainability initiatives. Understanding these factors can help organizations develop strategies to enhance supply chain transparency, reduce emissions, and promote sustainable sourcing. Optimizing supply chain dynamics can significantly contribute to achieving CSRD readiness and overall sustainability goals.

By addressing these topics, future research can provide valuable insights and practical recommendations for improving sustainability performance and CSRD readiness in the healthcare sector. This will not only benefit healthcare organizations but also contribute to broader efforts to achieve sustainable development goals across industries.

Despite the comprehensive analysis and valuable insights provided by this study on CSRD readiness in the healthcare sector, several limitations must be acknowledged. The study relied primarily on publicly available reports, CSR reports, and relevant sustainability metrics from the selected companies. While these sources provide a wealth of information, they may not capture all aspects of a company's sustainability performance, potentially omitting significant elements such as internal documents, proprietary data, and non-public initiatives. Additionally, the analysis was conducted on a sample of 14 global leaders in the healthcare industry. Although these companies span various sectors within the healthcare industry, including pharmaceuticals, medical technology, and service providers, the relatively small sample size may not fully represent the diversity of practices across the entire industry.

The study was initiated in 2024, analyzing sustainability reports from the year 2023. As sustainability practices and regulatory frameworks are rapidly evolving, the findings may quickly become outdated. Changes in regulations, industry standards, and corporate practices occurring after the data collection period are not reflected in this study, which may impact the relevance of the conclusions over time.

Moreover, the study primarily focused on quantitative data and metrics to assess sustainability performance and CSRD readiness. While this approach provides measurable and comparable results, it may overlook qualitative aspects of sustainability, such as corporate culture, employee engagement, and stakeholder perceptions. These qualitative factors can significantly influence the effectiveness of sustainability initiatives, but are more challenging to measure and analyze. Lastly, there is an inherent potential for bias in the sustainability reports themselves, as companies might present their data in a manner that highlights positive aspects while downplaying negative ones. This potential bias could affect the reliability of the data used in the study, thereby influencing the overall conclusions drawn.

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