



**SIMONELLI** | GROUP

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Avenues for corporate sustainability management:  
guiding SMEs in their strategic journey towards a sustainable long-term growth

RELATORE

Chiar.mo Prof. FRANCESCA SPIGARELLI

DOTTORANDO

Dott. OLENA LIAKH

COORDINATORE

Chiar.mo Prof. MASSIMO MECCARELLI

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## Thesis abstract

L'impatto potenziale delle piccole e medie imprese (PMI) sullo sviluppo sostenibile globale è considerevole e deve derivare da un programma di responsabilità e sostenibilità d'impresa (RSI) strutturato internamente. Questo, tuttavia, non è un compito facile, data, da un lato, l'esistenza di barriere interne che caratterizzano le operazioni delle PMI e, dall'altro, le due nuove sfide mondiali emergenti dell'accelerazione digitale e della crisi derivante dall'emergenza pandemica da Covid-19. Inoltre, queste due questioni globali si rafforzano a vicenda e mettono le PMI in una situazione rischiosa in termini di continuità. Ma anche la sostenibilità d'impresa, che sta diventando sempre più una leva strategica di cui ci si aspetta che le aziende di tutte le dimensioni si avvalgano, presenta rischi simili. È in questo contesto che la tesi cerca di trovare delle soluzioni alle barriere interne e alle sfide esterne che impediscono alle PMI di diventare leader di successo del movimento per lo sviluppo sostenibile. Gli elementi di resilienza alla crisi, coordinamento delle attività di RSI e reporting, digitalizzazione e leadership sembrano avere la capacità intrinseca di guidare lo sviluppo sostenibile di un'azienda nel lungo termine. Tuttavia, per realizzare ciò, devono essere gestiti mediante procedure sistematiche e diventare parte del quadro strategico della sostenibilità all'interno delle aziende. Lo scopo di questa tesi è, dunque, quello di analizzare ciascuno di questi aspetti che sono strettamente legati al tema della sostenibilità aziendale (fornendo output che potrebbero supportare le aziende nel loro percorso di transizione verso la sostenibilità), e che le PMI oggi trovano difficili da affrontare perché il contesto in cui operano diventa sempre più complesso e iniziano a formarsi dei divari tra ciò che ci si aspetta dall'operatività delle PMI e la loro effettiva capacità. La struttura della tesi è composta da quattro capitoli che seguono una prospettiva macro-micro e ogni capitolo adotta una metodologia di ricerca diversa per esplorare gli elementi sopra menzionati. I risultati possono essere utilizzati principalmente dalle aziende che cercano di avviare o migliorare un programma esistente di gestione della sostenibilità. Nonostante il progetto di ricerca sia principalmente rivolto alle PMI, poiché le best practice analizzate sono state principalmente quelle delle grandi aziende, anche queste ultime potranno dunque trarre ispirazione per le loro operazioni di sostenibilità. Per quanto riguarda le PMI, il vantaggio principale sarebbe quello di trovare soluzioni per evitare che le loro barriere interne e le questioni mondiali ne compromettano la capacità di impegno verso un approccio di CSR correttamente strutturato.

The potential impact of small-medium enterprises (SMEs) on the global sustainable development is considerable and must stem from an internally structured corporate sustainability and responsibility (CSR) program. This, however, is no easy task, given, on one hand, the existence of internal barriers that characterize SME operations, and on the other, the two newly emerging world-wide challenges of digital acceleration and the crisis resulting from the Covid-19 pandemic. Moreover, these two global matters are mutually reinforcing and put SMEs in a risky situation in terms of continuity. But so does corporate sustainability, which is increasingly becoming a strategic lever that companies of all sizes are expected to make use of. It is within this context that the thesis seeks to find solutions to the internal barriers and external challenges that prevent SMEs from successfully becoming the leaders of the sustainable development movement. The elements of resilience to crisis, coordination of CSR activities and reporting, digitalization, and leadership all seem to have the intrinsic ability to guide the sustainable development of a company in the long term. However, to do so, they must be managed through systematic procedures and become part of the sustainability strategic framework within companies. The aim of this thesis is, thus, to analyze each of these aspects that closely relate to the topic



of corporate sustainability (providing outputs that could support companies in their sustainability transition journey), and which SMEs nowadays find difficult to deal with because the context in which they operate becomes increasingly complex and gaps begin to form between what is expected of them and their actual capacity. The structure of the thesis consists of four chapters that follow a macro-micro perspective, each chapter adopting a different research methodology to focus on the above-mentioned elements. The results can be of use mainly by the companies seeking to initiate or improve and existing sustainability management program. Despite the research project being primarily targeted at SMEs, since the best practices analyzed have been mainly those of larger corporations, the latter will also be able to receive some inspiration for their sustainability operations. As for SMEs, the main advantage would be to find solutions to prevent their internal barriers and worldwide issues tamper their ability to engage in a correctly structured CSR approach.



## Thesis introduction

The impact of small-medium enterprises (SMEs) on the development of the global economy is considerable [1]. They represent the predominant form of business (about 90%) in each nation [2,3], providing 60% of the world-wide employment opportunities [3] and serving as a fundamental engine in value chains globally [4]. Environmentally speaking, precisely because of their predominance in the business and industrial scene, they appear to generate high negative externalities, if considered in their aggregate form [3]. But exactly for the same reason, SMEs also have the greatest potential in supporting the world's efforts to develop in a sustainable way [1,4]. Hence, the integration of sustainable practices – which are increasingly becoming of strategic relevance [5] – within SME operations is a key step [3].

This, however, is no easy task, for at least two reasons. On one hand, there are the internal barriers that characterize SMEs' businesses [1,4]. On the other, new emerging world-wide challenges, such as the digital acceleration [6] or the crisis resulting from the Covid-19 pandemic [7], have been recently hindering, in one way or the other, the activity of all market players. Both of these factors resulted in SMEs fighting for business continuity in the market, due to the progressively uncertain context [1,8–10]. These two modern concerns are also intertwined, in that, due to the lockdowns, the uptake of digital technologies was sped up even further [11], causing a divide between SMEs that managed to promptly adjust their operations, becoming crisis-resilient and crucial in reversing the global economic slowdown [12–15], and those that struggled [11,16].

Regarding the intrinsic organizational obstacles that SMEs face, the most impactful one is the lack of resources to operate, be it capital, labor, or competencies [1,4]. There are also external failures that play a role, such as the lack of regulations and standardized tools specifically developed to tackle SME sustainability [4]. The consequences stemming from these barriers affect the ability of SMEs to develop a structured approach to sustainability change [4], which may result in them being at risk for survival, given the strategic importance of corporate sustainability and responsibility (CSR) practices [5]. The poor managerial skills and limited number of human resources, for example, can hinder the establishment of a common sustainability direction, as well as the correct measuring and reporting of sustainability data (also to comply with ESG requirements by investors and banks), and the development of sustainable and digital innovation capacity [1]. And this communicative limit is an important one, because CSR-wise SMEs are informally very proactive, especially towards communities employee wellbeing and safety, and eco-friendly products, but they might not be aware of the fact that their activities fall in the sustainability domain, or they simply lack understanding as to how to formalize and externalize their effort [4].

It is within this context that the thesis seeks to find solutions to the internal barriers and external challenges that prevent SMEs from successfully becoming the leaders of the sustainable development movement. And indeed, the activation of internal leaders [4], such as top managers [17], may trigger a series of internal mechanisms that lead to more effective management, motivated and skilled employees, the development of a sustainability program and the generation of innovative ideas and technologies [2,17,18].

The above analyzed elements – namely resilience to crisis, coordination of CSR activities and reporting, digitalization, and leadership – all seem to have the intrinsic ability to guide the sustainable development of a company in the long term. However, to do so they must be managed through systematic procedures and become a part of the sustainability strategic framework of companies.





The aim of this thesis is, thus, to analyze each of these aspects that closely relate to the topic of corporate sustainability (providing outputs that could support companies in their sustainability transition journey), and which SMEs nowadays find difficult to deal with because the context in which they operate becomes increasingly complex and gaps begin to form between what is expected of them and their actual capacity. Given that, generally, the larger companies are the ones defining the operational and organizational trends of the other players in the market, and especially of the small-medium ones [19], this research mainly refers to the practices implemented by these larger companies, together with a concise overview of the problems encountered by SMEs.

The structure of the thesis (Figure 1) consists of 4 chapters that are presented sequentially following a macro-micro perspective. Each chapter adopted a different methodology of research.

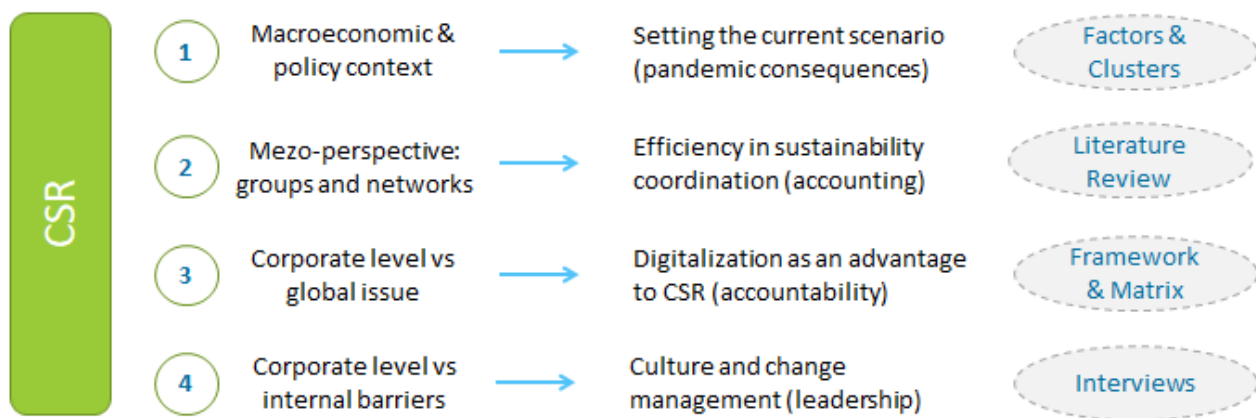


Figure 1. Thesis outline

*Chapter 1* introduces the current macro-operating context – strongly marked by the outbreak of the Covid-19 pandemic – in which companies are now to implement their sustainability strategies. Through a quantitative-statistical cross-analysis (factors and clusters) of the policy-mixes introduced to fight the crisis consequences, it tries to understand whether these had any impact on the continuity of commitment to or form of CSR.

*Chapter 2* (published) uses the so-called "middle" lenses of company aggregations, namely business groups and networks of SMEs, to assess how they leverage the potential of management control systems to improve the rigor of their overall sustainability management process. Additionally, the implications of group/network CSR on the macro (political influence), mezo (collaborative innovations) and micro contexts (removal of SME barriers) are presented. This study was based on a literature review (statistical trends in publication and qualitative contents of articles).

The third and fourth chapters are both dedicated to the individual company dimensions.

*Chapter 3* (under review), in particular, discusses the implications for business operations stemming from the other external global challenge that was previously mentioned: digitization. The goal in this case was to find out in which ways companies utilize the typical tools and practices that support digitalization (data governance, digital activities) to enhance the management quality of sustainability data, and in turn improve



accountability towards stakeholders. The study examines the literature in the first part, subsequently presenting empirical trends and contents.

*Chapter 4* compares literature and perceptions of a group of interviewed sustainability specialists on the components defining sustainability leadership, presenting the internal organizational challenges and strengths that affect the transition to sustainable operations, first and foremost sustainability culture.

This comprehensive work has been developed over the course of three years, within the context of a “Eureka” research project, co-funded by the University of Macerata, the coffee machine manufacturer Simonelli Group SpA and the Marche Region.

Through the industrial PhD format, I was able to work with Simonelli Group on the implementation of their novel sustainability transition, which also inspired the exploration of the topics discussed throughout the thesis, with particular regard to the roles of organizational culture and sustainability accounting in fostering a successful intra-functional and intra-company coordination. Getting onboard the company’s sustainability committee and team allowed me to grow my expertise in various management control and sustainability tasks, including sustainability assessments – defining metrics and gathering sustainability-related data; collaborating on sustainability reporting; managing sourcing evaluations required by clients, e.g. Ecovadis, etc.; testing change readiness through the B Corp and Circulytics assessments; preparing a series of internal policies pertaining to a wide range of sustainability aspects, e.g. code of ethics, environmental/circularity/end-of-life policy, labor/human rights policy, community/donations policy, etc.; managing participation to awards by collecting relevant data and preparing the narrative, etc.

This set of acquired practical knowledge has been complemented by an international mobility to the University of Eastern Finland, where, over a period of four months, I was able to get new insights into the topic of circular business models, present my work to the research teams or during doctoral tutorials and receive feedback for the improvement of the chapters composing this thesis.

Additionally, I became part of the ESSSR Cooperative Doctoral Programme on Sustainable Development Research, which gave me the chance to collaborate in the drafting of two research papers, thus further expanding my understanding of sustainability themes.

Comprehension of sustainability topics and field experience also enabled me to prepare and present sustainability-related content (related to innovation, SMEs, value chain) during lectures at the University of Macerata and remote guest lecturing.

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## Chapter 1. Covid-19 policies and their implications on the sustainable corporate practices of European firms

*The current pandemic emergency has put the efficiency of the private sectors to the test, shifting the focus to short-term survival, sometimes slowing down long-term commitment towards sustainability. The purpose of this study is to analyze how policy-mixes of Covid-19-responses are shaping the context in which companies will compete in the following years, in order to evaluate how the crisis might impact firms' ability to keep their commitment towards sustainable practices. European country-performance data for the years 2019 and 2020 were cross-analyzed with the policies adopted during the period, mainly using correlations, factor analysis and clustering techniques. It appears that the importance and influence of the traditional and extended groupings of sustainability determinants have been reorganized in light of the novel context that has been shaped by the responses to the pandemic crisis: GDP, social wealth and social performance, environmental innovation, digital growth and digital employment, and cross-border relevance represent the new groups of sustainability variables. The social and digitalization aspects are the only ones that were evaluated under two different facets. Moreover, the countries under analysis formed four distinct groups, with one (Baltic) splitting from a major cluster (Central Europe) in 2019. In general, the Continental-Nordic cluster (C1) outperformed the others in several domains – including social wealth, social performance, and digital growth – whereas the Baltic group appeared to have had the least improvements compared to the other country groups. As a whole, the different country clusters have indeed shown some changes in the leadership of the various sustainability domains, with the newly implemented emergency policies (mainly financial in nature and mandating) driving this change. In fact, environmental innovation, digitalization and social support policies have been found to be the main variables to be impacted by the intensity of the policy efforts.*

### 1.1 The changing “rules” of corporate sustainability in the new pandemic scenario

The outbreak of the global Covid-19 pandemic had consequences on all three major sustainability pillars – environmental, social and economic.

With respect to the environment, on one hand some major cities experienced a dramatic improvement in air quality owing to lockdowns, on the other higher amounts of waste were generated [1,2].

In the social domain, labor and workplace productivity suffered greatly [3]. The decrease in global employment levels in 2020 was historically unprecedented: 114 million jobs lost compared to 2019 (higher losses for women and young workers), out of which 33 million shifted to unemployment and 81 million to inactivity. This resulted in a reduction of 8.8% in global working hours – four times more than during the global financial crisis in 2009 – and of 8.3% in labor income. [4]. The lockdowns additionally prompted the majority of firms to massively introduce teleworking as an exceptional but standard social measure that could maintain continuity of business activities, and at the same time prevent the spread of the virus through safer, law-abiding working conditions [5–7]. This widespread application challenged firms to reorganize their business activity around remote working, prioritizing workplace wellbeing (e.g. employee's rights to rest), safety (both physical health and avoidance of security breaches) [6]. Overall, MNEs seemed to be more engaged in this practice, since SMEs lacked facilities, technological innovation, or any structured pandemic contingency plan to successfully carry out teleworking [6]. Moreover, the consequences of the Covid-19 emergency have put the operational capacity and efficiency of the public sector to the test [8]. In such a scenario, even in less affected countries [5], many corporate actors – both small-medium (SMEs) and multinational enterprises (MNEs) – replaced certain public support systems [8] through their Corporate Sustainability and Responsibility (CSR) initiatives [9]. They became the “social institutions” accountable towards societal needs in the midst of the pandemic, and thus also legitimized by governments. Donations, supplies of food and protective equipment, and disinfection of public areas were the prevailing forms of support they provided [5,8,10]. In particular, the collective effort of MNEs – given their global presence and influence on high level decision-making, strategic relationships, and control of information and media – as



well as their explicit interest in the crisis, helped to globalize public concern and CSR responses to Covid-19 [5].

In general, CSR appeared to be a valid response to cope with the short-term challenges posed during Covid-19 [5], and in the post-pandemic scenario CSR is presumed to develop even further, due to the public expectations for leading brands to contribute to the recovery of society [11]. Socially responsible actions have in fact become a key reputation factor [12] – even more so during severe social and economic upheaval – and organizations are now constantly scrutinized against their brand authenticity and corporate ethos [13]. Should a company behave irresponsibly during the pandemic, once normality is restored it will be penalized with negative publicity by its customers (avoiding purchasing products or expressing dissatisfaction on social media). This will in turn drive away an increasing number of investors, relying on consumer opinion for their own decision-making [13,14]. On the contrary, those firms that will have consistently led by example and exhibited social solidarity through genuine CSR actions will build trust with stakeholders and be rewarded in terms of corporate image, profits and employee commitment during more uncertain times [8,11,12].

Nevertheless, in the straining pandemic conditions, not all companies managed to support society. In economic terms, for smaller companies any social contribution they were expected to give may have represented a sacrifice of profits [9], considering that their activities (and hence accessibility to and availability of resources for their own core operations) were already restricted because of lockdowns. As a result, the focus of these firms shifted to short-term survival, at the expense of long-term CSR investment and ethical commitment [11]. Among the corporate sustainability goals, environmental priorities seemed to be the most neglected, both prior to and even more so after the pandemic outburst. Only those firms that worked with sustainability for the longest time, were more concerned with environmental and social issues [15]. Conversely, in the case of civil society and public sector organizations, after the COVID-19 outburst organizations only changed their sustainability priorities to place social issues (i.e. wellbeing of workers) before economic interests [15]. Thereby, the public intervened to provide for the economic sustainability of smaller and less sustainability-experienced companies [15] and, as a result, governments worldwide tried to relieve financial pressure through various actions, in order to encourage firms to continue their activities (sustainability objectives included) [11].

Several containment and emergency measure were implemented touching indirectly upon each of the sustainability domains [16,17], providing a potential opportunity to both respond to specific Covid-19 challenges in the short-run, but also make the global community – where also businesses carry out their operations – more sustainable overall [18]. In fact, public authorities seem to play a key role in a company's ability to maintain its sustainability commitment, particularly during times of crises such as the one caused by the Covid-19 outbreak. Therefore, the goal of this chapter is to explore whether the short-term policy measures implemented to contrast the pandemic were effective in changing the corporate sustainability context in which companies operate, helping them to further pursue their CSR activities.

The remainder of the chapter is organized as follows: an analysis of the conceptual background for the assessed macroeconomic and policy measures in section 2, the presentation of the research methodology in section 3, the discussion of results in section 4 and the conclusions in section 5.

### ***1.1.1 Government's engagement with CSR through policy levers***

CSR is referred to as a set or organizational practices that account for the sustainability impacts (socio-economic and environmental) of an enterprise by: (a) implementing ethical, responsible and sustainable core business operations (governance, work environment, value chain, marketplace included); (b) strengthening local communities through strategic philanthropy (“investing” the firm's human, material, estate and financial resources); and (c) engaging in private-public discussions and advocacy (e.g. on climate change) to reinforce the institutional capacity to deliver on sustainable development aims [19].



Although voluntary CSR initiatives are considered to yield many advantages, the active engagement of governments in its promotion (international guidelines, collaboration with national and international stakeholders, technical and financial support for developing CSR activities in SMEs too) contributes to the sustained success of corporate sustainability [20], and ultimately society-wide sustainable development, given how firms are able to affect the development of societal welfare within a country [21,22]. National governments can foster sustainability through a variety of implicit and explicit activities [23] that fall under the domain of public policies, which are able to stimulate engagement in CSR on three levels of societal actors: corporate, civil and governmental [24]. With regards to this relational aspect, public actors can apply CSR to improve corporate practices, increase awareness of sustainability themes in civil society, as well as to make their own practices more responsible. The collaborative efforts among these three stakeholders is referred to as relational CSR [21]. The major advantage that it provides is the acceleration of the development of sustainable innovations, which are a particularly relevant and effective response to the unprecedented challenges posed by the Covid-19 outbreak. This political approach to CSR, also known as reflexive corporate governance, requires corporate actors to balance active participation and expertise in order to ensure efficiency and effectiveness of their innovation processes, as well as legitimacy, engagement and acceptance by stakeholders of the right goals for business innovation [25].

CSR policies are largely defined as the “soft” governmental “mechanisms” (implying no sanction or compulsoriness) that encourage the adoption of (mostly voluntary) sustainable business practices [26,27]. However, a limited number of mandatory CSR actions are also available and can be beneficial in solving stakeholder conflicts of interest, controlling for negative globalization externalities and overpowering multinational enterprises, boosting corporate reputation and leading to a lower financial risk and a higher loyalty of employees and clients. Such enforcement of the CSR commitment has been termed “CSR legalization”, due to the growingly “official” nature of the measures (e.g. imperative law like the nonfinancial disclosure) [28]. Researchers have classified CSR public policies into various categories. One way to see these categories is to distinguish between policy tools that are implicit, explicit, stimulated, or regulated – based on their impact on business behavior and direction of intervention stimulation (incentives vs disincentives). The implicit and regulated type are both “push” strategies, with the difference that in implicit CSR firms are directly allotted specific portions of responsibility (e.g. pollution thresholds) for the entire society by the national institutions, whereas regulated CSR indirectly stimulates a more procedural sustainable behavior (e.g. environmental management system). On the contrary, explicit and stimulated CSR kinds rely on exogenous “pull” elements, such a corporate self-interest towards sustainability in explicit CSR, and endorsement or facilitation of it by the public sector in stimulated CSR (thus promoting the explicit type) [29]. CSR interventions can also be differentiated into legal (often in the form of recommendations rather than “hard” laws, directives, regulations or bans), financial (awards, grants, subsidies, tax incentives or export credits), informational (publicly sponsored websites, education, guidelines, campaigns and conferences, reporting standards and conduct codes), partnering (e.g. multistakeholder forums and networks for exchanging complementary resources), and hybrid (a combination of the afore-mentioned ones) [30]. In fact, besides the rare cases of “hard” regulations and laws, governments make use of a plethora of policy tools for setting the rules for sustainable business operations and defining the corporate capacity to deal with sustainability challenges. The intensity of CSR performance (e.g. technological implementation) can be controlled, for example, through the publication of binding standards (e.g. allowed emission rates) or voluntary guidelines (not very expensive options and therefore quite common) [23], bans (e.g. use of hazardous substances) and quotas (partial bans, e.g. tree logging). Taxes (e.g. carbon tax) and fines are used to regulate any harmful conduct, whereas tax credits and incentives help to encourage investment (e.g. in energy-efficient facilities). And finally, funding (or public spending) and dissemination of best practices may improve the capacity building and training stimulate more responsible and sustainable company practices (despite being more difficult to be evaluated against compliance) [22,23,31].





In addition to classifying policy tools for CSR, the literature presents an overview of the most crucial functions or trends that national policies follow with regards to the sustainability transition of an organization. For example, governments can take on a traditional mandating role when compulsory, top-down regulations and legislations are used to enhance the quality of CSR (i.e. transparency, reliability for stakeholders and overall quality of sustainability performance through obligatory sustainability disclosures, minimum industry standards, fiscal sanctioning or green taxes) [24,29,30,32]. Additionally, public measures on CSR guide the society through the transition to sustainability by setting a strategic vision [32]. Another purpose of CSR policies is to facilitate sustainable raising awareness on its challenges and benefits within the business scene through national campaigns (conferences, portals, forums, etc.) that support the deployment of guidelines and enforcement of standards, as well as through economic incentives, funding and appropriate framework conditions [23,24,29,30,32]. Leadership by example is yet another role that the public policies in this area play, showing how governments apply sustainability principles to their own activities (e.g. public procurement [30,32]). Governments also engage in public endorsements through awards, publicity and praise to the most sustainable firms at national, regional and international levels, in order to set market benchmarks of CSR behavior. Furthermore, the creation of public-private partnerships through dedicated projects supports the increase of stakeholder engagement, dialogue around sustainability themes, as well as the provision of public goods and the sharing of resources and platforms [24,29,30]. And finally, public authorities are also responsible for empowering companies by boosting the innovative capacity for advancing sustainable development [24,32].

The national context of stakeholder relationships determines which public interventions are applied [22]. European countries are considered leaders in implementing innovative policy actions that promote environmental protection themes (e.g. clean sources and technology, climate change) [31]. Their primary focus is, however, on non-compulsory (or “soft”) measures and the national governments have historically operated through four distinct policy models to validate CSR in the European territory. In the (1) “partnership” or Nordic model (Sweden, Denmark, Finland, with the addition of the Netherlands), social responsibility is an innate business trait because of how culturally experienced the respective local governments are in fostering public-private-social organizations (e.g. trade unions), as well as mediating co-responsibility and partnership (considered a key variable) to deal with both social negotiation (welfare state) and environmental management. The English-speaking countries (e.g. the UK, Ireland, USA) can be characterized through the (2) “business in the community” or Anglo-Saxon model, where the public sector acts as a facilitator of social and community development/sustainability (unemployment, social services shortage, social exclusion) through “soft interventions” (e.g. incentives, tax measures, encouraging voluntary services). The companies that are part of the (3) “sustainability and citizenship” or Continental model nations (Germany, Austria, France, Belgium, Luxembourg) address CSR as an adjunct strategy to global sustainable development. They become social agents that initiate corporate citizenship activities (tax compliance, operational transparency, strong link to the community and social actors) themselves, with the government only functioning as a motivator. And finally, the (4) “Agora model” gathers the Mediterranean countries (e.g. Italy, Spain, Portugal, Greece), which made CSR a part of their political agendas not long ago (thus typically having underdeveloped welfare states), and mainly by creating commissions or working groups among social actors (social organizations, corporate bodies, universities, research centers etc.) to find an agreement on government CSR solutions. SMEs represent the majority of the business actors involved, which these actions are aimed at [22]. In contrast to the sustainably-active Nordic and Anglo-Saxon countries, the Transitional model, implemented in Central-Eastern European (CEE) nations, represents the lowest engagement and social expenditure levels in CSR, coming after the Mediterranean Region (with Poland, Slovenia and Hungary representing an exception) [33].

### *1.1.2 The connection between macroeconomic parameters and the pillars of sustainability*



Sustainability is a development process that represents the interplay between three systems – economic social and ecological. The economic pillar is focused on limiting the societal barriers to economic growth and ensuring long-term productivity, the social perspective aims at taking care for the fundamental needs of human development (a cohesive community, a livable environment and a fair and flourishing economy), while the ecological component is concerned with preserving the biological sphere and the natural resources [34]. Economic sustainability also largely depends on the two additional variables of legal and policy framework, as well as technological innovation [35].

Measuring sustainability appears to be no easy task, as no direct computational method exists for incorporating divergent indicators to make them promptly applicable to the policy setting [36,37]. Nevertheless, literature and practice have both examined the impact of various components on the sustainability pillars, providing the research and business community with potentially interesting metrics to be further developed.

Economic sustainability, for example, can be explained by production and consumption. And especially productivity growth represents one of the major stimuli of economic development [38–40], which results in a higher product and service output (and in turn also consumption and revenue through increased sales) by resorting to the same work capacity [39,41]. Sales and Research and Development (R&D) are considered economic indicators too [42]. Furthermore, the Sustainable Development Goals (SDGs) framework has helped to contextualize the above-mentioned variables in the broader sustainability expectations. Consumption and production will have to follow more sustainable and resource-efficient models in the long-run, and in particular for emerging countries [43]. The growth of productivity will have to be supported by technological development and policies for nurturing innovation and scientific research (also supporting R&D in developing nations), employment, the Gross Domestic Product (GDP), and strengthening Small-Medium Enterprises (SMEs) [44,45].

Social responsibility is concerned with relationships among and repercussions on people. In a workplace context, this means taking care of employees' wellbeing by providing decent working conditions (e.g. jobs, working hours, salaries). But social sustainability also looks into developing local communities (e.g. donations, education) and securing the acceptance of consumers by providing suitable solutions to them, which will determine the success degree of sustainability initiatives. Given the relevance of the consumption variable in social sustainability, it is easy to see how sales to final consumer (retail trade) also relates to this sphere [46–48]. Therefore, sales and consumption are shared indicators between the economic and social pillar. The SDGs see this aspect in the light of attaining the highest employment rate and pay levels –including through social, fiscal and wage policies [49] – both for men and women [44], given how prominent a topic gender equality is in sustainable development [50].

As for the environmental pillar, improving urban air quality [51] on one hand, and driving governmental intervention through climate change policies [52] on the other are currently among the top priorities. Thus, it is not surprising that one of the most notable indicators, found among national policies, to gauge pollution levels is carbon emissions (a.k.a. greenhouse gas emissions), quantified in million tons of CO<sub>2</sub> (MtCO<sub>2</sub>e) [53,54].

In addition to the classic sustainability pillars, literature also discusses about three other extended pillars that can strongly influence the traditional ones – digitalization, international trade, and reputation – all measured through their own specific determinants.

Digitalization has been found to be both positively and negatively correlated to sustainable development. Firstly, as digital technology advanced, it enabled an expedite achievement of the SDGs. In the manufacturing industry the implementation of Industry 4.0 instruments to product lifecycling caused a progress leap in eco-efficiency. Nonetheless, a disparity in digital knowledge also emerged among countries, with developing ones quickly and increasingly falling behind. Moreover, in practice digitalization also resulted in an intensification of emissions, energy use and hardware waste production, thus becoming a growing environmental issue





[55,56], despite being potentially effective in the mitigation of emissions due to the real-time responsiveness to and prevention of emergencies provided by Information and Communication Technologies (ICT) [57], as also envisioned by the SDGs [45].

Similarly to digitalization, international trade can either relieve or strain the environmental burden. The surge of global trade led to the consolidation of global value chains and the growth of world economy. The immediate consequence that resulted from this was a raising pollution level and degeneration of natural resources. On the other hand, however, exporting organizations became more pressured by importers to adopt cleaner technologies and processes, in order to respond to more stringent normative requirements. This, in combination with greater access to ICT owing to the open markets, could make local production processes less energy and input-intensive in the long-run [58]. The SDGs plan in this regard is to help developing countries expand their share of global exports [59]. According to several empirical studies, Foreign Direct Investments (FDI) are another important theme in cross-border trade that is closely connected to emissions (either positive or negative), as well as on income inequality in various countries [60–65]. The mobilization of financial (and also technological, know-how) flows through FDI (income on FDI inflows and outflows) are an extremely interesting aspect for the SDGs as well, especially those in favor of less developed economies [49,59].

And finally, reputation is another crucial feature for the organizations that are part of the socio-economic tissue of a country, and corporate sustainability has the power to determine whether the general public will have a positive or negative image of a company [66]. And in general, the companies with good CSR performance are usually at the top of the credit ratings (e.g. S&P) too [67], especially those engaging with the main social stakeholders (e.g. employees and communities) [68], so creditworthiness can be seen as a reputational factor due to the public exposure of the scoring. The monitoring of global financial markets and the creation of metrics for financial soundness are the SDG targets which pertain most closely to this theme [49].

## 1.2. Research approach and methodology

This chapter seeks to analyze how the policy mixes implemented in response to the Covid-19 crisis are shaping the country-contexts in which companies will compete in the coming years. The focus is on whether these measures are effective in supporting the continued commitment to CSR of the businesses operating under the specific national circumstances created during the 2020 pandemic.

The study adopts the quantitative method to carry out a data analysis with the support of some statistical tools (R Studio/R Commander, Excel). Below are the steps followed to perform the analysis.

### Step 1. Choice of the set of variables.

Both macroeconomic measures and policy interventions (Table 1) were selected based on the results of the background literature (section 2). The OECD datasets were mainly used to retrieve economic, social, digitalization and international trade data, whereas Standard & Poor's indices were used for the credit ratings, and Enerdata (2019) and Nature (2020) values help to retrace information on emissions. Then these variables were converted to relative values (increase/decrease % from the previous period) to make them comparable across countries by focusing on the strength of the variations.

**Table 1.** Overview of the explored macroeconomic variables and policy measures

Variable	Type	Database	CSR topic	Abbr.
Production of total industry (=production)	index (2015=100)	<a href="#">OECD (Stat)</a>	Fin_sus	prod
Private final consumption expenditure	% growth on n-1	<a href="#">OECD (Stat)</a>	Fin_sus, Soc_sus	cons



(=consumption)				
Imports in goods	% growth on n-1	<a href="#">OECD (Stat)</a>	Cross-bord	imp
Exports in goods	% growth on n-1	<a href="#">OECD (Stat)</a>	Cross-bord	exp
Total retail trade (= sales to final consumer)	index (2015=100)	<a href="#">OECD (Stat)</a>	Fin_sus, Soc_sus	trade
Income on outward FDI flows	% growth on n-1	<a href="#">OECD (investment policy)</a>	Cross-bord	out_fdi
Income on inward FDI flows	% growth on n-1	<a href="#">OECD (investment policy)</a>	Cross-bord	in_fdi
Unemployment rate	% (aged 15-64)	<a href="#">OECD (stats)</a>	Soc_sus	unem
Unemployment rate (females)	% (aged 15-64)	<a href="#">OECD (stats)</a>	Soc_sus	unem_f
Hourly earnings (manufacturing) (= wages)	index (2015=100)	<a href="#">OECD (stats)</a>	Soc_sus	earn
Credit rating	index	<a href="#">Standard &amp; Poor's (S&amp;P)</a>	Reput	cred
CO2 emissions (MtCO2/day)	% growth on n-1	<ul style="list-style-type: none"> <li>• <a href="#">Enerdata (2019)</a></li> <li>• <a href="#">Nature (2020)</a></li> </ul>	Env_sus	co2
Businesses purchasing CRM software	%	<a href="#">OECD (Stat)</a>	Digital	crm_pur
Businesses employing ICT specialists	% growth on n-1	<a href="#">OECD (Stat)</a>	Digital	ict_emp
Businesses offering positions for ICT specialist	% growth on n-1	<a href="#">OECD (Stat)</a>	Digital	ict_emp_nw
CCPI score	index	<a href="#">CCPI</a>	Env_prox	p_CCPI
Environmental sustainability tax measures	occ	<ul style="list-style-type: none"> <li>• <a href="#">OECD (country policy tracker)</a></li> <li>• <a href="#">IMF (policy tracker)</a></li> <li>• <a href="#">ILO (country policy responses)</a></li> <li>• <a href="#">Carbonbrief (green policies)</a></li> </ul>	Env_pol	p_env
Social sustainability tax measures (community)	occ		Soc_pol	p_s_comm
Social sustainability measures (employees)	occ		Soc_pol	p_s_emp
Financial sustainability measures (innovation, investment in high tech, digitalization)	occ		Fin_pol	p_innov
Financial sustainability measures	occ		Fin_pol	p_fis
Financial sustainability measures (SMEs)	occ		Fin_pol	p_sme

Abbr: CCPI (Climate Change Performance Index), CRM (Customer relationship management), Cross-bord (cross border relevance), Digital (Digitalization), Env\_pol (Environmental Policies), Env\_prox (proxy for environmental policies), Env\_sus (Environmental sustainability), FDI (Foreign Direct Investment), Fin\_pol (Economic/Financial Policies), Fin\_sus (Economic/Financial Sustainability), ICT (Information and Communication Technology), n-1 (previous period), occ (occurrences), Reput (market reputation), SMEs (Small-Medium Enterprises), Soc\_pol (Social Policies), Soc\_sus (social sustainability)

As suggested by the empirical literature and as envisioned by the SDGs (section 2), the status quo could be at the moment summarized through the following available groups of variables:



- Economic sustainability → production and consumption/sales
- Social sustainability → labor (unemployment, female unemployment, wages), consumer (consumption, sales)
- Environmental sustainability → greenhouse gas emissions (CO<sub>2</sub>)
- Digitalization → employment and job offers in ICT, purchase of software
- Cross-border relevance → imports, exports, income on inward and outwards FDI flows
- Reputational context in the financial market → credit rating

After having determined what the current situation must be, the data was tested to understand whether the actual dynamics between variables followed these expected groupings during the outburst of the pandemic in the European territory.

The available policy tracking instruments (OECD, IMF, ILO, Carbonbrief) helped to identify the policy actions. The databases were scanned manually, except for when looking at environmental policies. In that case, a search through the keywords “green” and “environmental” was run to quickly find the corresponding policies. Then the number of occurrences was noted for each policy type, based on the previous classification into (financial/economic, social, and environmental intervention). The Climate Change Performance Index (CCPI), measuring various aspects of a country’s climate performance [69], was also included as a proxy for a more complete indicator of environmental policies – to account for the risk of not retrieving all existing policies, given that the search was manual and also the qualitative nature of this information before the conversion into occurrences. The policies selected can be classified as the more mandating mechanisms (with a prevailing financial nature) described in the literature section. In fact, only the newly-introduced (or updated) policy measures that were specifically undertaken to counter the socio-economic crisis caused by the Covid-19 pandemic were considered, so as to be able to better define the CSR context stemming from Covid-19 policies. Appendix 1 shows the details for each kind of policy.

#### *Step 2. Selection of sample countries*

The criteria for selecting the countries to be studied were: (i) location in the European territory, and (ii) data availability and completeness). And based on these criteria, the nations of Bulgaria, Croatia, Cyprus and Malta (despite being part of the European Union – EU) had to be excluded, given how the lack of complete data could have biased the overall results (since mean values were also used to fill in the missing occurrences). Norway and the UK, however, had a high affiliation with other countries from the sample and, therefore, had to become part of it (even though they are not part of the EU in 2020)

The obtained sample consists of a total of 24 countries, all part of the Organization for Economic Cooperation and Development (OECD) and located in the European territory. Table 2 shows that they were all assigned a “regional” label too, according to the CSR territorial models found in literature (section on the conceptual background about CSR policies) and their geographic proximity).

**Table 1.** Sample of selected countries

Country	Code	Region	2019	2020
Austria	AUT	Continental (Center)	√	√
Belgium	BEL	Continental (West)	√	√
Czech Republic	CZE	Central-Eastern	√	√
Denmark	DNK	Nordic	√	√
Estonia	EST	Central-Eastern (Baltic)	√	√
Finland	FIN	Nordic	√	√
France	FRA	Continental (West)	√	√



Germany	DEU	Continental (Center)	√	√
Greece	GRC	Mediterranean	√	√
Hungary	HUN	Central-Eastern	√	√
Ireland	IRL	Anglo-Saxon	√	√
Italy	ITA	Mediterranean	√	√
Latvia	LVA	Central-Eastern (Baltic)	√	√
Lithuania	LTU	Central-Eastern (Baltic)	√	√
Luxembourg	LUX	Continental (West)	√	√
Netherlands	NLD	Continental (West)	√	√
Norway	NOR	Nordic	non-EU	non-EU
Poland	POL	Central-Eastern	√	√
Portugal	PRT	Mediterranean	√	√
Slovak Republic	SVK	Central-Eastern	√	√
Slovenia	SVN	Central-Eastern	√	√
Spain	ESP	Mediterranean	√	√
Sweden	SWE	Nordic	√	√
UK	GBR	Anglo-Saxon	√	non-EU (31.01.2020)

### Step 3. Descriptive analysis (means and correlations)

After defining all the variables and the sample, means and correlations were compared for the available data, and, in the case of averages, only for those variables that were in common between 2019 and 2020. In fact, the 2020 dataset included two additional metrics (ict software purchase, credit rating), as well as all the policy measures (except for the CCPI proxy, which was common to both years). That is explained by the fact that 2020 is the actual year of interest for the study, when the situation changed and the specific policies for fighting the pandemic crisis deployed. The main result of this section is a comparison of the macroeconomic and policy outlooks in 2019 and 2020. Concerning correlations, only the ones starting from the moderate values (0,4-0,6 is the chosen moderate range) upwards were considered in the analysis.

### Step. 4. Factor analysis

To determine the ideal number of factors, a Principal Component Analysis (PCA) was run on the selected variables. After the first round, it appeared that one of the factors was explained by a single variable (social policies regulating value added taxes, and therefore representing measure on consumers). It was, therefore, necessary to remove it altogether and a new analysis suggested choosing 7 final components. The interpretation of the factors was done by observing the factor loadings, and thus how strongly variables were correlated among themselves. The macroeconomic and the policy measures have been visually separated to see the two effects individually, as certain policy variables had a moderate influence on various factors, so all significant relations were analyzed. After that, the 2019 values were regrouped in a similar fashion for comparative purposes. The goal of this analysis was to check if the pandemic reassessed any of the dynamics of interaction between variables, compared with what was initially stated in the background literature, and if any new regroupements emerged that were fundamental for that period, especially considering the introduction of short-term policies.

### Step 5. Cluster analysis



The number of clusters was first defined using the “elbow” (and “silhouette”) method, through the visual interpretation of the “within sum of squares” graph (kmeans results). This yielded an initial proposal between 2 and 5 clusters. After several iterations, the most homogeneous and comparable groups (across 2019 and 2020) were assessed in their average variable values within the new clusters. The objective of the cluster analysis was to understand the degree of the pandemic impact on the country dynamics in the CSR context, in order to corroborate or contrast the models proposed by literature.

#### *Step 6. Combined factor and cluster analysis.*

A number of studies found it beneficial to combine cluster and factor analysis [70–72], which the approach that also drove the present research. The output of these two analyses were studied together in order to understand the integrated dynamics of macroeconomic and policy measures within the main country groups for the CSR context during 2019 and 2020. The objective, in this case, was to assess the differences (across years and clusters), verify policy influences and variations in the resulting cluster “rankings”.

#### **1.3 Correlating macroeconomic and policy data**

Given the mean changes in the growth (or decrease) of variables, as well as the correlations (mostly moderate) between them, the below figures attempt to reconstruct the macroeconomic and policy dynamics that occurred to the traditional and extended sustainability pillars between 2019 and 2020.

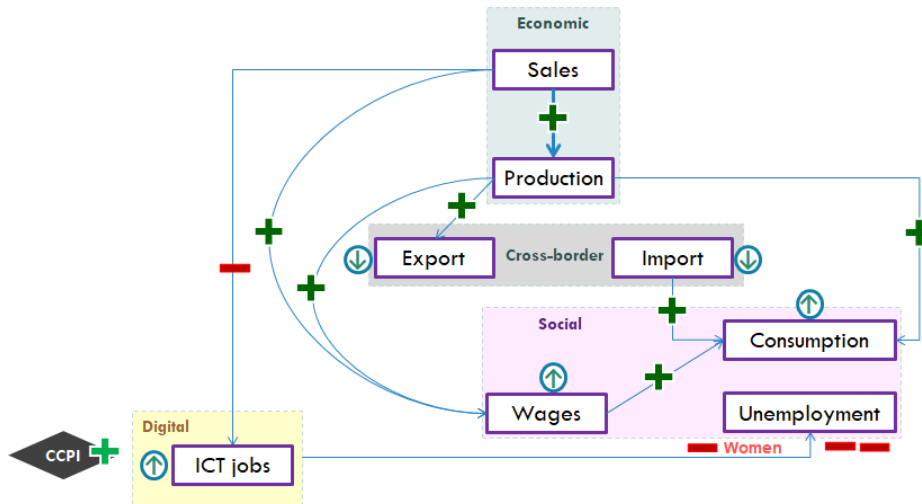
Since in most cases the values show the direction of the change from the previous year, the “minimum”/“maximum” or “worst”/“best ” terms may be used throughout this section to indicate the smallest or largest improvements with respect to the preceding period and also the other countries.

In 2019 (Figure 1), growing internal sales further developed production, which was the one variable that in turn fueled exports (despite having an overall decrease), while the higher consumption was mainly dependent on imports, and in turn it allowed an additional increase in production. Wages were positive both in sales and production, giving consumers their purchasing power to make the social-economic and international trade mechanisms work.

Concerning digitalization, despite new positions were offered in the ICT field, general unemployment grew, (a little less for women). This situation might be due to a gap in digital skills required by the job market and those possessed by job seekers, leading to the assumption that technological progress at companies is happening at a faster rate than provision of education or learning in the ICT field [73]. Hence, digitalization was already accelerated prior to the pandemic. Furthermore, new ICT positions are also negatively correlated with sales, which might be explained by the fact that the retail sector – mainly composed by small businesses – was still not ready for digitalization prior to the pandemic [74]. The CCPI, however, was positively related to this digitalization aspect, showing the growing reliance of decision-makers on digital professionals as an engine to fight environmental issues [75].

Production, however, led to a negative CCPI score, confirming that no country was in the top 3 positions due to the unsustainable nature of their manufacturing structures and facilities [76].





**Figure 1.** Macro-economic and policy outlook in 2019 – traditional & extended sustainability pillars  
Own elaboration. Abbr: CCPI (climate change performance index), ICT (information and communication technologies)

The situation macro-economic in 2020 (Figure 2) appears to be almost completely the opposite of that in 2019. Sales grew slower than in 2019. This was positively correlated to a lower increase in production, which further resulted in the reduction of both exports and imports, leading, respectively, to lower wages, and a big decrease in consumption and employment – with female workers being the most impacted this time. The increase in unemployment also triggered a drop in credit ratings.

Labor earnings in the manufacturing sector, however, appeared to growth slightly more than the previous year, despite both the sales and production levels (both positively correlated to wages) are lower. This could be explained by the fact that companies prioritized survival during Covid-19, hence being forced to lay off. The lower paid workers are usually the first ones to be dismissed during a recession, leading to a shift in workers composition, with higher wage ones still employed and raising the average [77].

Manufacturing salaries appeared to decrease only in the instance when companies digitalized – e.g. purchasing software for managing customer relationships (CRM) – which nevertheless was appreciated by financial markets (positively correlated to credit ratings), given the role this instrument has in the pandemic recovery of financial institutions [78]. The adoption of these novel tools also required new professionals for managing them (positive correlation between CRM purchase and new ICT jobs), therefore confirming that digitalization might have still had an impact on replacing analogue jobs [79] amidst the pandemic crisis. This might be explained by the fact that Covid-19 forced some companies to become more progressive, thus reshaping professional requirements [80]. New ICT jobs were also positively received by the credit markets.

Compared with the 2019 digitalization situation, there appeared to be no positive correlation anymore (despite there was no positive one either) between the creation of ICT jobs and unemployment, which leads to think that there younger employees contributed to making the digital skills gap less evident during the pandemic [81]. Overall, it should be said, however, that the employment of ICT specialists slightly decreased compared to the previous year (also following the downfall of sales, according to correlations), possibly because manufacturing played a big role in this crisis – reconverting or increasing the capacity of production to respond to the increasing demand for personal protective equipment [82]– and the priority was to maintain operations (likely because of financial struggles and trade-offs). Therefore, the results above might be valid for limited cases. It would be interesting to assess if in 2021 the world learned to apply digitalization more favorably. Sales and ICT positions were, nevertheless positively correlated in 2020, unlike during the previous





year, which might show that there has been a progress in the digitalization alignment and acceleration of classic brick-and-mortar retail [83,84].

The decrease in production was also positively associated with a higher decrease in emissions. Nonetheless this result might mainly be the outcome of lockdowns [85]. It would be interesting to see a negative correlation between the two variable, so that despite production growth, the technologies adopted would be beneficial to the climate and help to reverse the emissions trend.

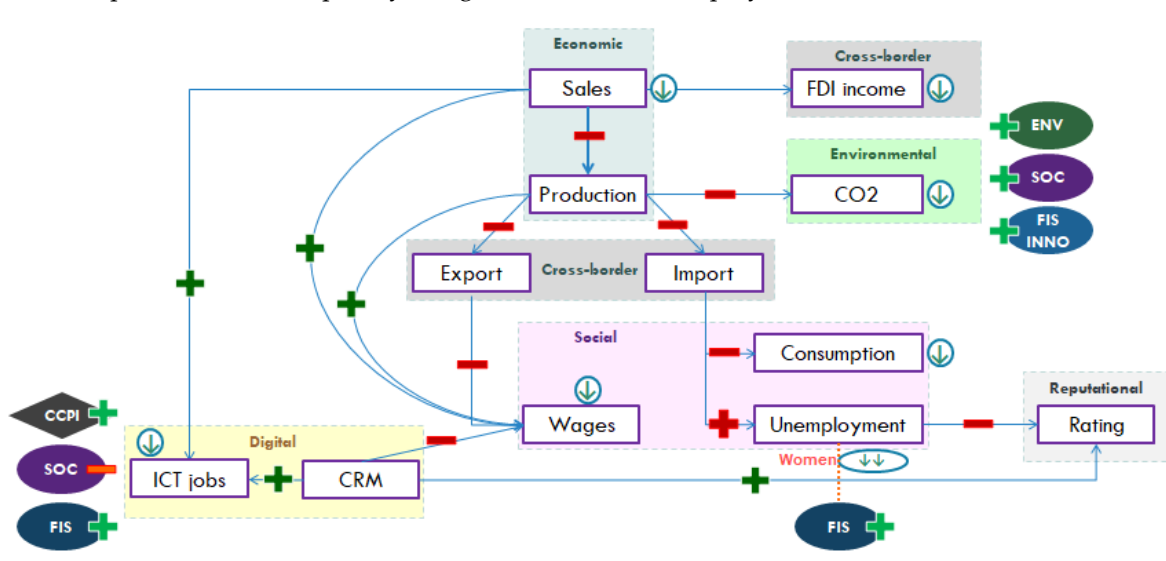
Compared with 2019, FDI income payments and receipts became a relevant variable of the cross-border pillar, but they also further fell in percentage, following the slowdown of the trade.

In terms of policy performance, CCPI was once again positively associated with ICT jobs. Overall the average CCPI index seemed to decrease less than in the pre-pandemic period, so it would be interesting to see if the policies actually had an influence on this circumstance or if this was purely an effect of CO2 drop due to lockdowns.

The environmental policies deployed did appear to produce short-term environmental benefits (strong negative correlation with co2), while also being in a negative relation to production and consumption. Policies fostering innovations also appeared to be related to environmental improvements in the short term, so it might be that the technologies stemming out from financially supportive conditions were designed to be more eco-friendly.

As for the measures in response to social concerns, those that were meant to foster employment seemed to be negatively related to the emissions reduction, likely because these measures were mainly intended to maintain the continuity of salary and contributions, given the forced lockdowns or economical strain of companies (Appendix 1). Such policies, however, seemed to be negatively related to jobs in the ICT sector, and this could possibly depend on the fact that their principal was to protect existing jobs in the short-term, while the promotion of digital roles became of secondary importance).

As for economic incentives, they appeared to have helped reduce unemployment (females in this case seemed to have benefitted less – probably because gender equality issues became of secondary importance during the pandemic [86,87]) and were more effective towards fostering companies' ability to promote new ICT positions, than the policies related explicitly designed to reduce unemployment.



**Figure 2.** Macro-economic and policy outlook in 2020 – traditional & extended sustainability pillars

*Own elaboration. Abbr: CCPI (climate change performance index), CO2 (carbon dioxide emissions), ENV (environmental policies), FDI (foreign direct investment), FIS (fiscal, economic, monetary policies), FIS INNO (economic policies supporting innovation), ICT (information and communication technologies), SOC (social policies)*



#### 1.4 Redefinition of variables and country-CSR-models through factors and clusters

A factor analysis helped to redefine the initial classification of the variables, from traditional (economic, social, environmental) and extended sustainability (cross-border relevance, digitalization, and reputational components) to groups that were more fitting with the European socio-economic situation that developed in 2020 (Table 3). This was done to better understand which issues acquired more pertinence and characterized the new context – during the outbreak of the pandemic – in which companies are called to implement their sustainability activities. Hence, the new variable groupings have been labelled as follows:

(F1) “Cross-border relevance” contains the same metrics as per initial classification with the addition of “employment in ICT”, which might show that it became fundamental for companies (especially working in international trade) to employ specialists with digital knowledge that could help maintain the entire commerce infrastructure and operations.

(F2) “Environmental innovation” can be seen as the evolution of the environmental sustainability pillar because, in addition to the appraisal of emissions, it contains several policy measures that might provide direct (CCPI and environmental measures) or indirect (innovation and employment support policies) innovative solutions (and in some cases consumption systems) to ecological consequences in the short-run. The positive links between these policies can also be observed in the correlation results (Appendix 2).

As for the social sustainability pillar, under the new circumstances it appears that it became intertwined with the reputational feature, while being now analyzed under the “social wealth” (F3) aspect – referring to the variation of unemployment through fiscal-economic policies and the subsequent implications on market credibility – and the “social performance” facet (F7) – in terms of the combined effect of the policies directed at communities and their overall impact on credibility in the market.

The economic pillar of 2020 can be observed through the “GDP” lenses (F4), gathering the national production along with some of the components of the gross domestic product (consumption, import, export).

And finally, digitalization has been split into two categories. (F5) “Digital growth” includes measures of company digitalization (software purchase and job offers to ICT professional), as well as wages and market credibility. (F6) “Digital employment” evaluates how the creation of novel positions in ICT is affected by the employment and fiscal policies (including those specifically targeted at SMEs).

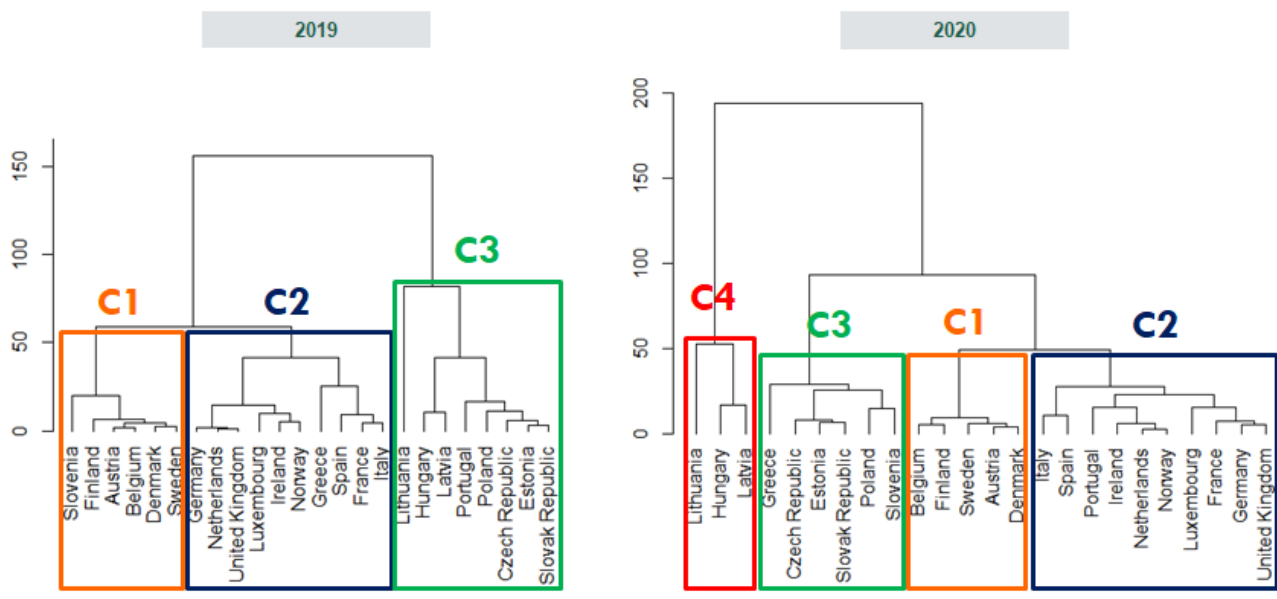
The symbol (\*\*) marks the variables that have a stronger relation to other factors.

**Table 3.** Interpretation of factors

	<b>F1</b> cross-border relevance (Xborder)	<b>F2</b> environmental innovation (EnvInno)	<b>F3</b> social wealth (SocialWe)	<b>F4</b> GDP	<b>F5</b> digital growth (DigitalGr)	<b>F6</b> digital employment (DigitalEmp)	<b>F7</b> social performance (SocialPer)
<b>Macroeconomic</b>	trade out_fdi in_fdi ict_emp	co2 **cons	unem unem_f **cred	prod cons imp exp **co2	earn crm_pur **ict_emp_nw **cred	ict_emp_nw	cred
<b>Policy</b>		p_CCPI p_env p_innov **p_s_emp **p_fis	**p_fis			p_s_emp p_fis p_sme	p_s_comm



The cluster analysis (Figure 3) revealed that also some country groups were rearranged in their performance as a consequence of the 2019 pandemic outbreak. Apart from the Continental-Mediterranean-Anglo/Saxon (plus Norway) cluster (C2), which remained the same across the two examined years, cluster C1 (Continental-Nordic) became less numerous by one unit (Slovenia moving to the Central European group), while cluster three split into two separate groups – namely the Central-Eastern/Mediterranean (C3) one, and the mainly Baltic (C4) group (plus Hungary). In the remaining part of the text, whenever a country code is inserted in brackets, this is referred to the absolute performer (either best or worst) for a certain group of variables or countries).



**Figure 3.** Clusters in the pre- (2019) and pandemic-outbreak (2020) context for CSR

Some interesting results can be noted by analyzing the links between macroeconomic variables and policies. The environmental innovation factor (F2) shows a strong impact of the policies on innovations and environmental protection with the decrease in emissions (C2 demonstrates leadership in it). Economic and employment policies are also somewhat impactful in this sphere. Policies in the economic domain have a slight influence on unemployment (F3) – where C1 performs the best – while supporting more new jobs in ICT, alongside employment and SME policies (F6). The last factor (F7) links credibility in the market to policies that target communities.

By combining factors with clusters, it is possible to notice which country groups performed best and worst in 2020 overall, with respect to the reorganized pillars of sustainability and make a ranking of the clusters. C1 appeared to be the best overall performer (outperforming in 7 domains and underperforming in 5), largely achieving the highest results in social wealth, social performance (mainly in credibility – DNK/SWE), and digital growth (in software purchase - FIN). Additionally, Belgium had the highest rate of job creation in ICT and Austria was leading the European countries in its CCPI score. On the other hand, the indicators in which the first cluster did not do well enough are FDI income outflows (Austria was the absolute worst performer) and wages, but also policies on innovation, employment, and community.

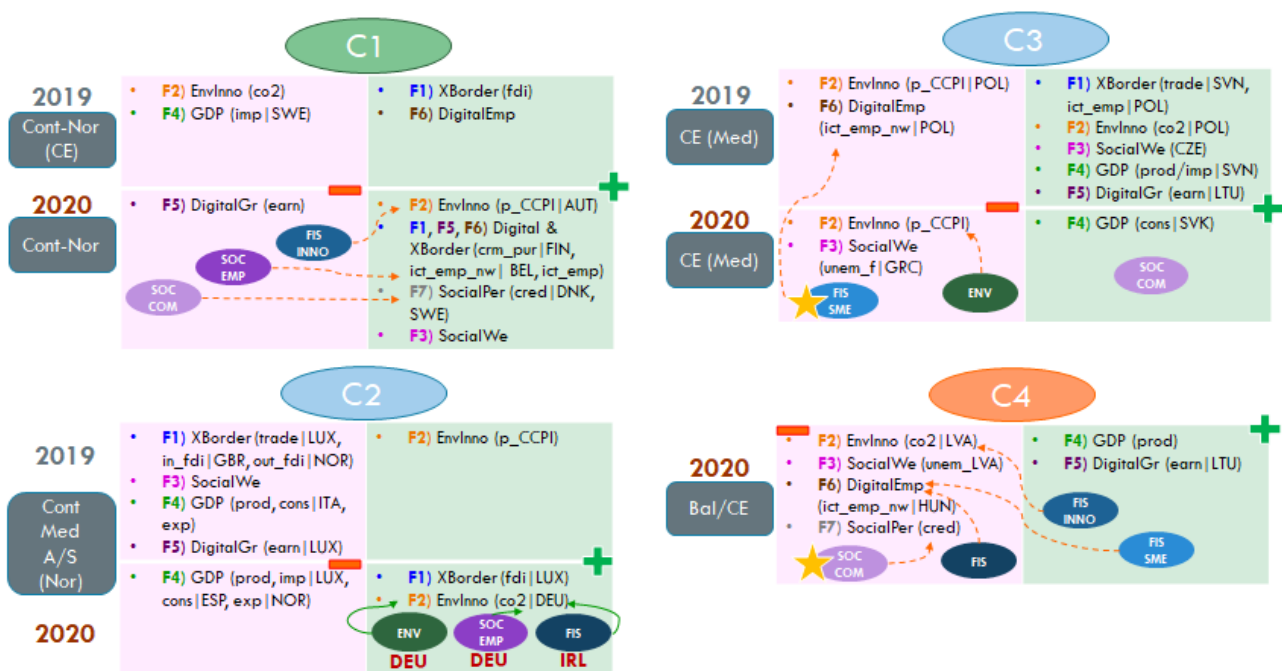
The second cluster can be considered the second-best performer among the European countries (outperforming in 6 domains and underperforming in 6). It was the top performer mainly in cross-border relevance (FDI=LUX), environmental innovation (co2=DEU, p\_env=DEU), and digital employment



(p\_s\_emp=DEU, p\_fis=IRL), with less prominent results in trade (LUX), ict\_emp (ITA), GDP (LUX in prod&imp, ESP in cons, NOR in exp).

The third spot can be virtually assigned to C3, being the best mainly in GDP (with SVK the absolute best in cons) and community policies (POL), while failing largely in environmental innovations (p\_ccpi&p\_env), and also female unemployment (GRC) and policies for SMEs.

The least performing cluster appeared to be the fourth one, with the lowest improvements in FDI payment receipts, emissions (LVA), general unemployment, software purchase, digital employment (p\_fis, HUN in ict\_emp\_nw) and market credibility. Its best results can be found in trade, innovation policies, production, wages (LTU being the absolute best) and policies for SMEs (HUN).



**Figure 4.** Overview of macroeconomic and policy dynamics for the CSR context during 2019 and 2020  
 Abbr: Cont (Continental), Nor (Nordic), CE (Central European), Med (Mediterranean), A/S (Anglo-Saxon), Bal (Baltic)  
 If only the common variables between 2019 and 2020 are considered, then changes in the sustainability context dynamics can be drawn for the year 2020, as compared to 2019.

For what concerns the economic – GDP – pillar, C2 remains the overall worst performer, while C3 (without C4) is the overall best, also considering the positive CO2 outcome, both in 2019 and 2020 (with community policies possibly playing a role).

For what concerns the changes in international trade, C2 improved in cross-border relevance from worst (trade=LUX, in\_fdi=GBR, out\_fdi=NOR) to best, replacing C1 in the outperformance in FDI (LUX). LUX remained the worst in terms of trade performance.

Concerning the social sphere, C3 used to perform well in social wealth (CZE), however from 2020 it becomes the worst performer in female equality (GRC in unem\_f) – with additionally a weak outcome in both reputation and economic measures – along with C4 (LVA in unem), improving the situation of C2 and making C1 the best performer (which is indeed linked to the highest credit ranking and 2<sup>nd</sup> best economic policy efforts) in all related indicators (including credibility and new ICT jobs). As per social performance, C4 appears to have the least credibility in the market, while also being the second worst cluster in enforcing community measures. C1 has the highest reputational advantage.





There appears to have been also a switch of environmental dynamics. Regarding emissions, the least performing cluster changed from Continental-Nordic (C1) to Baltic (C4, with LVA underperforming in general). This group was part of C3 in 2019, which outperformed all countries in terms of CO2 reduction. However, the results of the Baltic countries had the lowest improvement of all (with levels below those of the worst performer in 2019, C1), leading this group to be decoupled from C3 (Central Europe) in 2020. The bad results happened despite the fourth cluster issued the most policies on innovation, so perhaps such measures were not sufficiently strong or correctly directed to improve products or processes for eco-sustainability. The best performers in emissions reduction therefore changed from C3 (POL) to C2 (DEU), which might have depended on the highest effort of these countries in introducing a number of environmental (DEU), employment (DEU) and economic policies during the pandemic, and these measures being effective in influencing the short-term context of sustainability. Additionally, according to the CCPI proxy variables, C3 (POL) remained the worst overall performer (in 2020 on its own, without the Baltic countries, which are still the second worst group in this area) due to having the lowest number or most ineffective policies of environmental protection. A potential explanation is that, even though C4 might have had worse results in greenhouse gas emissions, it is possible that C3 performed overall worse in energy use, renewable energy and climate policy (the other elements of CCPI). On the other hand, the best position has changed from C2 to C1 (AUT), despite having the worst innovation measures (which probably were too minor and did not have the capacity to undermine the efforts in other environmental fields).

And finally, digitalization factors were also redefined. In terms of digital employment, the worst performer switched from C3 to C4 (HUN with low results also on economic policies, but high on SME measures) that split from the 2019 C3 group. It seems that certain countries have shifted roles, with POL having the best performance in `ict_emp` but worse in `ict_emp_nw`, while in 2020 HUN had the best results in `ict_emp` but the worst in `ict_emp_nw` and POL the worst in `crm_pur`. C1 appears to be the overall best performer, both in 2019 and 2020, across all indicators (`ict_emp` & `ict_nw`, `crm_pur`=FIN, `ict_emp_nw`=BEL, `cred`=DNK&SWE, `ict_emp`), despite the measures in favor of employment bear the worst results too. Digital growth was the factor in which first C2 then C1 (`earn`=LUX) underperformed. The most relevant positions for these variables are held by LTU – which has switched clusters from C3 to C4 – and also C1 in new ICT jobs (BEL) and credibility.

### ***1.5 Conclusions. The novel post-pandemic context for CSR***

The present study aimed at investigating the consequences of the policies, enacted in response to Covid-19, on the operational landscape in which companies are called to develop their CSR activities. In order to find this out, macroeconomic data was explored in combination with a series of measures introduced by the European countries to fight the immediate crisis effects. The results show that, even in the short-term (yearly variations from 2019 to 2020) there appeared to have been some switches in the sustainability dynamics. First of all, the importance and influence of the traditional (economic, social, environmental) and extended (digitalization, international trade, reputation) groupings of sustainability determinants have been reorganized in light of the novel context that has been shaped by the responses to the pandemic crisis: GDP, social wealth and social performance, environmental innovation, digital growth and digital employment, and cross-border relevance. The social and digitalization aspects are the only ones that were evaluated under two different facets. Second, the countries under analysis formed four distinct groups, with one (Baltic) splitting from a major cluster (Central Europe) in 2019. In general, the Continental-Nordic cluster (C1) outperformed the others in several domains – including social wealth, social performance, and digital growth – whereas the Baltic group appeared to have had the least improvements compared to the other country groups. As a whole, the different country clusters have indeed shown some changes in the leadership of the various sustainability domains, with the newly implemented emergency policies (mainly financial in nature and mandating) driving



this change. In fact, environmental innovation, digitalization and social support policies have been, for example, found to be the main variables to be impacted by the intensity of the policy efforts.

The implications of this chapter can be of use to policy makers and researchers who are trying to understand what changes have occurred in the new pandemic and post-pandemic scenario. The utility to decision makers will be the observation of the effects of each policy measure deployed on the macroeconomic variables related to the sustainability scenario in which companies operate. This will allow to assess what has worked and what has not, thus enabling policy makers to make improvements either in the present or with regards to what new concerns will be emerging in the post-pandemic scenario. The researchers will be able to construct further research on the topic, by using this study as a starting group, to later observe what has changed and how the macroeconomic dynamics in the wake of a global crisis, like Covid-19. Future studies could concentrate on statistical assessments of the evolution of the sustainability context for companies. The main limitation of this chapter is the broadness of the chosen variables of study, which was dictated by the scarce data availability, given that the pandemic outbreak happened quite suddenly but data takes time to be gathered.

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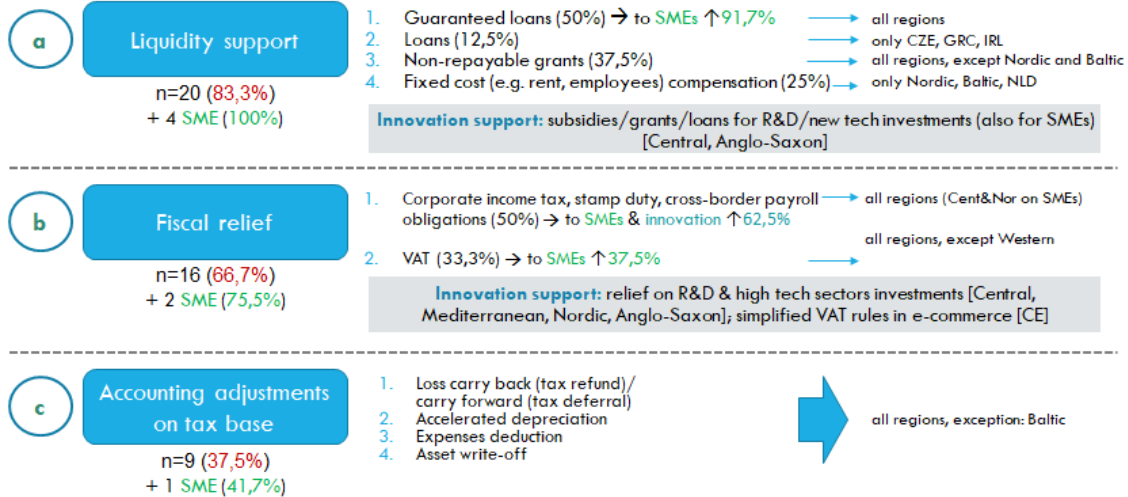
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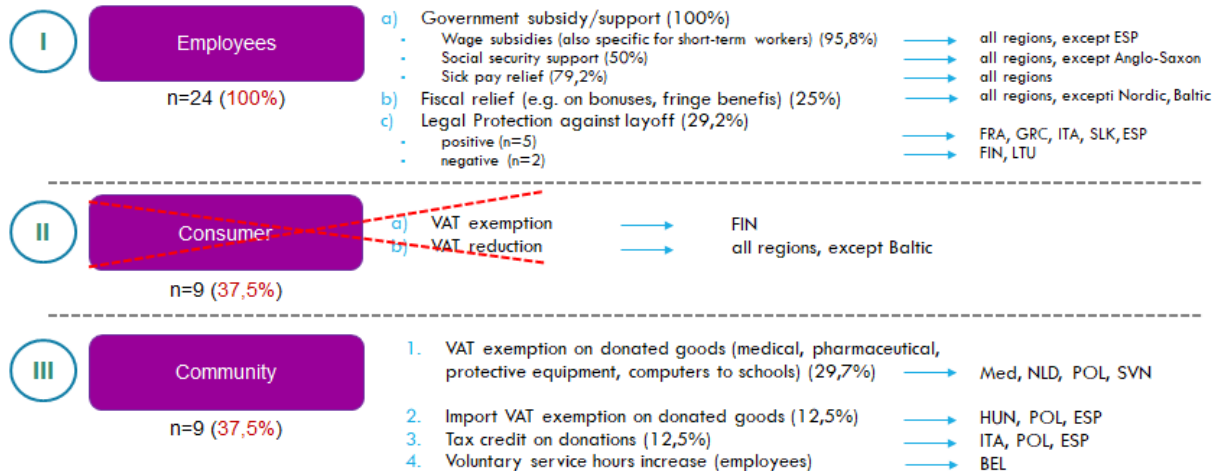
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## Appendix 1 – Policy measures for financial, social, and environmental sustainability



## (a) economic sustainability policies



## (b) social sustainability policies





Potentially positive repercussions

- ❖ Higher flight ticket tax
- ❖ Energy-saving renovation tax credit for SMEs
- ❖ Tax relief on carbon-free company car purchase
- ❖ Higher carbon tax rate
- ❖ Natural gas excise exemption abolished
- ❖ Sustainable electric mobility (investment depreciation)

- AUT
- FRA
- DEU
- IRL
- LVA
- ESP



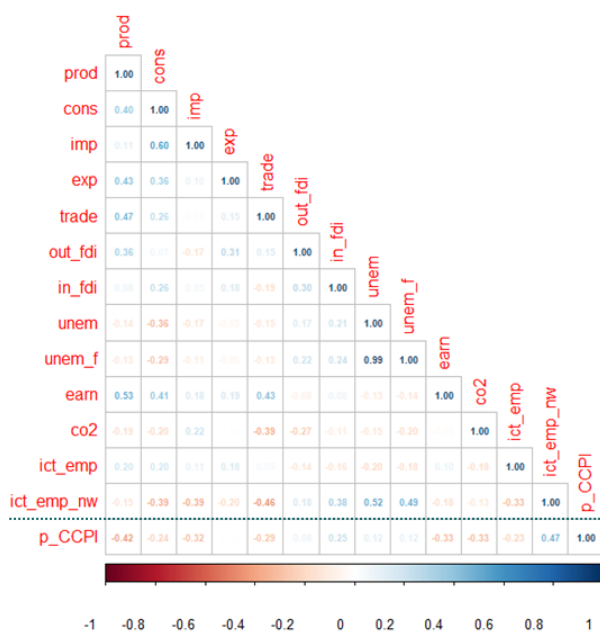
Potentially negative repercussions

- ❖ Fuel, gas, electricity excise reduction
- ❖ Environmental tax deferral
- ❖ Plastic tax payment postponed
- ❖ Aviation tax exemption

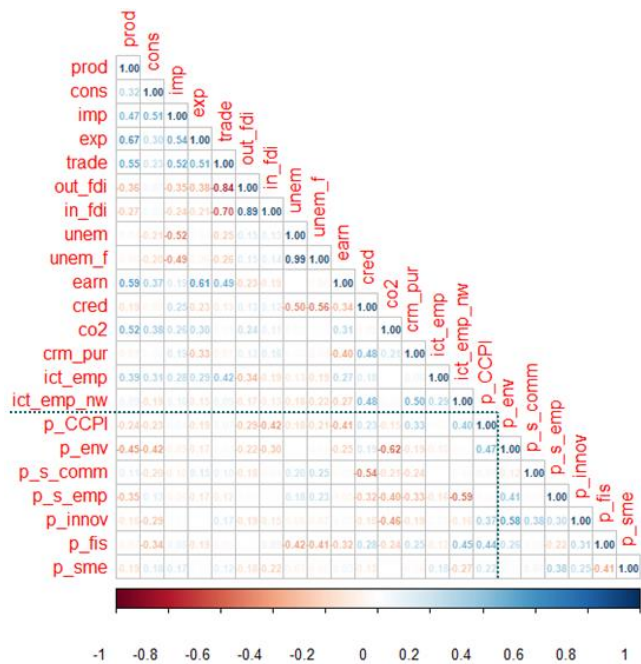
- EST
- DEU
- ITA
- NOR

## (c) environmental sustainability policies

### Appendix 2 – Correlations of macroeconomic and policy performances



(a) 2019 data



(a) 2020 data

### Appendix 3 – Mean values and value change of common variables for 2019 and 2020

Variable	2019	2020	growth Δ
prod	109,08	103,78	↓
cons	0,02	-0,06	↓
imp	-0,03	-0,08	↓
exp	-0,02	-0,06	↓
trade	1,09	1,09	↓

### Appendix 4 – Factor (F) loadings

Variable	F1	F2	F3	F4	F5	F6	F7
trade	0,81		-0,15	0,36	-0,13		
out_fdi	-0,96	-0,17					0,15
in_fdi	-0,88	-0,21				0,10	
ict_emp	0,41	-0,17		0,21		0,12	0,25
co2	-0,15	-0,59		0,43		0,13	0,10
unem	-0,10		0,98	-0,11			-0,12
unem_f	-0,13		0,96				-0,23





out_fdi	-0,05	-0,10	↓
in_fdi	-0,04	-0,13	↓
unem	6,16	6,88	↑
unem_f	6,40	7,10	↑
earn	117,49	120,80	↑
co2	-0,03	-0,07	↓
ict_emp	0,01	0,00	↓
ict_emp_nw	0,00	0,00	↓
w			
p_CCPI	-0,03	-0,03	↑

prod	0,38	-0,37		0,62	-0,22	0,30	-0,14
cons		-0,41	-0,17	0,50	-0,13	-0,36	0,14
imp	0,25		-0,40	0,82	0,25	-0,18	
exp	0,34			0,69	-0,35		
earn	0,28	-0,24		0,38	-0,72		
crm_pur		-0,23			0,73	0,21	0,19
ict_emp_nw	0,23		-0,13		0,53	0,57	0,12
cred			-0,41		0,45	0,21	0,68
p_CCPI	0,24	0,45	-0,16	-0,18	0,38	0,15	
p_env_tot	0,11	0,94		-0,15			0,26
p_innov		0,69			-0,16		-0,23
p_s_emp	-0,14	0,42	0,16		-0,16	-0,67	
p_fis	-0,12	0,41	-0,45		0,29	0,54	-0,23
p_sme	0,16					-0,59	
p_s_com m			0,12				-0,70

#### Appendix 5 – Factor/Cluster and Minimum/Maximum analyses

2019						
Factors	Variables	C1 N-C (W)	C2 W-S-NW (C-N)	C3 C-B (S)	Min	Max
<b>F1) cross-border relevance</b>	trade	1,097	1,009	1,187	LUX (0,32)	SVN (1,31)
	out_fdi	0,066	-0,098	-0,083	NOR (-0,56)	GRC (0,35)
	in_fdi	-0,017	-0,054	-0,036	UK (-0,42)	GRC (0,2)
	ict_emp	-0,004	-0,001	0,022	SVN (-0,02)	POL (0,1)
<b>F2) environmental innovation</b>	**co2	-0,023	-0,023	-0,056	EST (-0,22)	LUX (0,08)
	p_CCPI	-0,016	-0,004	-0,085	POL (-0,16)	DNK (0,15)
<b>F3) social wealth</b>	unem	5,579	7,530	4,875	CZE (2,08)	GRC (17,45)
	unem_f	5,508	8,112	4,925	CZE (2,45)	GRC (21,68)
<b>F4) GDP</b>	prod	114,557	101,508	114,438	NOR (92,47)	SVN (124,47)
	**cons	0,017	0,016	0,031	ITA (0,002)	HUN (0,05)
	imp	-0,041	-0,032	-0,025	SWE (-0,07)	SVN (0,04)
	exp	-0,019	-0,035	-0,017	NOR (-0,16)	IRL (0,03)
<b>F5) digital growth</b>	earn	109,015	107,720	136,058	LUX (101,28)	LTU (182,03)
<b>F6) digital employment</b>	**ict_emp_nw	0,008	0,006	0,000	POL (-0,01)	GRC (0,02)

2020							
Factors	Variables	C1 N (C-W)	C2	C3 C (B-S)	C4 B (C)	Min	Max



			W-S-NW (C-N)				
<b>F1) cross-border relevance</b>	trade	1,080	1,012	1,158	1,229	LUX (0,32)	POL (1,29)
	out_fdi	-0,269	0,059	-0,146	-0,229	AUT (-0,97)	LUX (2,14)
	in_fdi	-0,242	-0,033	-0,132	-0,264	AUT (-0,98)	LUX (1,22)
	ict_emp	0,012	-0,010	-0,005	0,011	ITA (-0,03)	HUN (0,03)
<b>F2) environmental innovation</b>	**co2	-0,031	-0,118	-0,036	-0,011	DEU (-0,32)	LVA (-0,004)
	p_CCPI	0,002	-0,004	-0,070	-0,059	LTU (-0,12)	AUT (0,07)
	p_env	0,200	0,800	0,167	0,333		DEU (2)
	p_innov	0,000	0,600	0,167	0,667		
<b>F3) social wealth</b>	unem	6,655	6,931	6,846	7,175	CZE (2,6)	GRC (16,48)
	unem_f	6,570	7,161	7,679	6,633	CZE (3,03)	GRC (19,95)
<b>F4) GDP</b>	prod	107,688	95,205	110,064	113,298	LUX (88,47)	POL (119,39)
	**cons	-0,060	-0,082	-0,044	-0,047	ESP (-0,12)	SVK (-0,01)
	imp	-0,060	-0,097	-0,058	-0,072	LUX (-0,14)	DNK (-0,01)
	exp	-0,058	-0,098	-0,023	0,028	NOR (-0,21)	IRL (LTU is avg) (0,06)
<b>F5) digital growth</b>	earn	109,228	109,248	125,889	168,438	LUX (99,29)	LTU (196,64)
	crm_pur	0,232	0,146	0,086	0,062	POL (0,05)	FIN
<b>F6) digital employment</b>	**ict_emp_nw	0,009	-0,004	-0,009	-0,013	HUN (-0,02)	BEL (0,03)
	**p_s_emp	2,000	3,100	3,000	2,667		DEU, GRC (5)
	**p_fis	2,800	3,000	2,000	1,667		BEL, IRL (5)
	p_sme	0,600	0,700	0,333	1,000		HUN (3)
<b>F7) social performance</b>	**cred	14,200	12,200	9,833	9,667	GRC (3)	DNK, DEU, LUX, NLD, NOR, SWE (15)
	p_s_comm	0,200	0,900	1,000	0,333		POL (4)



## Chapter 2. Managing Corporate Sustainability and Responsibility Efficiently: a Review of Existing Literature on Business Groups and Networks

*Given the global relevance of business groups (BG) and networks as efficient organizational forms for corporate sustainability and responsibility systems (CSR), and seeing that management control systems (MCS) play a pivotal role in transmitting authority to CSR and formalizing a sustainability organizational culture, this chapter aims to review the available literature in order to investigate efficient adoptions of CSR by BGs or networks. Both organizational forms have positive effects on CSR development, on three levels: (a) setting industry standards (macro—external environment); (b) stimulating sustainability-oriented innovations (mezzo—member firms); (c) reputational gains, CSR expenses mitigation, and optimization of organizational capabilities (micro—individual SMEs). The studies on SMEs were useful in identifying current sustainability practices: both partial (social, environmental) and complete sustainability systems were susceptible to being integrated with management accounting, making them an almost implicit tool for proper CSR. Finally, by gathering the empirical literature on sustainability transitions of networks and groups, it was possible to trace a comprehensive introductory plan that operators could resort to for initial guidance. The six steps of this process are 1) project initiation, 2) preliminary actions, 3) change management decision, 4) firm-level activities, 5) auditing, 6) transition to territorial social responsibility (optional).*

### 2.1 The actual and potential sustainability impact of SMEs

Small and medium sized enterprises (SMEs) provide a significant contribution to the development of the world economy, in terms of employment creation, innovation, and industrialization [74]. On the downside, cumulatively, SMEs are also responsible for around 60-70% of the global industrial pollution [75], which in turn negatively shapes public opinion. In order not to undermine their established relationships of trust with stakeholders and consumers alike, SMEs have been increasingly integrating corporate social responsibility, accountability and sustainability practices into their corporate strategies. Corporate social responsibility (CSR) is an important global concept that can be defined by the values it seeks to protect, such as decent working conditions and labor standards, human rights, environment protection, transparency and corruption. However, instead of using it as a passive reactive strategy, it would yield much greater results once built inside a company's core strategy, so that it can become a value creation driver [76].

However, the most successful SMEs at exploiting all the potential that CSR has to offer are those that coordinate their actions under a single economic entity. Global value chains and collaborative networks are an example of firm aggregations, exerting enormous influence on the community [76]. Networks, in fact, have already made several contributions towards the achievement of Sustainable Development Goals (SDG), while trying innovative approaches to do so on the way [77]. Business groups (BG) are another aggregation of firms, and they seem to be a particularly interesting configuration for SMEs to take into consideration. Firstly, they have a dominant influence on the global market. Secondly, they can efficiently allocate internal resources among affiliates [78], therefore leading to several advantages for minor companies. Additionally, groups are real champions at implementing sustainability activities [79].

The present chapter, therefore, enquires about the drivers (characteristics, processes, tools) that define the successful application of CSR strategies by SMEs in cooperative relationships, particularly in the form of BGs and networks, given that some case studies have shown that the uptake of CSR initiatives have been largely supported by formal and informal controls systems [80]. Considering the potential that management control systems (MCS) have in contributing to SDGs [81], it is worth including them as a system requirement.

In order to accomplish the above objective, we conducted a systematic literature review, with three levels of in-depth analysis linked to: (a) overall correlation between CSR and firm aggregations (mezo-interfirm focus); (b) CSR-related tools used within SMEs (micro-SME focus); (c) implementation of CSR systems in aggregated forms of SMEs (mezo-interfirm focus). The shift in focus was intentional, as it allowed us to find a more



accurate answer to the research question. By generally assessing that the CSR of BG/network structures had a positive effect on SME performance, it was then safe to proceed with a more in-depth evaluation of the specific CSR-MCS systems that helped SMEs with their sustainability operations. Since those tools were suitable for SMEs, they could certainly be generalized to the overall group/network they are part of. However, in order to allow for a CSR transition within an aggregation of companies, a unitary strategic direction is required. Therefore, in the final part of the chapter, a possible strategy to connect all member firms to a unitary sustainability system is presented.

The literature review has included n. 48 papers (2007–2020) for the descriptive analysis, 33 of which were further evaluated in terms of their content.

The remaining article is organized as follows. Section 2 presents the conceptual background explaining all terms and important concepts used relating to CSR, types of organizations, and interconnection between CSR and MCS. The third section begins by explaining the methodology used for the literature review, and then carries on with the quantitative analysis. Section 4 is entirely dedicated to the content evaluation of the papers included. Results are then discussed in Section 5, while Section 6 provides some brief conclusions.

### ***2.1.1 The link between sustainability, sustainable development goals and corporate social responsibility***

The term sustainability is most commonly defined in the literature as a way of living and working that allows the global population to meet their current needs of economic security, health and general realization, without compromising resources for generations to come [82–85].

These resources encompass the planet, people and profits, which in turn pertain to the ‘three pillars’ of sustainability, also known as the Triple Bottom Line (TBL): environmental, economic, and social. The ultimate goal would be to balance the trade-off between these interrelated and equally desirable objectives [35,86].

The concept of sustainable development (SD) expands the above idea even further. The latter is regarded as an evolutionary process towards a more responsible society. Its focus is on political dimensions, more than the economic growth per se, which is deemed sustainable only if it explicitly ensures social equity and environmental protection [85,87–89].

An important step in this direction was taken in 2015, when all United Nations (UN) member States agreed upon seventeen SDGs, to be delivered by 2030 as part of a 15-year plan aimed at reducing inequalities, preserving the environment and promoting global economic and social prosperity [90].

The commitment taken by governments alone, however, would not be sufficient for the successful outcome of the Agenda. Given the multiplier effects generated by companies on employment, income creation, technological development, and especially their influence on the global scale, they became increasingly acknowledged as crucial players in establishing a pragmatic path to sustainable growth [91–93].

From a normative perspective, despite no uniform legal framework being developed in this sense, certain types of organizations were still compelled to accelerate the adoption of sustainability practices due to regulatory pressures [94].

With reference to corporate transitions, these are usually carried out by implementing either Corporate Sustainability (CS) or Corporate Social Responsibility (CSR 1.0, or simply CSR) initiatives. Both these notions converge on the fact that they are voluntarily adopted by firms, by harmoniously incorporating the TBL within their business model as a way of creating shared value for society, including ecological benefits. CS seems to be a more comprehensive approach than CSR, in that it directly applies SD at the micro corporate level (unlike sustainability’s macro viewpoint), by especially focusing on long-run environmental, social and financial performances. The TBL, under CS, is therefore embedded at the very core of the corporate strategy, going beyond immediate responsibility [91].

As for CSR, despite the heterogeneity of definitions, it may be generally considered a moral commitment assumed by an organization, not strictly limited to minimum legal compliance nor at times even its direct



activities, to meet the needs of its present and future stakeholders alike (operating in a responsible way towards them), while continuously improving society's overall quality of life. This results in the short-term implementation of management practices that are based on broader CS strategies [91,95,96].

Although, at their minimum (law and social responsibility only with a short-term focus, where CSR ≠ CS), CSR activities are not sufficient for enabling companies to have a significant impact on sustainability, they are quite widespread in practice and have the potential to become the ultimate goal for corporations (long-term TBL focus, where CSR = CS), when properly developed [91].

This last evolutionary stage may be referred to as CSR 2.0, also known as Corporate Sustainability and Responsibility (maintaining the original acronym of CSR), so as to combine, in a complementary way, both the environmental ('sustainability', thus vision) and social ('responsibility', thus management) 'DNA strands' of CSR and CS (CSR1.0 + CS = CSR2.0) [96–98].

When shifting to sustainability, it is indeed easier for companies to start with the basic structure of CSR, and then gradually add more sustainable practices along the learning-curve over time. Consequently, businesses adopting the CSR 1.0 model only have already taken a first step towards embedding the essence of SD into their business strategies [99].

From this perspective, when a company seeks to transition towards encompassing sustainability concerns at the core of its corporate values, SDGs may serve as drivers for transforming CSR 1.0 into an even more progressive business model, one that would not only balance economic profits with genuine environmental and social sustainability within a 17-bottom-line framework (moving away from the limited TBL), but also make companies a decisive part of legal and political decision-making [100].

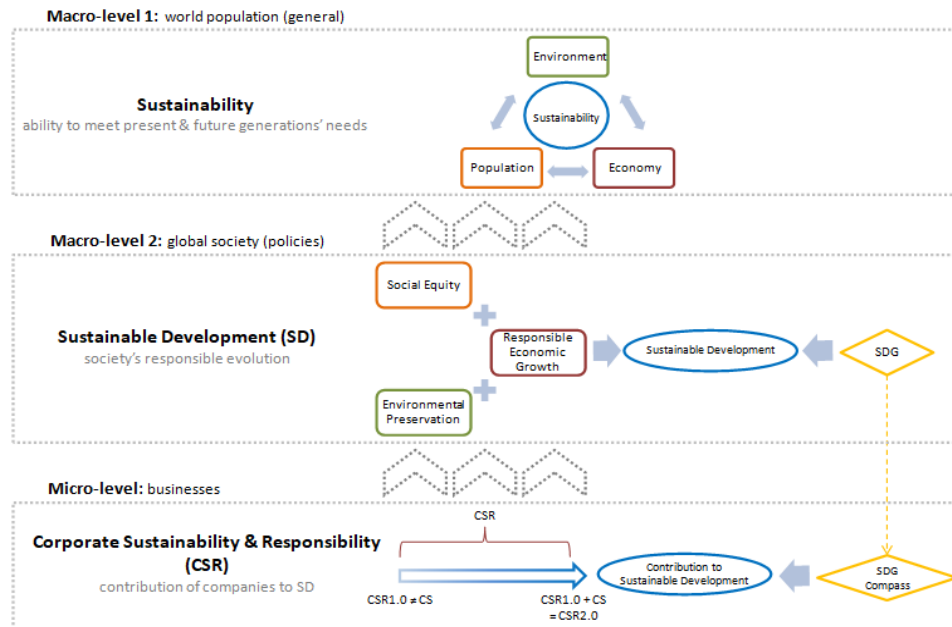
Figure 1 illustrates the interrelation between macro-level sustainability aims and micro-level CSR actions at corporate level.

The SDGs is, on the whole, a response to the need for a CSR engagement framework. It guides companies through the process of mapping their CSR activities, measuring the related impacts, reviving corporate growth and innovation, and contributing to SD across the value chain [101].

From an empirical point of view, a 2017 survey showed that there is in fact a growing trend of SDGs shaping CSR activities, as about 40% of the CSR reports that were analyzed incorporated SDGs only two years after their launch [102].

From a practical point of view, SDGs provide the SDG Compass for sustainability management. This tool encourages companies to align their objectives with the SDGs, embedding them across all corporate functions and communication. The Compass also allows them to measure and report on sustainability performance to stakeholders using common indicators and shared goals [93].





**Figure 1.** The relationship between sustainability, sustainable development, corporate systems (CS), corporate social responsibility (CSR) and sustainable development goals (SDGs).

Source: author's representation adapted from [85,91,96–98].

### 2.1.2 Considering the potential impact of small and medium-sized business groups on sustainable development

According to the literature, during transitional phases (e.g., internationalization, adoption of environmental practices), SMEs often lack the necessary resources, scale and benefits-awareness to access international markets. For this reason, joining a network becomes the most viable solution for them, in order to upgrade their capacity [103,104].

Networks (e.g., global value chains, industrial clusters) are an organizational form providing a stable relationship among participating companies, while maintaining their respective legal autonomy when entering into contracts with other entities on the market. BGs are a particular type of firm network, defined as a collection of legally independent companies which operate under common ownership, administrative and financial control [105] through either formal (e.g., equity) or informal (e.g., family) ties [104], often in multiple strategic and unrelated sectors [103,106].

Within the context of SME group relationships, BGs are considered a mediation mechanism. Affiliates mutually benefit from reduced transaction costs and the sharing of both risks and superior resource bundles among themselves (financial resources, human capital, advanced technologies, intangible resources such as R&D and advertising), but their allocation is not constrained and is up to each SME's individual strategy [103]. This stimulates the exchange, among affiliates, of knowledge of clients, industries, and the foreign market, leading to the achievement of competitive performance levels and new opportunities in disparate industries on global markets [103,104,106,107].

BG membership additionally provides a key informational advantage, namely positive referral (or promotion effect) from sister affiliates to prospective clients and investors, concerning the reputation, trustworthiness and reliability of member SMEs. This decreases the cost and facilitates the task of matching news suppliers to their respective clients [104,106].



BG structures can also increase the environmental innovation level (development of new technology for pollution reduction or recycling) and labor productivity of its SMEs, by suitably allocating labor resources within the group and providing an internal learning network to its member firms, for exchanging innovative ideas, technologies and know-how [104].

Moreover, enterprises forming BGs significantly improve their accounting and stock market values. In particular, when institutions fail to support labor, production and financial capital, which results in high transition costs, BG configurations are able to internalize labor, capital and product markets, thus partially offsetting these institutional voids [107].

All in all, due to their adaptive nature and remarkable effectiveness on marketplace variables, BGs are capable of stimulating a country's economic and social development, even under weak institutional contexts [103,104]. The Indian Tata Group, for instance, launched their mini truck with the aim of overcoming the challenge of driving on poorly constructed roads [108]. Groups of SMEs would normally produce an even greater effect, due to their flexible structures, quick decision-making processes and unique know-how in specific areas [109]. There are numerous examples of SME groups getting awarded with a grant for their highly innovative and impactful R&D projects (Fibertech Group, Proxigroup, InnovativeHealth Group, etc.) [110]. All this considered, along with the fact that SMEs have been increasingly focusing on environmental and other CSR activities to meet their stakeholders' needs and gain a further competitive advantage [104], it is easy to come to the conclusion that groups of SMEs could potentially provide an even greater impact on sustainability.

The above points can be grouped into three types of advantages each organizational configuration provides to the other, within the context of small and medium-sized groups (Table 1): structural, informational, focus on sustainability.

**Table 1.** Mutual advantages provided by business groups (BGs) and small and medium-sized enterprises (SMEs) in small and medium-sized groups: (1) structural, (2) informational, (3) sustainability.

	BG's Advantages for SMEs	SMEs Advantages for BGs
<b>1. Structural</b>	<ul style="list-style-type: none"> <li>a) Access to superior resource bundles and capacity</li> <li>b) Single company risks are spread across the group</li> <li>c) Stability of relationships over time</li> <li>d) Contractual and resource-allocating autonomy belong to each individual firm</li> <li>e) Resistance to market barriers and high transaction costs caused by institutional voids</li> </ul>	<ul style="list-style-type: none"> <li>a) Organizational flexibility</li> <li>b) Quick decision-making</li> </ul>
<b>2. Informational</b>	<ul style="list-style-type: none"> <li>a) Knowledge exchange on clients, industries and markets</li> <li>b) Positive referral of member SMEs to clients of other affiliates</li> </ul>	<ul style="list-style-type: none"> <li>• Unique know-how in specific industries</li> </ul>
<b>3. Sustainability</b>	<ul style="list-style-type: none"> <li>• Enhanced environmental innovation level through effective allocation of labor productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Increased focus on gaining a competitive advantage through CSR</li> </ul>

### 2.1.3 Management control systems for sustainability

Contributions to SD at micro-levels can only be efficient when enterprises start making tangible efforts towards sustainability. Commonly, only partial aspects of SD are addressed at organizational level, with



environmental responsibility and innovation being the most chosen route, while social actions are often disregarded [94].

Environmental innovation strategies alone, however, are not a guarantee for the achievement of successful financial and sustainability outcomes [111]. In this sense, research suggests that only if enterprises align their sustainability and innovation strategies with internal controls, will they be able to gain performance improvements and make noticeable progress towards SD [94,111].

From a theoretical point of view, internal controls, or MCS, are a set of formal and informal practices that are used to manage patterns in organizational activities, building upon an organization's information system (e.g., data queries, computations, functions, modeling, reporting). Formal controls include planning and goal-setting, budgeting, market share and outcome monitoring, and behavior controls through explicit measures and written rules (e.g., performance appraisal, reward criteria, code of ethics) [112–115]. Conversely, informal controls consist of traditions, attitudes, knowledge, beliefs and shared values that moderate individual behaviors within a firm, thus shaping corporate culture [112,114,116].

MCSs support the effective implementation of corporate strategy (competitive positioning), strengthen transparency and accountability towards stakeholders, ethical decision-making and management of environmental opportunities and threats [111]. MCSs are based on four different formal levers that operate in tandem, called levers of control (LOC): (i) belief (core values), (ii) boundary (risks to avoid), (iii) diagnostic (critical performance variables), and (iv) interactive control systems (strategic uncertainties). Belief and interactive controls are enabling forces (motivational), while the other two constructs are used for controlling purposes (ensuring compliance) [115]. In particular, enabling levers of MCS foster a positive impact of environmental innovation strategy on sustainability performance, whereas controlling MCS levers negatively mediate this relation [111].

Each of the above levers can help managers to reinforce their company's CSR (Figure 2). Through belief systems, firms are able to mobilize their employees' ideas (through mission statements, workshops, training sessions, etc.) in order to strengthen CSR values, while increasing their commitment to a shared vision.

Boundary systems draw on a set of tools directed towards internal and external stakeholders (employees, supply chain, customers, environment, communities), including codes of ethics and conduct, guidelines, quality certifications and labeling standards. These measures are used to stimulate innovation thinking, set criteria for supplier selection, ensure product and process quality and compliance with sustainability norms, as well as prevent environmental, socio-economic and internal risks.

Firms make use of diagnostic systems to develop measurable outcomes for their CSR practices and assess their cost-effectiveness and value creation, as well as any deviations from strategic targets. Through these systems, companies are able to internalize the relative net benefits and enable CSR decision-making on the one hand, and communicate performance results to stakeholders on the other. Internally, social indicators and reports should be used to provide feedback to human resources, however, research found that not many companies adopt a social diagnostic system [117].

Interactive control systems allow companies to leverage both primary and secondary stakeholders' (non-governmental organizations, activists, communities and suppliers) opinions in order to gain insight into additional CSR and sustainability policies, and therefore identify further opportunities and threats (that might undermine the organizational image) carrying an impact on CSR.

Informal controls are used to sustain the above-mentioned formal processes. Their purpose is to project the organizational climate onto an enterprise's internal and external stakeholders, so that they gain awareness of how it helps to strengthen CSR culture and commitment [80,94,117].

In spite of the key role played by formal controls in signaling a company's consideration of its stakeholders and responsibility goals, they are not capable of emphasizing sustainability in relation to their internal culture on their own. In other words, informal systems alone would lead to unstable CSR management [118]. According to research, formal and informal controls are actually mutually reinforcing and their combination



can prevent any perplexities or opportunistic behavior and positively stimulate the members of a firm to implement higher-level CSR [80,94,117].

After understanding the essential components of an MCS for sustainability, the next step would be to analyze which types are currently in use.

Conventional, or 'cybernetic', MCS techniques (e.g., cost accounting, budgeting), are deemed to be limited to the attainment of economic objectives. As they do not yield any significant improvement in the social and environmental spheres, companies started looking for other solutions in the last decade [94,111,119]. More contemporary management accounting techniques, such as benchmarking and balanced scorecard (BSC), seem to have a slightly better influence, not only on sustainability, but also on innovation and international presence as well [111].

BSCs, in particular, are quite useful in delivering the discipline that can formally make TBL objectives operational and measurable for sustainability disclosure [116,120]. This is important because the non-conventional data provided by TBL reports cannot rely upon official standards for reference, unlike mainstream MCS reporting [118]. BSCs benefit, in turn, from the integration with the TBL, as it improves their interaction with external stakeholders [121]. The sustainability balanced scorecard (SBSC) is a successful example of the integration between formal tools and sustainability strategies [116]. Integrated tools undergo a more meaningful transformation and serve SD implementation better.

Nonetheless, in order to suitably address the social and environmental issues raised by various stakeholders, and at the same time support the transition towards sustainability, traditional management control has been gradually revised and more specific concepts began surfacing in the literature [94,111,119]. Umbrella terms, such as environmental management accounting (EMA), social accounting, sustainability accounting, and social and environmental accountability, are the most frequent examples [118].

In terms of environmental controls, EMA was found to be positively related to process innovation, but did not appear to have a positive impact on product innovation [111].

Social controls capture both informal and formal procedures concerned with human resource management, but also the tacit knowledge owned and applied by the individuals in the firm to their everyday work.

Sustainability controls are the most comprehensive type of system, in that they encompass both environmental and social strategies, in addition to traditional economic objectives, extending the scope of MCSs and promoting organizational learning and change. Similarly to MCSs, Sustainability Control Systems (SCS) are a link between strategy and operations [119,120,122].

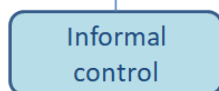
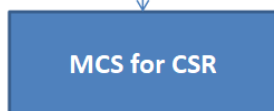
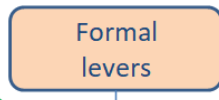
Researchers found two main barriers to the consolidation of sustainability aims into corporate strategy. First, when SCSs are applied as a diagnostic system in place of an interactive one, managers risk ignoring sustainability uncertainties. Second, companies might fail to connect MCS and SCS into a unified system, since the integration should simultaneously occur on a (i) technical (sustainability and financial data reporting), (ii) organizational (shared responsibilities and skills between management accountants and sustainability managers, not limited to a group of specialists), and (iii) cognitive level (shared understanding and perspective between financial and sustainability managers). Nevertheless, a technical integration alone might partially compensate for the insufficient integration of the remaining two dimensions [119]. In general, the successful design of sustainability policies within an organization is only possible when traditional control systems are extended through SCSs [120]. It is also a matter of consistency, because when an organization's MCS fails to accept and externalize its claim to operate in a socially responsible manner, it may lose credibility in the eyes of its stakeholders [118].

To sum up, MCSs play a pivotal role in supporting the operationalization of sustainability objectives, as well as in improving CSR communication and formalizing a sustainability organizational culture.

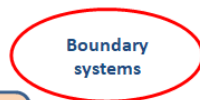


- Strengthen CSR values
- Increase commitment
- Shared vision

- Leverage stakeholder opinions for insight into
- additional CSR policies
  - opportunities
  - threats



Projects CSR culture onto stakeholders



- Stimulate innovation thinking
- Prevent sustainability risks
- Ensure compliance with sustainability norms

- Develop measurable outcomes for CSR cost-effectiveness and value creation assessment
- Internalize relative net benefits
- Enable CSR decision-making

- 
- High-level CSR
  - Opportunistic behavior prevention

**Figure 2.** Management Control Systems for Corporate Sustainability and Responsibility.

Source: author's representation adapted from [42].

## 2.2 Methodology: keywords, criteria, search strategy, and synthesis of sources

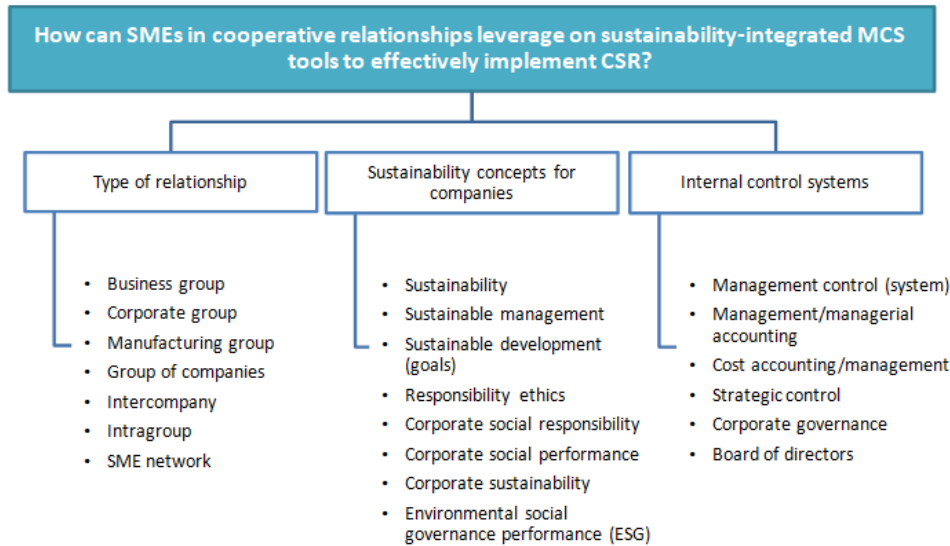
The systematic literature review was developed in four stages: (i) choice of keywords and inclusion criteria, (ii) search strategy, (iii) study screening and selection, (iv) extraction and synthesis of sources. Each step is described in detail below.

Choice of Keywords and Selection Criteria. Keywords for the literature search were chosen based on the main research question: 'How can SMEs in cooperative relationships leverage on sustainability-integrated MCS tools to effectively implement CSR?' (Figure 3). This question was divided into three main topics, namely (a) type of relationship, (b) sustainability concepts for companies, and (c) internal control systems. For each of the three conceptual categories, a series of associated terms were picked for the next step:

- Business/corporate/manufacturing group, group of companies, intercompany, intragroup, SME network;
- Sustainability, sustainable management, sustainable development (goals), responsibility ethics, corporate social responsibility, corporate social performance, corporate sustainability, environmental social governance performance (ESG);
- Management control (system), management/managerial accounting, cost accounting/management, strategic control, corporate governance, board of directors.



**Research Question:**



**Figure 3.** Map of the used keywords.

Subsequently, the following criteria were determined in order to select the articles for review: (1) only articles in English, excluding grey literature (e.g., conference proceedings); (2) inclusion of environmental, social and economic corporate sustainability, not economic sustainability alone; (3) only studies combining both group and/or SME organizational forms with corporate sustainable practices were included; (4) SME literature was deemed eligible only if it examined networks, sustainability-oriented innovations or social/environmental accounting; (5) focus on the corporate-level SD, not on a specific country's SD (country-specific BG examples are, however, included, e.g., Korean chaebols); (6) business cases are considered only if discussed in scientific articles, no short news reporting/cover stories; (7) results restricted to the for-profit sector, no third-sector organizations (e.g., cooperatives); (8) mainly the manufacturing industry is taken into account, no services; (9) not restricted to sustainability in the production process, rather, including studies on sustainability as a strategic asset for corporate governance.

**Search Strategy.** A structured keyword search (selected period 2007–2020, based on the comprehensive availability of articles on the topic) was performed in three major electronic databases (EBSCO, Wiley, Web of Science) covering a broad range of high impact factor journals, as well as the Sustainability Journal separately, and through the search engine. Sources were identified by using various string combinations of the three keyword groups (I: a–b–c; II: a–b; III: b–c) and applying the above-mentioned inclusion criteria.

**Study Screening and Selection.** In order to ensure the maximum relevance to the aim of the present review, three levels of screening were carried out, in addition to a pre-screening of the chosen databases, after which a total of 836 records were identified. The flow chart below (Figure 4) shows the study selection process.

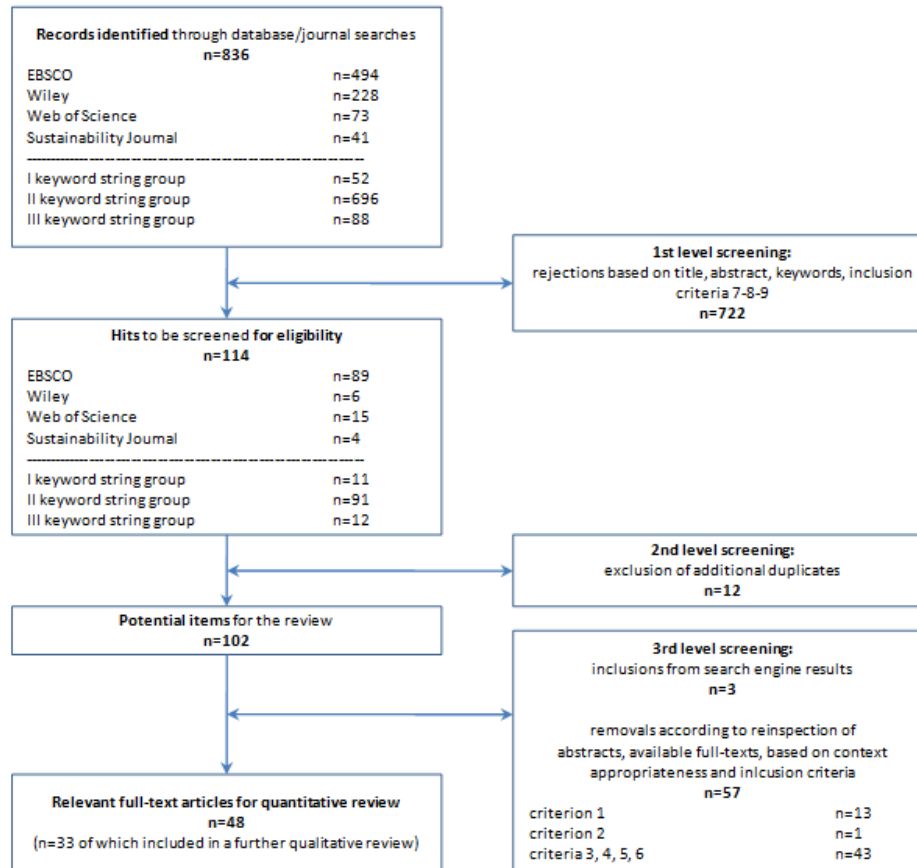


Figure 4. Articles selection flow chart.

A total of 114 items remained based on an initial screening of titles, abstracts and keywords, and considering some of the inclusion criteria (mainly 7, 8, 9). Additionally, some of the duplications found at first glance were also removed at this stage. The second level screening resulted in 102 articles being kept for further analysis (minus 12 duplicates). The third step involved a more thorough inspection of abstracts and available full-texts. Papers were reconsidered through the complete set of inclusion criteria. Specifically, 13 results were removed according to the 1st criterion (five other languages and eight proceedings), one result was removed considering the 2nd criterion, and 43 items were ignored based on context appropriateness and the remaining criteria (3, 4, 5, 6). At this point, three relevant sources were also added from search engine results. This process resulted in 48 remaining articles (33 of the texts were further discussed in a content analysis), for the remainder of which full texts were retrieved.

Table 2 shows the results after each stage. It is worth noting that the keyword string combinations of group I (a–b–c) did not produce many results (n = 52). This shows that the integration of MCSs and CSR is scarcely studied in the literature, and in particular with respect to companies affiliated through BG relationships or part of a network. Conversely, the most researched topic combination is BG/SME and sustainability (n = 696).



**Table 2.** Sources selected at each level of paper screening.

Keyword combinations	EBSCO		Wiley		WOS		Sustainability		TOTAL	INCLUDED	TOTAL	INCLUDED
	Tot.	Incl.	Tot.	Incl.	Tot.	Incl.	Tot.	Incl.				
I (SME)	21	6	3	1	0	0	4	2	28	9		
I (BG)	5	2	13	0	0	0	6	0	24	2		
II	420	69	196	5	67	15	13	2	696	91		
III	48	12	16	0	6	0	18	0	88	12		
<b>Total</b>	<b>494</b>	<b>89</b>	<b>228</b>	<b>6</b>	<b>73</b>	<b>15</b>	<b>41</b>	<b>4</b>	<b>836</b>	<b>114</b>	<b>102</b>	<b>48</b>
									<i>pre-screen removed</i>	<i>1st screen</i>	<i>2nd screen</i>	<i>3rd screen</i>
										722	12	57
									<i>added</i>	0	0	3

The bottom right corner shows the resulting items after each screening phase.

Extraction and Synthesis of Sources. The full texts of the selected articles were analyzed in depth. Pertinent information was then broken down into comparable data and organized through a spreadsheet. Table A1 (in the Appendix) below summarizes the following details for each included study (the ones whose key findings will be examined thereafter are highlighted): focus on BG or SME, authors and year of publication, journal, country of research, scope of research (e.g., country, project), research type (conceptual, empirical quantitative/qualitative) and method used (e.g., experiment, case analysis), topics, limitations (with respect to the present review). Topics were further grouped into three categories, relating to sustainability (S.), corporate governance or MCS or accounting (M.), and SD-MAC combined (SM.). In order to ensure validity (by widening the variety of sources) [123,124], the collection of articles was based on a triangulation of topics [125–127] (organizational forms of BG, network and SME) and methods applied (conceptual research, empirical qualitative research, empirical quantitative research with either analysis of reviews, business cases and experiments). Reliability and trustworthiness could be achieved by following rigorous and systematic steps, including a thorough four-tier literature screening and the application of pre-defined selection criteria for the retrieval of papers, making their content consistent with the aim of this review as closely as possible [124,128]. Additionally, we assessed the heterogeneity of sources to understand if a meta-analysis on the correlation between CSR and BGs was possible. However, only five studies were eligible, and we therefore decided not to proceed, as such a small number would not have been able to accurately predict the overall correlation. Subsequently, further quantitative techniques (e.g., sensitivity and subgroup analyses, meta-regression) were also excluded for the same reasons. Overall, given the thematic interest of the research question, the current review can be more accurately classified as a qualitative systematic review [129,130], thus focusing more on a conceptual analysis of the literature.

### 2.3 Literature trends

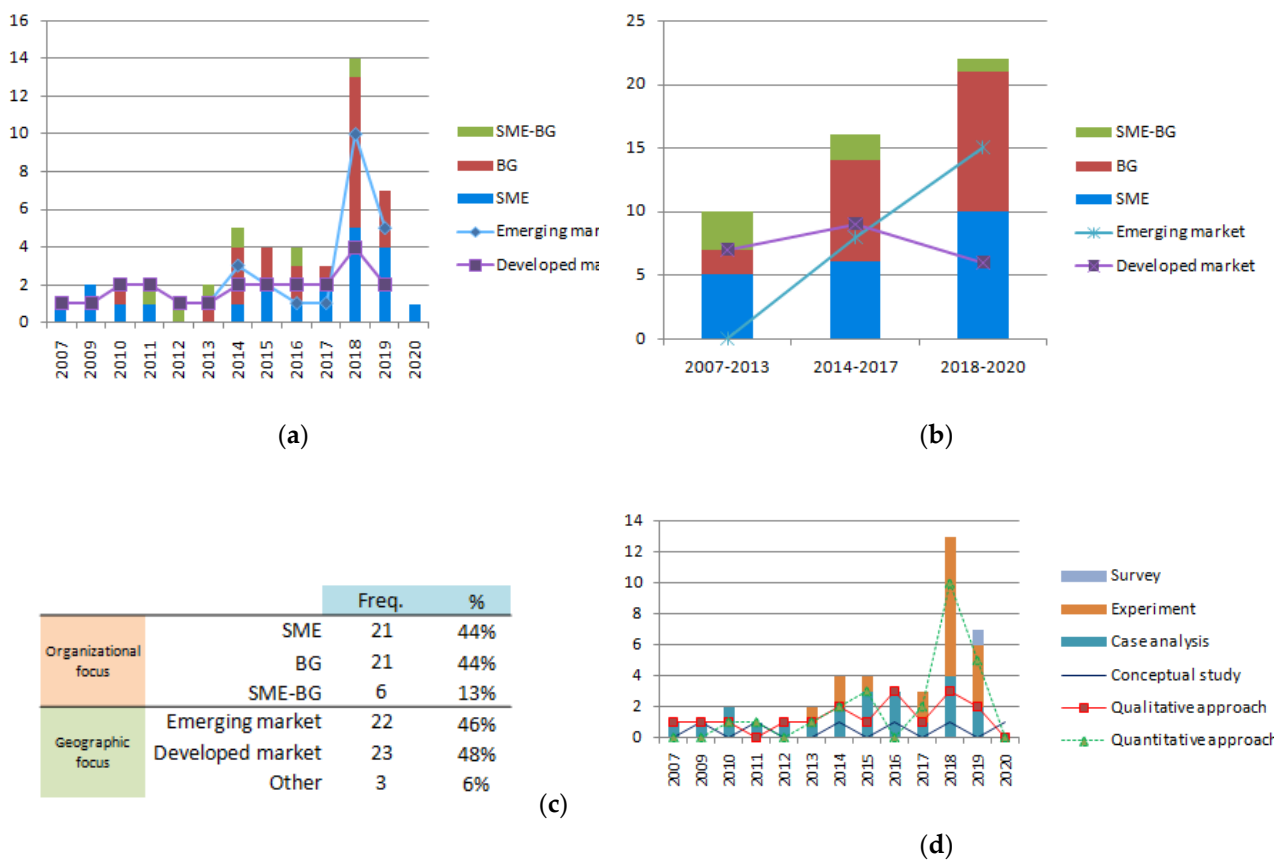
The present section provides some numerical insights into the 48 studies included in the review. To begin with, the articles retrieved were published in the period 2007–2020 (Figure 5), with a peak in publications in 2018.

Splitting the time span under observation into three clusters of uniform cumulative periods, it is possible to notice that there has been a constantly growing trend in publications on corporate sustainability management in SMEs and BGs. Specifically, while the increase in SME studies has been less than proportional, research on practices in BGs has outweighed that on SMEs since 2014–2017 (first appearing in 2010). Nevertheless, considering the entire sample, the interest in either SMEs or BGs was balanced ( $n = 21$  each), likewise for emerging ( $n = 22$ ) and developed economies (23). Papers specifically analyzing sustainability in BGs of SMEs were extremely rare ( $n = 6$ ), and, cumulatively, it seems that interest in them has gradually decreased.



Concerning geographical scope, developed markets have been quite a stable focus over the three considered periods, while interest in emerging markets has cumulatively rapidly grown from 2013 onwards.

With regards to types of study, conceptual works such as literature reviews remained low over time. In empirical studies, quantitative approaches seemed to slightly prevail over qualitative ones, especially during the period 2017–2019. Experiments and case analyses were the most chosen designs for quantitative empirical research (survey, in most cases, were used to collect data for experiments). Nevertheless, while case studies were almost constantly used throughout the period in question, hypothesis testing only began taking place in 2013. Once again, in 2018, they were subjected to a rapid increase.



**Figure 5.** Number of papers, organizational and geographic focus, types of approaches per year: (a) Distribution per year; (b) Distribution per period; (c) Distribution per focus; (d) Distribution of approaches per period.

Table 3 provides an overview of the frequency of journals that published about sustainability in BGs and SMEs. As expected, publications that are normally concerned with sustainability and ethics engaged in the topic the most. These also appeared to discuss specific tools for sustainability recurrently: integrated measures (social and environmental) were the most common, followed by environmental measures and, to a lesser extent, contemporary MCS tools, such as benchmarking, also in its adapted version for sustainability. Among the most popular journals in the sustainability and ethics category were the *Journal of Business Ethics* (n = 6), *Journal of Cleaner Production* (n = 5), *Corporate Social Responsibility & Environmental Management* (n = 3), and *Sustainability* (n = 3). Among the accounting and management journals, the *Journal of Small Business Management* was the only one touching on all five types of tool in one paper.



**Table 3.** Overview of journal frequency and tool type by journal.

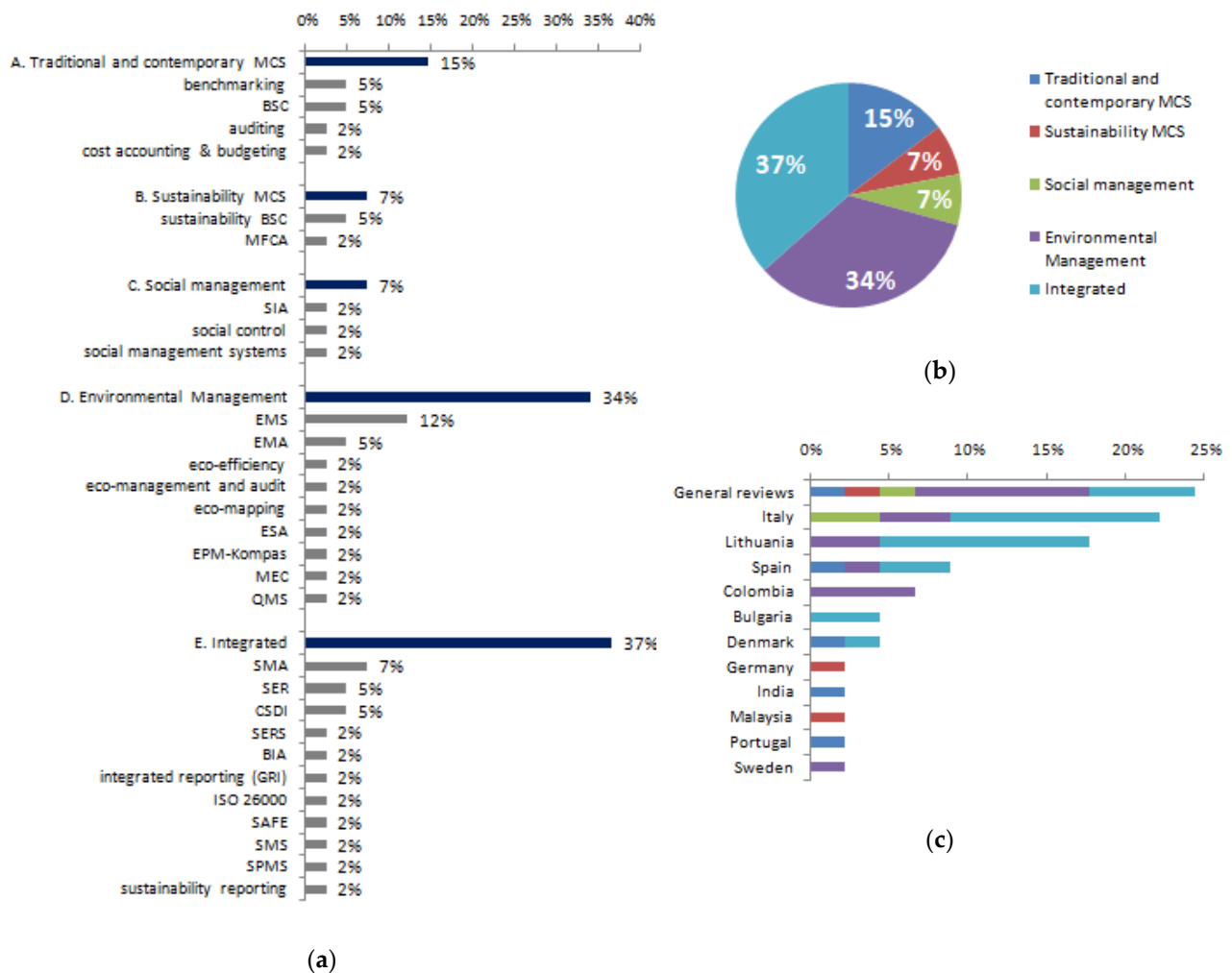
		Nr	TCM C	SuM C	So M	E M	Int
<b>Sustainability and ethics</b> (n = 25)	<i>Journal of Business Ethics</i>	6	X				X
	<i>Journal of Cleaner Production</i>	5		X		X	
	<i>Corporate Social Responsibility &amp; Environmental Management</i>	3				X	X
	<i>Sustainability</i>	3	X		X		X
	Business Strategy & the Environment	2					
	Business Ethics: A European Review	1					
	Clean Technologies & Environmental Policy	1				X	X
	Environmental Research, Engineering & Management	1				X	X
	International Journal of Business Governance and Ethics	1					
	International Journal of Sustainable Development & World Ecology	1				X	
<b>Accounting and management</b> (n = 12)	Social Responsibility Journal	1					
	Asian Business & Management	1					
	Benchmarking: An International Journal	1					
	Business & Economic Horizons	1					
	Corporate Governance: An International Review	1					
	Corporate Governance: The International Journal of Effective Board Performance	1					
	Journal of Applied Accounting Research	1					X
	Journal of Management & Governance	1			X		
	Journal of Marketing Communications	1					
	Journal of Small Business Management	1	X	X	X	X	X
	Management Research Review	1					
	TQM Journal	1					
<b>Economics</b> (n = 3)	UTCC International Journal of Business & Economics	1					
	Applied Economics	1					
	Australian Economic History Review	1					
	Economic Research-Ekonomska Istraživanja	1					
<b>Finance</b> (n = 4)	Emerging Markets Review	2					
	Pacific-Basin Finance Journal	1					
	The Journal of Asian Finance, Economics and Business	1					
<b>Public governance and policy</b> (n = 2)	Innovation: The European Journal of Social Sciences	1		X			
	Urban Affairs Review	1					
<b>Other</b> (n = 2)	Journal of Intelligent Manufacturing	1	X				
	Tekstilve Konfeksiyon (Textile and Apparel)	1					

Abbreviations: EM = environmental management; Int = integrated systems; SoM = social management; SuMC = management control system adapted for sustainability; TCMC = Traditional and contemporary management control system. Journals in grey featured specific MCS-CSR tools, journals in red are sustainability-specific and present MCS-CSR different tools.





In the articles that did at least mention some sustainability management tools, the main focus was on integrated (37%) and environmental (34%) approaches, and mainly SMA (7%) and EMS (12%) respectively (Figure 6a, b). Social management (e.g., SIA) and MCS-sustainability-adapted tools (e.g., sustainability BSC) were less used, while in MCSs, contemporary tools such as benchmarking/BSC (5%), were predominantly deemed suitable for sustainability management (Figure 6a,b). Researchers were mainly interested in reviewing previously written papers (24%) when studying sustainability management tools, and in this case all categories were analyzed (Figure 6c). Studies concentrating on the Italian situation were the second most frequent (22%), then came those exploring Lithuanian context (18%). Environmental management and integrated tools prevail in both geographical focuses, with the only difference being that social management is additionally taken into consideration for Italy. The countries evaluated in terms of sustainability management tools are all developed economies, except for Colombia and India.



**Figure 6.** Frequency of tools analyzed: (a) Frequency of tools per macro-type; (b) Frequency of macro-types; (c) Frequency of macro-type per country of research.

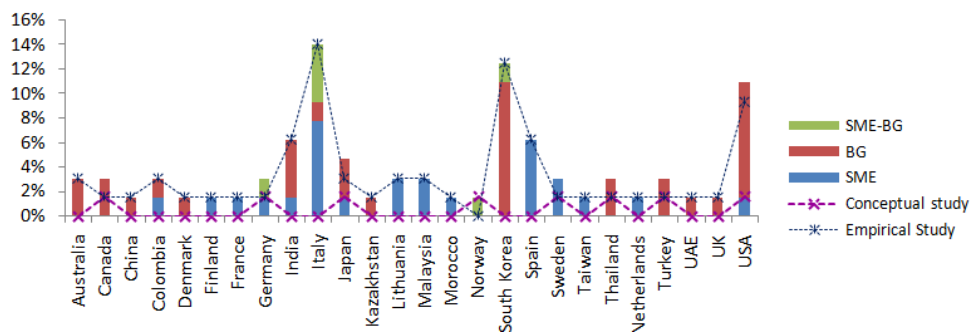
Abbreviations: BSC = balanced scorecard; CSDI = composite sustainable development index; EMA = environmental management accounting; EMS = environmental management system; ESA = environmental and sustainability accounting; MCS = management control system; MEC = monitoring and environmental control; MFCA = material flow cost accounting;



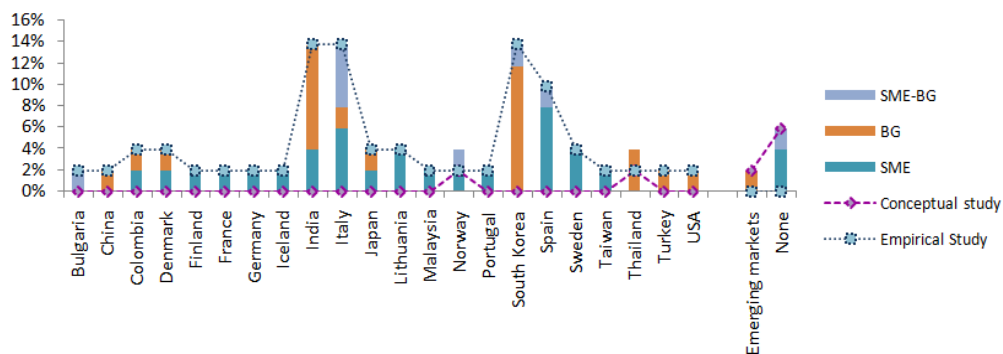
SAFE = sustainability assessment for enterprises; SER = social and environmental reporting; SERS = sustainability evaluation and reporting system; SIA = social impact assessment; SMA = sustainability management accounting; SMS = sustainable management system; SPMS = sustainable performance management system.

The most active researchers on the topic of sustainability in BGs and SMEs were located in Italy (14%), South Korea (13%), and the USA (11%). However, while South Korea and the USA were mostly interested in finding out about business groups, Italian studies were mainly focused on SMEs and, to some extent, SMEs in BGs. Empirical approaches were chosen by all researching countries, except for Norway. Conversely, the majority of conceptual articles were written in larger economies, with the exception of Thailand and Turkey (Figure 7a).

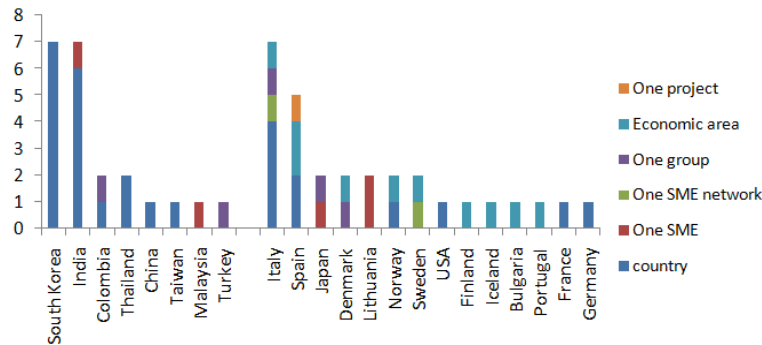
Italy and South Korea (both 14%) were also primarily chosen as countries of investigation (they often study their own internal situation), but not the USA (2%). In its place, India (14%) and Spain (10%) gathered major attention (Figure 7b). Studies on Indian BGs were quite popular, while Spanish circumstances were similar to Italy (focus on SMEs and partly on BGs of SMEs). In summary, South Korea and India (APAC) are the most researched emerging markets, focusing primarily on country data in terms of research scope (Figure 7c), while Italy and Spain are the most studied developed economies (EMEA).



(a)



(b)



(c)

**Figure 7.** Countries of research and countries investigated: (a) Countries where research took place (distribution of topics and study types); (b) Countries investigated (distribution of topics and study types); (c) Countries investigated (scope of research).

### 2.3.1 The influence of group affiliation and networks on the intensity of CSR implementation

This section analyzes the content of 33 of the selected papers, covering three major topics: (1) correlation between firm aggregations, like affiliations or networks, and CSR success; (2) overview of sustainability management tools used by SMEs; (3) corporate sustainability processes developed in SME networks/groups. The literature on the relation between BG affiliation and CSR intensity features mixed evidence, the majority of which, however, is positive. Compared to stand-alone firms, group affiliation normally resulted in better CSR performance overall, including environmental, social and governance ratings (ESG – a proxy for CSR but based on more precise criteria for assessment), and for its individual social and environmental components [78,79,131–133]. The social score seems to yield an even stronger effect in larger groups and for such dimensions as employment, human rights, community and product responsibility, but less in terms of safety, training and diversity. Concerning the environmental aspect, remission and resource reduction, as well as product innovation/R&D are the factors responsible for raising CSR intensity in BGs [131,132].

Conversely, other studies suggested that publicly listed groups in particular do not aggressively invest in CSR activities [134], and that the higher cost of equity for disclosing nonfinancial information, makes CSR reporting less valuable to BGs [135].

As for the positive BG–CSR correlation, this depends on the intrinsic characteristics of BGs themselves. First of all, size (several companies in one group) and years of experience significantly affect corporate sustainability. Specifically, larger and older BGs have a higher availability of resources, therefore it is easier for them to invest in CSR [131,136].

Second, the support provided by BG promoters (families or controlling corporations) is equally important. Unlike the promoters of unaffiliated firms (individuals), which are exclusively interested in profits, promoters of BGs are genetically interlinked with society, and thus feel compelled to also nurture socio-economic wealth [133]. Family control, counter to the belief that it is only a source of opportunistic expropriation of CSR investments, proved to be an excellent leverage for increasing a BG's environmental disclosure propensity, mainly if leadership is taken by a family CEO [136]. Some authors, however, state that it is group affiliation itself that mitigates the negative effects of family ownership on CSR, and this is only true for non-individual family owners [78]. As for controlling companies, they exert significant influence on subsidiaries, both if these operate in their parent company's sector, or in a different industry but with notable direction and coordination by the holding. This leads affiliated firms to adopt their same sustainability practices and improves their



individual corporate social disclosure, demonstrating that a BG is indeed a united economic entity, even when it comes to sustainability performance [137]. Peer pressure by likewise affiliated firms plays an influential role too. As a matter of fact, if some affiliates already have previously disclosed environmental information, the disclosure propensity among the other group members increases [136]. The external BG influence dynamic is also to be noted. When it comes to the promotion of socio-economic wealth, BGs can truly make a difference, as they wield considerable political power in shaping the local legal framework for their respective societal contexts, thanks to collaborations with governments [138]. Their sustainable business operations often inspire other BGs to transition towards CS too [79].

BGs do not primarily resort to CSR-related tools to address narrowly defined environmental issues; they instead rely on its insurance-like effect to obtain reputational gains [131,136]. Sustaining or restoring group reputation is particularly important during negative group-specific externalities (e.g., dissemination of bad news among member firms) [131], as well as when members need to be protected from inherent reputational risks emerging from embezzlement schemes potentially put in place by family owners [136]. A good reputation particularly helps BGs to convince international stakeholders during the internationalization process, when they have a tendency to communicate more CSR activities [139]. The one case mentioned in which BGs do not need to worry about recognition is when they hold the dual status of state-owned BG. These organizations are in fact naturally afforded both legitimacy and protection from negative CSR performance, making them less compelled to conduct sustainability-related activities to maintain their reputation [140].

Seeing that groups are composite entities, it is also interesting to understand how the adoption of CSR within a BG influences each member firm. Researchers have distinguished between the benefits and costs of affiliation for CSR-deploying SMEs. On the benefit side, coordination of all group-level sustainability activities by centralized headquarters makes it possible to efficiently allocate all internally available resources (information advantage). The fact that all group members are linked to one another allows the headquarters to generate spillovers of accumulated expertise, reputation capital, and group-level donations (a good proxy for social investments), improving CSR performance homogeneously across the BG [78]. Particularly, SMEs that are part of a BG benefit in terms of improved environmental innovation, thanks to the moderating effect of complementary assets and the sharing of external investments and risks. Higher levels of environmental innovation, in turn, indirectly improve labor productivity (through closer employee involvement in sustainability), making it possible for group-affiliated SMEs to fulfil environmental regulations, at times even exceeding mandatory requirements, but also productivity requirements moved by shareholders [79,104]. Finally, BGs mitigate the negative relationship between CSR and financial performance, but only at low CSR levels [132]. Nonetheless, this attenuated effect between CSR and earnings management (considered a reliable metric in the absence of a standard framework for CSR) is at times suggestive of a managerial opportunistic behavior that uses CSR to conceal poor earnings quality [141]. This means that, in some cases, group affiliation actually weakens the ability of unexpected accounting earnings to reflect the potential benefits of CSR spending [142]. In general, however, the intensity of sustainability activities is positively related to reputation, which in turn allows firms to decrease company total costs in the long term. This happens because consumers are more supportive of socially responsible companies, and therefore more willing to accept the premium pricing, allowing firms to generate value [143].

On the cost side of BG affiliation, resource-rich members are requested to contribute more to the group resource endowment, subsequently having to abandon certain investment opportunities in order to support poorly performing affiliates with their CSR [79].

Network models have also been assessed in the literature as aggregated forms of SMEs involved in CSR-related activities (especially environmental management). The cluster approach, for example, was found to be useful in accelerating the uptake of CSR on three levels. From the macro perspective (network to external environment), it helps to develop a unitary brand identity which increases negotiating power internationally (investors' confidence) and support to policy makers in setting environmental and social priorities/standards





for the local industrial system. According to the mezo perspective (network members interactions), clusters provide a common long-term strategic direction, as well as knowledge shared from different businesses (supporting capacity building for members). This fosters a multiplier effect on all partner organizations in terms of involvement and intra-network synergies, promotes corporate learning, and enables common management, certification and audit systems. Besides, clusters act as innovation drivers and stimulate continuous competitiveness through peer encouragement, helping to differentiate the cluster as a whole from its direct rivals.

On a micro-level, clusters help each individual SMEs to minimize any operational barrier (lack of financial, expertise and time resources), while at the same time legitimizing pro-active engagement in all CSR activities, as organizations increase their ethical awareness to act on sustainability issues. In this sense, organization capabilities (e.g., staff/management specialization, finances, knowledge building) are optimized, technical complexities and costs associated with CSR implementation are reduced, and due diligence and vigilance are increasingly implemented [76,144,145].

When approaching sustainability-oriented innovations (SOI), and more specifically organizational environmental innovations (e.g., EMS), as part of an innovation-based or sustainability strategy, SMEs tend to be more prone to spanning their boundaries through existing knowledge networks with key actors for innovation (e.g., technical centers, research institutions, universities). In this context, three different learning-action patterns can be observed. If the SME concentrates on resource acquisition (grazer network pattern), learning for SOI is limited to being exploitative (new knowledge applied commercially), because missing firm resources are simply complemented to realize pre-determined innovation opportunities. The second type, explorer behavior, focuses on the acquisition of new ideas and information per se, supporting the broadening of prior network experiences and the translation of the acquired knowledge into firm processes. Finally, if a firm already has extensive prior experience with networks and is sustainability-rooted, it will then pursue the networker pattern, which allows it to expand its interaction ties externally for support and benchmarking, and enjoy a gradual learning process to strengthen innovative capacity for SOI (both exploitative and exploratory learning are feasible) [145,146].

### 2.3.2 Systems and tools for sustainability management in SMEs

After having discussed the relationship between composite organizations and CSR, a more in-depth focus on sustainability practices adopted by the individual organizations that are part of groups and networks is necessary. SMEs can benefit from the implementation of a CSR strategy in many ways. It helps them gain better access to talent, improve their employer–employee and supplier–buyer relationships, increase brand equity (or publicity, which fosters investors' interest in forming joint-ventures), save on costs in the long-run (through lower energy consumption and employee turnover), and develop a differentiation strategy. CSR can also minimize certain SME-specific risks, such as restricted market access (strategic risk) due to not having a specific sustainability certifications or systems required by some foreign buyers [76]. However, in order for SMEs to develop, monitor, and actually benefit from organizational sustainability practices, in terms of performance and innovation, CSR should be integrated into MCSs. Technically, this will allow the transmission of rigorous planning, reporting and monitoring mechanisms from MCSs to CSR [147], while, socially speaking, formal interactive controls will help CEOs motivate employees and translate stakeholders' opinions into sustainability actions, through interaction with the company's CSR policy [80].

Different levels of integration between MCSs and CSR were identified through the review. Traditional (cost accounting, budgeting) and contemporary control types (benchmarking and BSCs) are both used in the absence of a specific sustainability system within the organization. Nonetheless, contemporary MCSs have a stronger moderating effect on sustainable innovations for international performance [147]. The BSC, for instance, has been found to be quite suitable for addressing the limit that SMEs have in focusing exclusively





on financial and operational performance. BSCs in fact supplement traditional financial measures (F) with three additional perspectives, namely delivering value to customers (C), promoting the efficiency and effectiveness of internal business processes (P), and learning and growth (L) for acquiring capabilities to face future challenges [147,148]. For slightly more advanced and complex system needs, this tool can also be reconfigured to include sustainability. This can be achieved by adding a fifth perspective, developing a sustainability BSC from scratch, or integrating various indicators throughout the original four perspectives. The latter case includes an initial selection of sustainability key performance indicators (KPI), performance ratings and relative importance weights of indicators using the fuzzy analytic hierarchy process (FAHP). The obtained weighted performance ratings are subsequently filtered through a three-stage hierarchal fuzzy inference system (FIS) on all four perspectives in order to obtain the final sustainability score. The FAHP and FIS methods are especially useful in dealing with the subjectivity and vagueness of manufacturing decision-making, translating opinions in linguistic terms into reliable crisp values. An empirical study applied this framework and identified that the most important indicators for sustainability performance are manufacturing cost and debt ratio (F), customer satisfaction and quality (C), material intensity and hazardous material ratio (P), annual training hours per employee and management commitment (L) [148]. Performance measurement systems (PMS) are the broader processes that embed BSCs and other tools. Similar to BSCs, PMSs can be converted into sustainability-focused tools by incorporating the relevant indicators. This way, they will assist management in defining sustainability objectives, developing socio-economic and environmental activities, identifying critical areas, as well as efficiently distributing scarce resources [149].

Traditional cost accounting (measuring deviations between actual production costs and strategic objectives) [147] was adapted in a much more structured way into a stand-alone sustainability MCS tool. The material flow cost accounting (MFCA), also known as ISO 14051, is a recognized international standard that helps organizations both achieve economic goals and optimize material use, without prioritizing only cost saving or waste reduction. It physically traces material flows, detailing quantities and costs. Material losses are thus readily visible, making it easy to identify inefficient processes. MFCA can be regarded as a managerial innovation technology and an efficiency tool for SMEs to be flexibly applied to processes, products, an entire plant, the whole company, or even the supply chain [150].

Under different circumstances, firms may choose to invest into a separate CSR system, and then incorporate MCS elements into it. If SMEs decide to manage the social aspects alone, then social management systems or social impact assessments (SIA) are typical partial models to look out for. SIA aims to identify, evaluate, and minimize negative social outcomes, while maximizing its targeted social mission [149,151]. Social accounting and auditing (SAA), as well as social return on investment (SROI), are the most established SIA methods among many. SROI, in particular, is able to compare different types of benefit values and measure outcomes rather than just tracking output [152]. In order to demonstrate social responsibility towards workers specifically, the Occupational Health and Safety Assessment Series (OHSAS) 18001 and Social Accountability, on workers' rights and workplace safety (SA8000) certification standards can be adopted.

The other side of the coin is environmental measurement and, compared to the previously examined systems, a much wider variety of strategies and implementations are found in the extant literature. On the strategic side, the managerial philosophy of eco-efficiency encourages SMEs to become more environmentally responsible, while pursuing parallel economic savings [153]. Not all SMEs, however, are capable of carrying out good practices, since, according to a study in an emerging market, around 60% of respondents were not even aware of SD issues. The development of appropriate training schemes towards an internal sustainability culture [154], along with the application of strategic and financial controls to eco-efficiency (broadly known as eco-control) [155], may solve this. The following tools for eco-efficiency were identified in SMEs: environmental management system (EMS), eco-mapping, and environmental performance measurement (EPM).



EMSs are based on scrupulous and recurrent cycles of planning, implementation and reviewing (organizational environmental control), ensuring interaction among the principal organizational functions on environmental operations, impacts and operative efficiency. They are commonly audited, which makes them useful for addressing regulatory demands [154,156]. The most prevalent EMSs are the ISO 14001 standard and the eco-management and audit scheme (EMAS). The first is directed towards organizational improvements (efficiency, effectiveness of internal processes) and, indirectly, at performance output. The second concentrates directly on performance outcomes, credibility and transparency, and supports public accountability through mandatory reporting [156]. It can be applied both for environmental certification purposes but also for any other eco-project not requiring formal accreditation [145].

Both systems are mostly popular in Europe and rely on the maturing of internal control systems and accounting practices. The major advantage of such standardized systems for SMEs is that they represent an assurance mechanism for stakeholders or against regulatory pressures, providing firms with the ability to demonstrate commitment through formalized environmental management. Networks seemingly maximize EMS's effects in SMEs, as they decrease the uncertainty from working with similar businesses, trade associations or environmental bodies (experiences and costs are shared) [156].

It is worth mentioning that total quality management (TQM) is also considered an EMS by some authors [154]. TQMs are also quite similar to quality management systems (QMS or ISO 9001), with the exception that QMSs are standardized and audited, similarly to EMS-ISO 14001. ISO 9001 and ISO 14001 can be used complementarily (similar Plan-Do-Check-Act structures, but clauses do not directly align), with QMS providing a systematic approach for maintaining consistent quality internally, and ISO 14001 being used for measuring and improving environmental impact [157].

The implementation of either ISO 14001 or EMAS can be achieved using eco-mapping, a step-by-step process to integrate environmental actions into an SME's daily activities [158,159]. This is a do-it-yourself, visual toolbox for conducting on-site environmental reviews and internal audits. It allows firms to prioritize problems, increase employee participation and training through a participatory learning processes, improve communication, and form the basis of environmental documentation [159].

Outcomes resulting from environmental management have to be evaluated in order to prompt improvement. In this regard, EPM can be seen as the penultimate stage of an EMS or its logical continuation. One of the measurement tools developed to systematically integrate environmental performance into SME decision-making processes is the EPM-KOMPAS. Its most salient feature is the capacity to recognize a firm's strengths and weaknesses, as well as the associated environmental opportunities and threats, at an early stage [160].

At the basis of environmental performance measurement, and ultimately environmental management, is the identification, collection, evaluation, distribution and control of data. These activities are essential for SMEs to be able to truly transition to CS, however, a good 70% of firms still had issues establishing environmental indicators [154]. In this review, we identify three synonymous terms that describe the above processes: environmental management accounting (EMA), environmental and sustainability accounting (ESA), monitoring and environmental control (MEC). EMAs, similarly to MCSs, and support management in the accurate gathering of necessary data for internal decision-making, and they can either be the result of integrated existing accounting systems or environment-related accounting systems built from scratch. They collect two types of data: physical (flows and uses of material, energy, water and waste) and monetary (environment-related earnings, savings, and such costs as emission/waste treatment, material purchase value of non-product output and inefficient production-materials turned into emissions/waste). The data analysis techniques typically used in EMAs are benefit assessment, full-cost accounting, life-cycle costing and strategic planning for environmental management [161,162].

In terms of reporting, several international bodies offered structured guidelines for self-disclosure on environmental information, among which the Climate Disclosure Standards Board (CDSB) framework and the Greenhouse Gas accounting standards (GHG Protocol) are worth mentioning [163]. Since companies, at



times, focus too much on either compliance or stakeholder engagement, it is advisable for them to decouple environmental accounting information from environmental communication to stakeholders, so as not to lose track of their CSR strategy [164].

Apart from separate social or environmental management, firms also have the option to directly choose a sustainability performance system encompassing both aspects. Numerous integrated tools were identified for SME use. The ISO 26000 international standard is a (not certified) consolidated framework providing guidance on how to operationally articulate social responsibility into achievable micro practices [149,163].

Sustainability management systems (SMS) equally provide guidelines and are oriented towards handling sustainability as a package, helping to set strategic goals, design support tools and measures, and establish strategic action plans [165]. The last step of the SMS roadmap, namely performance analysis, can also be taken over by a stand-alone sustainability performance management systems (SPMS). It is considered an excellent method for capturing the complexity of the TBL, as it identifies and measures progress towards all drivers (economic, social, environmental) [149].

One of the studies reviewed additionally introduced a couple of sustainability instruments that were specifically developed for SMEs based on empirical experiences [166]. The sustainability assessment for enterprises (SAFE), for instance, served as a “dialog” tool to involve workers in the sustainability change process, so that they felt motivated to contribute to it. It consists of a questionnaire (“Is your company fit for the future?”), that is administered at regular intervals and helps to identify the strengths and weaknesses of a company along with a list of suggestions for improvement, based on the collected information [167]. The other SME-specific tool is the sustainability evaluation and reporting system (SERS), representing an efficient overall CSR assessment that contributes to integrating non-financial and financial measures for improved responsiveness and stakeholder accountability. The three elements composing this system are the sustainability reporting system (annual, social and environmental reports), an integrated information system and sustainability KPIs [168]. Similar to EMA, sustainability management accounting (SMA) lays the data grounds for SMS, but unlike EMA it includes not only environmental but also social (e.g., training and education, health and safety are very important in SMEs) and economic performance costs. SMA yields benefits in the provision of higher quality data and indicators, which improved information consistency for better investment appraisal (by stakeholders) of the implementing companies. However, SMA’s indicators are limited to reflecting the company’s sustainability problematic aspects only. In order for SMA to consider the overall corporate sustainability effectiveness and to be used for continuous improvement, an article suggested integrating it with the composite sustainable development index (CSDI), providing a larger set of indicators [162]. For each of the three sub-indices of CSDI (economic, environmental, and social) a set of 5–15 indicators are chosen; they are thereafter normalized (since expressed in different units) and finally aggregated into the CSDI. The combination between SMA and CSDI provides a strong foundation for decision-making in SMEs through SMS [169]. In order to connect the operational SMA level to strategic SMS, a sustainability control system (SCS) can be applied [156].

Finally, the papers under analysis presented several guidelines and tools for sustainability reporting (also referred to as social and environmental reporting or SER) in SMEs, which are complementary to sustainability accounting [149]. The purpose of these reports is to communicate the performance of an organization (assessed using the previously mentioned tools) on all three TBL levels [163]. SER is mostly voluntary and based on financial accounting; it can also be disclosed in either a printed version for internal consultation, or as digital files on a firm’s official website [170,171]. The most relevant SD guidelines, principles and standards are issued by international organizations: Global Reporting Initiative (GRI); the Prince’s Accounting for Sustainability Project (A4S) for sustainable economy, business models and finance; the Sustainability Accounting Standard Board’s (SASB) industry-specific standards on corporate financial materiality; the Principles for Responsible Investments (PRI) [163]; Impact Reporting and Investment Standards (IRIS); Global Impact Investing Report System (GIIRS); the SDG Action Manager by the UN Global Compact for developing SD goals within a firm’s



micro context, and B Impact Assessment (BIA), both hosted on B Lab's platform. The GRI set of standards is a globally recognized leader in the development of TBL for companies [149]. They include both universal (GRI 101: Foundation, GRI 102: General Disclosures, and GRI 103: Management Approach) and topic-specific standards related to the three TBL categories of disclosure. In addition to sustainability reporting, companies can also resort to integrated reporting, in adherence to the international <IR> framework by the International Integrated Reporting Council (IIRC). Unlike SER, IR is more of a concise communication, illustrating the process (strategy, governance, performance) of short-, medium- and long-term value creation through six forms of capitals (financial, material, socio-relational, intellectual-organizational, human and natural) to all internal and external stakeholders, and therefore is principally focused on "business sustainability" and additionally presents an organization's SD path. Both report types are valuable options for SMEs to disclose their path to SD, but convey different messages. The <IR> can replace the management report only and sheds some light on the resources (capitals) used for value creation, while the SER concentrates on the TBL aspect [163]. The other standardized instrument for measuring sustainability impact is, as previously mentioned, the BIA. Its comprehensive B Corp Index is a cumulative score obtained as a sum of questionnaire answers (both qualitative and quantitative) in five impact areas, namely workers, community, environment, customers, and governance. Companies obtaining a score of minimum 80 can apply for the B Corp Certification, which would require them to change their legal form into a Benefit Corporation within two years of after certification. However, apart from the certification, firms can use the Benefit Report on their own as an goal-setting tool for decision-making, for improving their sustainability and comparing their performance to the industry benchmark [149].

### 2.3.3 CSR processes in SME networks and corporate groups

In general, cooperative and community-based approaches to CSR (e.g., strategic alliances) between multiple SMEs, like in the case of networks/clusters and BGs, lead to major advantages for the individual firms taking part in them, not only in short-term economic terms but also from a long-term strategic perspective, by simplifying the implementation of sustainability management policies and helping to maintain the relative tools over time [166]. The following section analyzes how some of the sustainability tools from the previous section were extended to an entire group or network. For this purpose, it will be useful to understand how a BG relates to a network. Groups of companies, in fact, can be seen as having two layers of independent networks: the inter-organizational network, represented by the headquarters and branch offices (core BG), and the intra-organizational network, consisting of the core company, as well as suppliers and associated firms sharing the same goal. One of the articles used these definitions to illustrate the process of knowledge creation for the implementation of a network-wide environmental policy for "zero emissions". After the initial direction provided by top management in announcing the program for environmental management, middle management organized information flows about the new policy from branch offices to construction sites, hauliers and subcontractors in their allocated sites. This drove the arrangement of the inter-organizational network towards stronger ties (more qualitative information and cooperation, decreased opportunism) and density (shared norms and reputational monitoring), as well as effective externalization and socialization of BG's sense of CSR value. Then, middle management emphasized the centrality of corporate headquarters by serving as mediators between them, the construction managers of each branch office and the staff from the environmental improvement department. This bridging led to the sharing and combination of concrete knowledge for setting a proper path for CSR development. Next, branch office managers encouraged hauliers and subcontractors to design, test and share information on environmental management, externalizing the process to the entire intra-organizational network. Then, they helped supervise this process and provided operative training, internalizing this whole approach [172].





Another study showed how the endorsement of an EMS by an intra-organizational network of SMEs can be accomplished using a four-stage decision-making process, representing an adaptation of the ISO 14001 certification model. For the successful implementation of an EMS within an SME network, the network should already exist, the companies should not be competing against one another (for longer term network survival), a network promoter or facilitator should be appointed to carry out the development of the EMS, and it should be possible to decouple, for the innovation in question, the activities that are common across the network from those that address specific company issues. In the first stage, the management of each network company fully commits and accepts that it will take 6-12 months at least to initiate the project. This period will be utilized to build trust among the network members through discussions on projects that would appeal to all of them and, hence, can be achieved by the network as a whole (e.g., decreased environmental impact, and subsequently firm expenses). The second phase revolves around the implementation of those macro network activities, including the development of an environmental policy that shows each organization's commitment to the environment, the identification of the attributes (of products, services and activities) with the most impact on the environment, the awareness and understanding by all staff of any possible legal requirements, the establishment of environmental goals as per policy, and finally the planning of actions for achieving these targets. These first two stages follow the same structure across all network participants, while the remaining two have to be adapted to the peculiar situation of each firm. However, they will be carried out only if the network unanimously agrees to undergo extensive organizational change and work towards obtaining a certification, if satisfied with the results of the first two stages' in-depth analysis (3rd stage). In case a unanimous consent is reached, during the last phase each company will have to start implementing customized processes for establishing EMS responsibilities, providing employee training, managing operations in line with the environmental policy and objectives, developing procedures for identifying, correcting and preventing emergencies and problems, and periodically reviewing or auditing the EMS with the aim of improving it [145].

Concerning the final EMS phase of sustainability reporting, the legitimization BGs and networks are looking for from their CSR policy can be achieved by changing internal systems to include an auditability process. This way accounting technologies (group-wide information systems and data documentation, accounting instructions, books closing and internal controls), which are deemed an exemplary, authoritative and objective approach when it comes to reputation (towards external stakeholders, assurance providers or the top management), ensure that SER becomes an ongoing practice. The three essential elements of this integrated system, according to one of the studies, are data capture (information on data flow from site to group level/consolidation), data quality and reliability (at site accounting accuracy; its expertise can be translated to nonfinancial data), and a specific group social and environmental quality (SEQ) function (responsible for group level sustainability data preparation and external reporting). This function, with the auxiliary involvement of Group Finance and Group IT, sets BG's priorities on SER, so that business sites and areas give it due attention. The empirical research in question documented the stages a group went through on order to make SER auditable and functional across the entire core BG. The first step is to set up a proper information system, either an internally developed one or an external software solution, even one connected to an existing financial reporting platform. In the second stage, the Group Finance is to develop specific accounting instructions to make data registration, processing and the whole SER reporting system auditable and aligned with the financial. These uniform instructions, however, may be considered unfit for some local contexts and not acknowledged by local SEQ staff (e.g., engineers). In these cases, despite the risk of losing the objectivity provided by accounting, Group SEQ opted to not control the intervention so meticulously, allowing local staff to follow their own locally adapted strategies to a certain extent. Third, social and environmental indicators, that are normally disconnected, should then be linked through financial accounting systems (based on double-entry bookkeeping, hence reliable) to ensure that data are reliable. Once defined, these indicators are disclosed in a CSR report on the website, as well as to governmental agencies and nongovernmental organizations, if





required. Fourth, it should be arranged for Group SEQ to assist with the collection of data at sites and registration in the information system, and a standard for data documentation should be internally developed. Once these prerequisites are implemented, the internal control system, ensuring data completeness, can finally be established. For this purpose, the BG should experiment with MCSs, so as to find the most fitting system for its SER strategy. Controls can either be automated, thus built into the information system, or manual, meaning that the SEQ of the BG would perform some analytical procedures (e.g., performance review) to identify deviations between prior- and present-year data, then comment on the differences above 20% only. Alternatively, the BG may trust the assurance provider to design the control system [170].

CSR does not necessarily have to be limited to the group or network only. In fact, SME networks have great potential for increasing positive SD outcomes, especially when SMEs are embedded in the local territory. SMEs in these ethical territorial networks lead through their best practices and a collective vision the diffusion of CSR across the territory, known as territorial social responsibility (TSR). The focus of TSR is not only on shareholders but especially on the community (citizens and territory), which serves as both the main judge and beneficiary of socially responsible activities, such as improvements in the local quality of life and integration of economic events with socio-environmental considerations. TSR focuses on such important dimensions as participation, territorial identity, and the cultural CSR aspect (strategic and operative) for SD [173].

An example of this territorial approach to CSR is given by the implementation of the EMAS scheme, available to stand-alone firms, by a cluster (e.g., industrial districts, technological parks, other territorial agglomerations). This integration of environmental management at cluster level builds upon the co-opetition (cooperation among competing entities) between private companies and stakeholders located close to one another, as well as local governments. This can be considered a policy tool with a twofold purpose. On one hand, there is the pursuit of a more effective environmental performance within a certain jurisdiction (macro level), due to the narrowly focused traditional policy tools. On the other, environment managerial priorities that arise in SMEs also need to be taken into consideration (micro level), since they are simultaneously competing on a global issue for an opportunity to be globally recognized, despite the resource constraints. The transmission mechanism to the territorial area is guaranteed by the fact that SMEs in a cluster share suppliers, clients and similar environmental issues, and comply with the same legislations, thus making it possible for them to jointly come to solutions regarding their common territory, and exploit the resulting economies of scale (e.g., water purification systems used by all firms). The EMAS cluster approach, which is similar to the regional environmental management systems (REMS), is used for consolidating territorial, industrial and environmental policies in industrial clusters [144].

#### **2.4 Integrated sustainability tools and processes for SME groups or networks**

The aim of the present review was to identify the processes through which aggregated companies (mainly in the form of SME networks and groups), which have a dominant influence in the global market, are able to effectively introduce and manage corporate sustainability practices, through integration with their control and management systems.

Insights were gathered on three different levels. On a general level, we tried to understand how corporate sustainability affects the performance of BGs and networks, at the same time investigating the geographic scope of each cooperative organizational type engaged in CSR. Then, through an overview of CSR tools used by SMEs, we identified the possible combinations of integrated MCS-sustainability systems and processes that could be potentially extended to firms engaged in a cooperative relationship. The third and last step consisted of finding out how to implement some of the previously evaluated systems as a network/group-wide strategy. Concerning research interest by countries, emerging economies from the APAC area (South Korea and India, and to some extent China) were the main target for studies on CSR in BGs, while the European context



(Norway, Germany, Italy, Sweden) spurred curiosity about the way networks interacted with CSR. The reasons behind such distributions of geographic focuses in the literature are related to the specific characteristics of each area.

As for emerging markets, in some cases (e.g., India, China) they face mandatory CSR models, making groups easily receptive of community as the purpose of their activities [138]. Additionally, BGs in these contexts are extremely aware of the liability of emergingness (LOE) causing negative reputational spills due to poor ethical practices and institutional voids, hence BGs frequently seek market legitimacy through sustainability-related practices [139]. And last, groups of companies have a prominent economic influence in emerging societies compared with other countries [139,141], which is mainly due to their unique relational structures (e.g., conglomerates and vertical integration in Korean chaebols) and regional business diversification across industries [104,174]. In the case of business networks, they are mainly associated with the European scene because they are perceived as one of the most efficient forms to pursue various strategic objectives (e.g., innovation, internationalization and cross-border cooperation) [175], due to their proven improved access to information and dialogue created within European projects [145]. There have indeed been many successful cases of European networks—especially in Germany (Konvoi approach), Italy (Ambiti Produttivi Omogenei-APO scheme), Spain, Denmark and Sweden [144]—that stimulated a growing interest by academics, policy makers and industrial analysts [176]. The European Union also provides extensive funding for implementing the afore-mentioned goals, which results in a high number of innovation projects led by networks [146]. Due to their importance, business networks are starting to be recognized as proper industrial policy instruments to be developed at European level, like in the Italian case of Business Network Contracts [177].

In terms of relationship between organization type and CSR intensity, among the papers that analyzed this occurrence, the majority found a positive correlation (63%). Both group affiliation (42%) and networks (21%) were found to accelerate the uptake of sustainability practices. No clear connection was found between country-specific contexts or listed status, as both negative and positive outcomes were associated with the same nations (e.g., South Korea, India) and featured both listed and non-listed firms.

A break-down of sustainability drivers revealed that the social dimension, in its employment, community and product responsibility components, was more developed than the environmental one. A possible explanation of this might be that such aspects can be achieved even through slight adjustments in employee wellbeing (e.g., annual monitoring through questionnaires), and hence lower expenses for organizations, more streamlined decision-making and managerial/directorial approval processes, which makes them almost immediately actionable. The same goes for donations to local institutions (e.g., cultural entities), the amount of which can be voluntarily decided based on the financial situation of the donating company. As for product responsibility, it is usually an integral part of the production-distribution process, because it is in a firm's interest to best present their product through warranties, marketing and after-sales assistance. Concerning the most impactful environmental factors, namely R&D, and management/reduction of materials and waste, they understandably require higher investments and a longer-term commitment, hence they are not promptly applicable, nor are the results immediate.

In Table 4, we compare the internal variables and interaction dynamics of BGs and networks that support the uptake of CSR, as summarized from the literature. Size and age (a1) increase resource endowment and, consequently, CSR investments. For BGs to obtain this advantage, they should either be larger or older (with experience incremented over time). The same also applies to networks, since BGs are form of it. However, in this case the situation is a bit more complex because the integration has to be done vertically across the value chain, while, in a group's case, despite firms being also legally independent, they are horizontally coordinated and controlled. The other internal variable is influence by member firms (a2). While both aggregations are inspired by fellow member companies that have adopted CSR practices first, once again the difference lies in the additional control dynamics present in BGs. Here, group promoters (family owners and holdings) both encourage and sometimes require the initiation of CS.



With regard to interaction with CSR, the three levels are macro (b1), that is to say, external interactions, mezo (b2), namely interactions between members, and micro (b3), that is, the impact of group/network structures on SME's CSR. On a macro level, the unitary brand identity of networks and BGs increases their international relevance, and therefore their chances of obtaining external investments. Besides, both structures provide support to governments in defining legal frameworks, priorities and industry standards locally and internationally. Nevertheless, the type of leadership exerted by BGs seems a bit more advanced, probably once again due to their unitary coordination and ownership: their power is quite political-like and, given their authority, they are able to lead by example a sustainability transition in industries or markets.

The mezo perspective suggests that strategic direction, spillover of synergies, and innovation expertise are common characteristics shared by members of both aggregation types. The differences are given once again by the horizontality or verticality in the respective organizational structures. On the one hand, group-level activities are all centralized and coordinated by headquarters, and firms are interdependent, which makes it easier to allocate resources more efficiently, as well as stimulate labor productivity homogeneously across the group through R&D projects. The only downturn in this case is that this homogeneity comes at the expense of those affiliates with the largest resource stock, leading to them sacrificing their own investment opportunities as well as a larger chunk of their endowment. Networks, on the other hand, present a looser but more varied structure, consisting of various value chain levels. This allows them to develop separate knowledge networks for each innovative project, through which they can then gain legitimacy for certifications or audits more easily. Their learning-action patterns can be as simple as exploiting new knowledge commercially and focusing on resource acquisition only, (grazer behavior), acquiring knowledge for the sake of translating it into internal processes (explorer behavior), or it can be more complex when attempting to strengthen external interaction ties for obtaining a benchmark for their existing innovative capacity, exploring and exploiting ideas at the same time (network behavior). Finally, these two collaborative organization forms yield the same positive effects in SMEs. They stimulate SMEs' active engagement in sustainability issues, transmitting more diligent schemes of vigilance to them, and this all helps smaller firms to differentiate themselves from their rivals. SME-specific limits dissipate, as they are able to attract talent, gain better access to markets by improving their capability to fulfill sustainability requirements (by buyers, financial institutions, etc.), optimize their technical and organizational capabilities, and potentially spread their CSR cost burden across numerous firms in the long term, improving earning management. Finally, all networks, but especially BGs, have an interest in adopting CSR in order to improve their brand equity, cumulatively and individually. In this sense, CS has an insurance-like effect that protects a BG's (international) reputation against group-specific externalities and reputational risks coming from family ownership.

**Table 4.** Implications of BG and network dynamics on CSR uptake.

Variables (a) and Interaction Levels (b)	BG Implications for CSR	Network Implications for CSR
a1) Size and age	More assets available (physical, financial, intellectual) to invest in CSR	Sum of different firm resources and capabilities in various business areas along the value chain
a2) Internal influence by <ul style="list-style-type: none"> <li>• Promoters (higher controls) <ul style="list-style-type: none"> <li>○ Family owners</li> <li>○ Controlling firms</li> </ul> </li> <li>• Fellow affiliates (peer pressure)</li> </ul>	<ul style="list-style-type: none"> <li>• Leverage from promoters for initiating CSR and increasing disclosure propensity</li> <li>• Following the example of headquarters and same level subsidiaries by adopting already tested schemes and disclosing behaviors</li> </ul>	Ongoing competitiveness stimulated through peer encouragement



	<ul style="list-style-type: none"> <li>• BG mitigates negative effects of family controls on CSR</li> </ul>	
<p><b>b1) Macro perspective: network/group to external environment</b></p>	<ul style="list-style-type: none"> <li>• High international negotiating power: brand identity increases investors' confidence</li> <li>• Transmission of CSR leadership to the social setting:             <ul style="list-style-type: none"> <li>◦ socio-economic wealth development</li> <li>◦ stimulate other BGs towards a sustainability organizational change</li> <li>◦ exert political power to improve local sustainability laws, requirements, standards</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• High international negotiating power: brand identity increases investors' confidence</li> <li>• Support to policy makers in setting environmental and social priorities/standards for the local industrial system</li> </ul>
<p><b>b2) Mezo perspective: interactions between network/group members</b></p>	<ul style="list-style-type: none"> <li>• Benefits             <ul style="list-style-type: none"> <li>◦ Common long-term strategic direction</li> <li>◦ Efficient resource allocation                 <ul style="list-style-type: none"> <li>◦ Spillovers of expertise, reputational capital, group-level donations</li> </ul> </li> <li>◦ Development of environmental innovations, in turn increasing labor productivity for fulfilling shareholder and legal requirements all possible thanks to                 <ul style="list-style-type: none"> <li>◦ Group firms' interrelatedness</li> </ul> </li> <li>◦ Centralized CS coordination by headquarters                 <ul style="list-style-type: none"> <li>◦ Sharing of resources, external investments and risks                     <ul style="list-style-type: none"> <li>• Costs (resource-rich affiliates only)</li> </ul> </li> </ul> </li> <li>◦ Requested to contribute more assets</li> <li>◦ Having to sacrifice their own investment opportunities to help poorly performing members</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Benefits             <ul style="list-style-type: none"> <li>◦ Common long-term strategic direction</li> <li>◦ Capacity building support for members: expertise shared from different businesses                 <ul style="list-style-type: none"> <li>◦ Multiplier effect in terms of involvement, intra-network synergies, corporate learning</li> </ul> </li> <li>◦ Enables common certification and audit systems management                 <ul style="list-style-type: none"> <li>◦ Sustainability-oriented innovation drivers in the form of knowledge networks:                     <ul style="list-style-type: none"> <li>▪ grazer behavior-resource acquisition, learning is only commercially exploitative</li> <li>▪ explorer behavior—acquisition of new knowledge, translated into processes</li> <li>▪ networker behavior—strengthening of external interaction ties for support/benchmarking, exploitative and exploratory learning</li> </ul> </li> </ul> </li> </ul> </li> </ul>
<p><b>b3) Micro perspective: specific advantages for individual SMEs</b></p>	<ul style="list-style-type: none"> <li>• Increase in ethical awareness, due diligence and vigilance             <ul style="list-style-type: none"> <li>• Promotion of active CSR engagement                 <ul style="list-style-type: none"> <li>• Increase brand equity</li> </ul> </li> <li>• Differentiation strategies against competitors</li> </ul> </li> <li>• Removal of operational barriers (lack of financial, expertise and time resources)             <ul style="list-style-type: none"> <li>◦ Better access to talent</li> </ul> </li> <li>◦ Better access to markets (fulfillment of circularity requirements by buyers)             <ul style="list-style-type: none"> <li>◦ Optimization of organization capabilities, e.g., staff/management specialization, finances, knowledge building, improved employer–employee and supplier–buyer relationships                 <ul style="list-style-type: none"> <li>◦ Decreasing technical complexities</li> <li>◦ Improved CSR earnings negative relations</li> </ul> </li> </ul> </li> </ul>	





This initial evaluation of the advantages of BG/network CSR in SMEs, prompted us to further discover which sustainability-control-integrated instruments were specifically used by SMEs, and could then be potentially extended to the mezo context. The reason for including financial and managerial accounting and controls as a requirement for sustainability systems lies in the authority and reliability transmitted by them to sustainability management, which conversely cannot rely on rigorous and uniform standards.

Different levels of integration between MCSs and CSR were identified throughout the review, depending on the maturity of existing MCSs at the moment when a sustainability transition decision is taken. In one extreme, if MAC is well-established within an organization and any prior CS system is absent, sustainability can be “attached” to the existing system, without great modifications (traditional and contemporary MCS). In the other extreme, sustainability management can disrupt an existing MCS (integrated sustainability systems), by giving equal importance to CSR and MAC. The literature suggested decoupling, to a certain extent, sustainability accounting information from sustainability reporting; this way, it would be possible to keep track of the CS strategy, without mining the accuracy of managerial controls. If we consider MCSs as the economic variable in TBL, we can then cross-evaluate all the identified CSR tools according to their TBL type and degree of integration with the accounting and control system of the company. Figure 8 illustrates such cross-integrated categories, namely “pure” MCSs, sustainability-adapted MCSs, partial social and environmental management tools, and ultimately integrated sustainability systems. It is of note that the higher the cross-integration level, the higher the cost, complexity and requirements of the system. The boxes in the upper part represent MAC systems resulting from the integration with either partial or complete sustainability systems, while the arrows in the lower part provide an overview of sustainability-adapted MCSs. In such a perspective, traditional cost accounting and contemporary BCS (along with the broader PMSs which they belong to) can be considered proper integrated instruments once sustainable indicators are added (MFCA/ISO 14051, sustainability BSC and sustainability PMS respectively).

In terms of social management tools, SIA is a partial CSR model for assessing a firm’s impact on its community. If integrated with MAC, it will result in SAA and SROI. There are also two partial social certification standards that can be adopted for helping improve a company’s accountability towards its workers: OHSAS 18001 (mainly UK) and SA8000.

The largest variety of tools, however, could be attributed to the partial-environmental and sustainability-integrated categories. The procedures for both types could be similarly reorganized and combined into a unified logical process. For example, at the top of environmental management there is eco-efficiency, a managerial philosophy that strategically drives the planning and control cycles of EMS. This may take two main forms, ISO 14001 and EMAS, respectively, taking care of internal process improvements and public accountability, through the eco-mapping toolbox for on-site reviews. EMSs can be complemented by QMS/ISO 9001 (or its non-audited equivalent TQM) for ensuring internal quality, and integrated by EPM (e.g., EPM-KOMPAS for SMEs), in order to prompt enhancements through performance evaluation and support decision-making with additional information on a firm’s strengths, weaknesses, opportunities and threats (SWOT analysis). When EMSs are combined with MACs, EMAs are obtained, with the function of monitoring both physical (e.g., materials, waste) and monetary flows. Benefits assessment, full-cost accounting, life-cycle costing and strategic planning are typical EMA instruments. Once the process of data collection and elaboration is set, the reporting phase can be supported by such schemes as the CDSB framework and the GHG protocol. Similarly, sustainability tools can be developed along the above-mentioned phases of management (ISO 26000, SMS), continuous performance assessment (SPM in general, and SME-specific SAFE), data monitoring (SMA, extending indicators on sustainability effectiveness through CSDI), and reporting (SER in general, and SME-specific SERS). The only difference is that the SCS was proposed as an additional control system to bridge strategy-based SMS and operational SMA. Concerning sustainability reporting, GRI was considered the most complete tool (containing both universal and TBL-specific standards), and BIA was also mentioned as an instrument that could either be used on its own for decision-making, goal-setting and



industry sustainability benchmarking, or as a certification-leading route towards a more “serious” change (in terms of statute and legal form of Benefit Corporation). Finally, sustainability reporting was compared with integrated reporting: the latter is more of a concise managerial report (not replacing sustainability disclosure) providing detailed information on the types of capitals used for creating value (business sustainability), while the former delineates the TBL aspects of a firm, either partially or in its entirety. All the above-mentioned tools are extensively discussed in Section 4.2.2, should a more detailed explanation be useful.

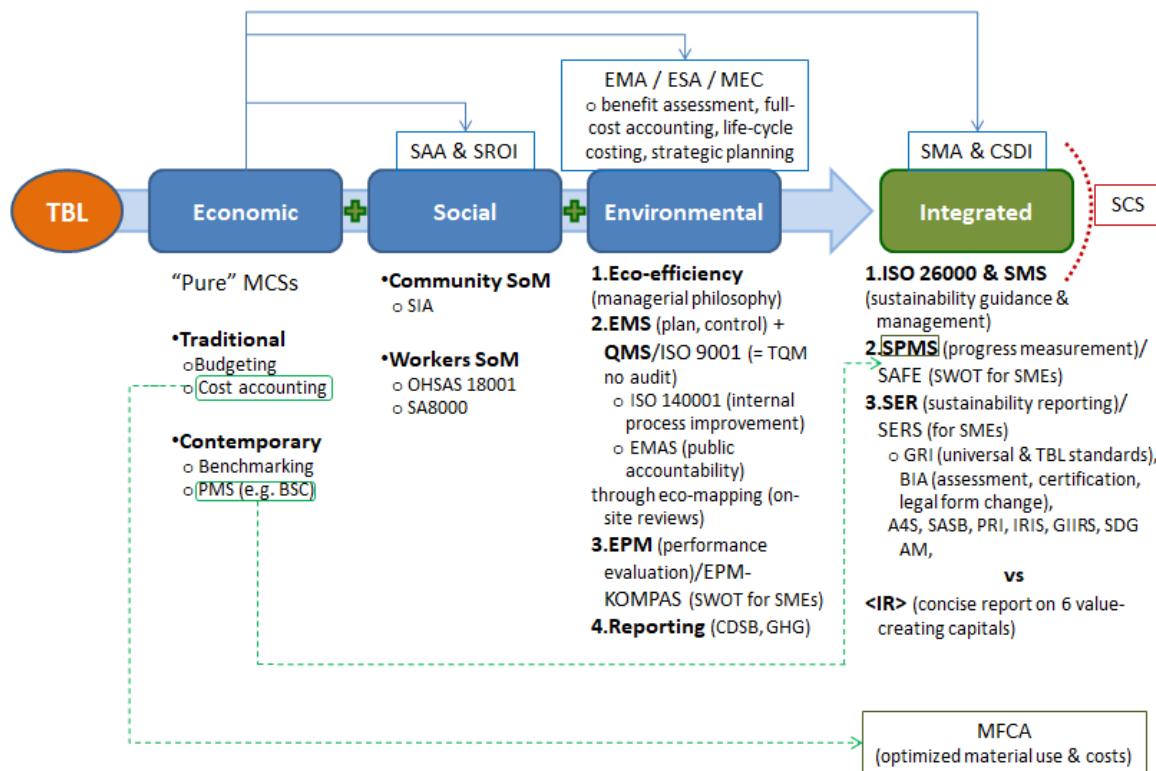


Figure 8. Cross analysis of CSR–MCS and TBL integration.

Abbreviations: A4S = Prince’s Accounting for Sustainability Project; BIA = B Impact Assessment; CDSB = Climate Disclosure Standards Board; CSDI = composite sustainable development index; EMA= environmental management accounting; EMAS = eco-management and audit scheme; EMS = environmental management system; EPM = environmental performance measurement; ESA = environmental and sustainability accounting; GHG = Greenhouse Gas Protocol; GIIRS = Global Impact Investing Report System; GRI = Global Reporting Initiative; IR = integrated reporting; IRIS = Impact Reporting and Investment Standards; ISO 26000 = Social Responsibility; MEC = monitoring and environmental control; MFCA = material flow cost accounting; OHSAS 18001 = Occupational Health and Safety Assessment Series; PMS = performance measurement systems; PRI = Principles for Responsible Investments; QMS = quality management system; SA8000 = Social Accountability; SAA = social accounting and auditing; SASB = Sustainability Accounting Standard Board’s; SDGAM = Sustainable Development Goals Action Manager; SER = sustainability and environmental reporting; SIA = social impact assessments; SMA = sustainability management accounting; SMS = sustainability management systems; SoM = social Management; SPMS = sustainability performance management systems; SROI social return on investment; SWOT = strengths, weaknesses, opportunities and threats; TQM = total quality management.

Once the possible types of CSR tools applicable in the micro-SME context have been identified, along with their sequence of use, we wanted to understand how BGs and networks introduced and applied either of them



across all member firms (mezo perspective) in a systematic fashion. The various steps gathered from the papers in this section were then reorganized in a logical flow, in an attempt to reconstruct a possible comprehensive process that either of the aggregated forms could apply in their transition towards sustainability. Despite some methods being empirically found in groups and other in clusters, this should not pose a problem for the scope of this analysis, as the focus is not on control or ownership, and also because both forms have a similar nature of coordinating multiple and differentiated businesses. In this review, partial environmental tools were replaced with sustainability terms. This was acceptable because the analysis in the previous section showed the similarity of the structures followed by both types. The logical process that resulted from the assessment of the articles consisted of the following stages (Table 5).

First, an initial commitment to and mutual acceptance by all member firms of the objective to build a sustainability management system. During this initial phase, (which can last up to 1 year) in order to build reciprocal trust, fellow companies should collectively pick a project that is both interesting for them and stimulating but achievable by the network or group.

Second, after the first year, group or network-wide preliminary activities should be set in place. The whole process will be initiated by executives, defining a proper sustainability policy, along with the most important CSR topics for the organization (materiality analysis). After all workers have studied and acknowledged the related legal requirements, it will be possible to determine sustainability targets and practical action plans to reach them. The role of middle management is fundamental in this case, as it will serve as a bridge for information flows among the holding, subsidiaries and other participating firms, such as suppliers.

The third step consists of an evaluation of the first two phases. If all the companies in the BG or network feel satisfied with these early results, this will be a decisive stage for the entire network or BG. This is because, at this point, they can opt to either undergo a serious organizational change or abandon the idea. The decision does not necessarily have to do with a certification but can consider the introduction of a different but complex sustainability system at aggregated firm level. In any case, whatever the decision, it has to be unanimous.

Once firms come to a resolution, they can move on to the fourth stage, which consists of them adopting the necessary firm-level actions towards certification or sustainability system. A prerequisite to this phase is the identification or the creation of a network facilitating or appropriate Group SEQ function, which should cooperate with and be supported by the entity's Finance and IT functions. The responsibilities and data capture process will be established at each micro level, along with data quality and communication flow. Other firm-specific activities include employee training, management of operations in conformity to the general sustainability policy, the development of procedures for managing and preventing issues and emergencies. The newly applied system should be periodically reviewed in order to improve it.

Concerning the fifth phase, before concentrating on the design of the chosen internal control system, in order to make sustainability reporting auditable, a series of prerequisites have to be settled down, namely, the establishment of an internal or external information system and the development of specific accounting instructions, which will then be used to link social and environmental indicators so that they can be disclosed on the company website. The group/network SEQ's task will be to assist local branches with data collection and registration at sites. In addition, they will need to develop an internal data documentation standard for auditable reporting. Finally, the extension of CSR through the territorial approach of TSR, not only will help to improve local community and environmental performance in a specific jurisdiction, it will also maintain individual firm focus based on their individual sustainability priorities. Two extremely useful tools, providing excellent support in the diffusion of CSR to the community, are the EMAS scheme and the regional EMS.

**Table 5.** Process-flow for integrating sustainability initiatives within a group or network.

Stage	Activity Description	Actors
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<p><b>1) Project initiation: commitment and acceptance</b></p>	<p>Trust-building through exchange of views on the best project</p> <ul style="list-style-type: none"> <li>• Appealing for each firm</li> <li>• Achievable by group/network</li> </ul>	<p>All member companies</p>
<p><b>2) Implementation of aggregation-wide base activities</b></p>	<ul style="list-style-type: none"> <li>• Sustainability policy development</li> <li>• Materiality analysis</li> <li>• Absorption of legal requirements</li> <li>• Setting of sustainability goals and action plans</li> </ul>	<ul style="list-style-type: none"> <li>• Top management: direction</li> <li>• Middle management: organizing information flows between headquarters, subsidiaries, suppliers, etc.</li> <li>• All staff: study of acquired information</li> </ul>
<p><b>3) Decision to undergo ample change management</b></p>	<ul style="list-style-type: none"> <li>• Undertake a certification</li> <li>• Build a sustainability system</li> </ul>	<p>Top management: strategic decision</p>
<p><b>4) Firm-level actions</b></p>	<ul style="list-style-type: none"> <li>• Establish responsibilities, data capture process, ensure data quality and communication flows</li> <li>• Training</li> <li>• Operations management in conformity to policy</li> <li>• Development of procedures for issue and deviations correction, and emergencies prevention</li> <li>• Periodic system review for future advances</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of a network facilitator <ul style="list-style-type: none"> <li>○ or institution of a Group SEQ function for social and environmental quality</li> <li>○ supported by group/network Finance and IT, awareness of the significance of their new roles</li> </ul> </li> </ul>
<p><b>5) Make reporting auditable for legitimization</b></p>	<ol style="list-style-type: none"> <li>Set up the information system (internal or external)</li> <li>Develop specific accounting instructions</li> <li>Link social and environmental indicators through above accounting system and disclose them</li> <li>Provide assistance in data collection and registration at sites</li> <li>Develop a standard for data documentation internally</li> <li>Establish an internal control system</li> </ol>	<ol style="list-style-type: none"> <li>Group/network IT, Finance, SEQ</li> <li>Group/network Finance</li> <li>Group/network Finance, SEQ</li> <li>Group/network SEQ</li> <li>Group/network SEQ</li> <li>Group/network Finance, SEQ</li> </ol>
<p><b>6) Transition from CSR to territorial social responsibility (optional)</b></p>	<p>Diffusion of CSR across the local territory to</p> <ul style="list-style-type: none"> <li>• Improve citizen's quality of life</li> <li>• Integrate economic events with socio-environmental concerns</li> </ul> <hr/> <p>Regional environmental management systems or EMAS schemes are fitted policy tools to</p> <ol style="list-style-type: none"> <li>Develop effective environmental performance locally (macro level)</li> </ol>	<p>Group/network (top management)</p>



- |  |   |
|--|---|
|  | <ol style="list-style-type: none"><li>2. Consolidate territorial, industrial and environmental policies in industrial clusters</li><li>3. Simultaneously take into consideration individual firms' priorities (micro level)</li></ol> |
|--|---|

## 2.5 Conclusions

The aim of this systematic literature review was to investigate the success behind the adoption of a corporate sustainability and responsibility system by cooperative forms of organization, such as corporate groups and business networks.

To begin with, an evaluation of relations and influences unveiled that both organizational forms have positive effects on CSR development on three levels. With respect to external environment, both yield a certain “political power” when supporting governments in setting industry environmental standards. Concerning member–firm interactions, sustainability-oriented innovations are stimulated by centralized coordination and control in BGs, on one hand, and vertically integrated knowledge networks, separately developed for each innovative project, on the other. Moreover, their micro impact on an individual SME’s CSR allows the latter to increase its reputational gains, mitigate CSR expenses, and optimize organizational capabilities. This study also found that both partial (social, environmental) and complete sustainability systems were susceptible to being integrated with management accounting in SMEs, making it an almost implicit tool for proper CSR.

Finally, by gathering the empirical literature on the sustainability transition of networks and groups, it was possible to trace a complete introduction plan that operators could resort to for initial assistance. The six steps of this process are 1) project initiation, commitment and acceptance, 2) implementation of network/group-wide preliminary actions, 3) decision to undergo ample change management (e.g., certification or general sustainability transition), 4) implementation of firm-level activities, 5) auditability of reporting for better legitimization, 6) transition from CSR to territorial social responsibility (optional).

This chapter additionally provides some practical implications to managers of companies (especially SMEs) that are a part of groups or networks. Firstly, it gives some evidence on the specific characteristics of aggregated firms that can place them at an advantage in pursuing a sustainability management strategy, specifically, the size and internal influence. The size given by the plurality of companies allows each member to leverage a wider base of resources and skills from different business areas to invest in CSR. Concerning influence, headquarters and/or fellow members prompt each firm to engage in CSR by example, through control or peer pressure. Other facilitating factors are experience, international negotiating power, a common long-term strategic direction, and the removal of operational barriers. Along with this, a summary of benefits at each level of BG/network interaction should help companies to acknowledge the importance of CSR for business development and reputational growth. The most impactful corporate sustainability variables are then briefly analyzed, in order to provide an idea of the types of actions that companies can either take immediately or in the long run. Additionally, the chapter presents an overview of CSR-MCS integrated tools that are applicable in various contexts, depending on the organization’s complexity, establishment of pre-existing internal systems, and resource availability. Lastly, managers can follow the steps from the developed framework in order to pursue a sustainability change management and conform all member firms to a unitary CSR system.

Despite the systematic retrieval of all relevant publications, the study may still have limitations due to the risk of omitting applicable articles. Other limitations relate to the fact that findings may not be generalizable because of how heterogeneous the included papers were (emerging vs. developing markets, listed vs. non-listed firms). The current evidence base on sustainability in BGs formed by SMEs is extremely limited (n = 6).





Therefore, future research could empirically explore this particular situation, preferably in the context of developed economies, since all the literature used for content analysis was focused on emerging markets. Further, there is also a need for a wider research base on case studies of business groups and networks implementing CSR across multiple firms. Finally, an additional review on how the banking and financial sectors develop their CSR activities would be an interesting topic to explore.

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## Appendix A – Summary of included studies

	Author s, Year	BG or SME	Journal	Country of Researc h	Scope of Analys is	Research Type and Method	Topics	Limitations for Own Study
[154]	(Vásquez et al. 2019)	SME	Journal of Cleaner Production	Colombia, Italy	Emerging market (Colombia)	Eq (survey): discussion of findings	S. sustainability strategy M. organizational culture SM. EMS, eco-efficiency, MEC	focus on SMEs in an emerging country
[142]	(Kim et al. 2018)	BG	Management Research Review	USA, South Korea	Emerging market (South Korea)	Eq (experiment): descriptive stats, regressions (univariate and multivariate), correlations (Pearson)	S. CSR, legal environment M. ERC	focus on publicly listed companies in an emerging country
[156]	(Johnstone 2020)	SME	Journal of Cleaner Production	Sweden	None	C (review): literature analysis	M. MAC SM. EMS	focus on SMEs





[178]	(Chang, Cheng 2019)	SME	Journal of Cleaner Production	Taiwan	Emerging market (Taiwan)	Eqn (cases analysis): integrated multi-attribute decision analysis model (FDM, GRA, RST)	S. SD, TBL M. generic economic variables	focus on SMEs in an emerging country
[79]	(Ray, Ray Chaudhuri 2018)	BG	Journal of Business Ethics	India	Emerging market (India)	Eqn (survey): descriptive stats, correlations	S. CSS, stock of fungible resources M. generic economic variable (debt ratio)	focus on publicly listed companies in an emerging country
[138]	(Ararat et al. 2018)	BG	Journal of Business Ethics	Turkey, Japan, Canada	Emerging markets (mainly)	C (review): literature analysis	S. CSR, public good M. corporate citizenship	focus on emerging markets and public goods, no MCS analysis
[131]	(Choi et al. 2018)	BG	Journal of Business Ethics	USA, Australia, UAE	Emerging market (South Korea)	Eqn (experiment): descriptive stats, regressions (multivariate), correlations (bivariate)	S. CSR	focus on an emerging country, certain important factors influencing CSR decisions are neglected, no MCS analysis
[140]	(Guo et al. 2018)	BG	Emerging Markets Review	Canada, China	Emerging market (China)	Eqn (experiment): descriptive stats, regressions (univariate, multivariate), correlations (Pearson)	S. CSR M. generic economic variables (ROA, cash, leverage debts/assets)	focus on publicly listed companies in an emerging country
[170]	(Kasper sen,	BG	Journal of Business Ethics	Denmark	One group (UtilGr	Eq (case analysis):	M. auditability SM. SER	focus on one



	Johanse n 2016)				oup, Denma rk)	discussion of findings		multination al group
[139]	(Agnih otri, Bhattac harya 2019)	BG	Journal of Marketing Communic ations	USA, UK	Emergi ng market (India)	Eqn (experiment ): descriptive stats, linear regression (multiple)	S. CSR M. internationaliz ation, generic economic variables (profitability, sales)	focus on an emerging country
[137]	(Monte chia, Di Carlo 2015)	BG	Internation al Journal of Business Governance and Ethics	Italy	Italy	Eqn (cases analysis): content analysis	S. CSD M. generic economic variables	focus on publicly listed companies in one country
[173]	(Del Baldo 2012)	SME BG	Journal of Managem ent & Governance	Italy	Italy	Eq (cases analysis): discussion of findings	S. CSR M. business ethics SM. social control	social control is only mentioned
[132]	(Kim, Oh 2019)	BG	Economic Research- Ekonomska Istraživanja	Kazakhs tan, South Korea	Emergi ng market (India)	Eqn (experiment ): descriptive stats, correlations , panel regression	S. CSR M. generic economic variables (profitability, leverage/finan cial risk, sales growth)	focus on publicly listed companies in an emerging country
[141]	(Choi et al. 2013)	BG	Corporate Governance : An Internation al Review	Australi a, South Korea	Emergi ng market (South Korea)	Eqn (experiment ): descriptive stats, linear regressions (OLS, 2SLS), correlations	S. CSP M. generic economic variables (leverage, ROA)	focus on publicly listed companies in an emerging country
[78]	(Choi et al. 2019)	BG	Pacific- Basin Finance Journal	USA, South Korea	Emergi ng market (South Korea)	Eqn (experiment ): descriptive stats, regressions (logistic and linear OLS of Tobin's Q), correlations	S. CSR, financial donations M. generic economic variables (leverage, profitability)	focus on publicly listed companies in an emerging country
[164]	(Marco- Fondev	SME	Corporate Social Responsibil	Spain	Spain	Eqn (experiment ):	S. CS, EDA M. generic economic	focus on SMEs



	ila et al. 2018)		ity & Environmental Management			distributions, linear regression (ANOVA), correlations	variables (profitability, EBITDA, turnover) SM. ESA	
[172]	(Akiyama 2010)	BG	Asian Business & Management	Japan	One group (Sekisui House, Japan)	Eq (case analysis): discussion of findings	S. CSR, environmental management M. interorganizational-networks	focus on one BG, too project-specific, no MCS analysis
[135]	(Chauhan, Kumar 2018)	BG	Emerging Markets Review	India	Emerging market (India)	Eq (experiment): descriptive stats, regressions (multivariate of Tobin Q), correlations	S. ESG M. generic economic variables (cost of equity/debt/capital, cash flow, ROA)	focus on an emerging country
[104]	(Woo et al. 2014)	SME BG	Sustainability	South Korea	Emerging market (South Korea)	Eq (experiment): descriptive stats, regressions (multivariate), correlations	S. EI	focus on an emerging country, environmental accounting is only mentioned
[148]	(Singh et al. 2018)	SME	Journal of Intelligent Manufacturing	Malaysia	Emerging market (one SME, India)	Eq (cases analysis): sustainability evaluation method (FAHP, FIS)	S. sustainability evaluation M. BSC framework	focus on one SME in an emerging country
[179]	(Feiock et al. 2014)	BG	Urban Affairs Review	USA, South Korea	USA	Eq (survey): hierarchical model	S. local sustainability	focus on local programs and policies (macro not micro), survey of local officials instead of companies, no MCS analysis



[146]	(Klewitz 2017)	SME	Innovation: The European Journal of Social Sciences	Germany	Germany	Eql (cases analysis): discussion of findings	S. SOI M. knowledge network SM. sustainability BSC	focus on SME networks
[134]	(Lee 2018)	BG	The Journal of Asian Finance, Economics and Business	South Korea	Emerging market (South Korea)	Eqn (experiment): descriptive stats, regressions (Probit), correlations (Pearson)	S. CSR M. generic economic variables (ROA, leverage)	focus on publicly listed companies in an emerging country
[76]	(von Weltzien Höivik, Shankar 2011)	SME BG	Journal of Business Ethics	Norway	Norway	C (review): literature analysis	S. CSR M. network, CBA, risk management	focus on SME networks
[180]	(Suriya, Sudtasan 2014)	BG	Business & Economic Horizons	Thailand	Emerging market (Thailand)	C (presentation of an empirical method): description of an econometric model	S. CSR, SD SM. sustainable profit	focus on publicly listed companies in an emerging country
[80]	(Hosoda 2018)	SME	Corporate Governance: The International Journal of Effective Board Performance	Japan	One SME (Japan)	Eql (case analysis): discussion of findings	S. CSR SM. MCS-CSR integration	focus on one SME
[181]	(López-Pérez et al. 2017)	SME	Business Strategy & the Environment	Spain	Spain	Eqn (experiment): test of the causal paths through bootstrapping	S. CSR M. generic financial value variable SM. financial and non-financial outcomes	focus on SMEs
[150]	(Sulong et al. 2015)	SME	Journal of Cleaner Production	Malaysia	Emerging market (one)	Eql (cases analysis): discussion of findings	SM. MFCA	focus on one SME in an





					SME, Malaysia)			emerging country
[182]	(Acar et al. 2015)	BG	Tekstil ve Konfeksiyon	Turkey	Emerging market (one group, Turkey)	Eqn (case analysis): TOPSIS method	S. sustainability performance M. MCDM	focus on one BG in an emerging country, no MCS analysis
[145]	(Halila 2007: 14001)	SME	Corporate Social Responsibility & Environmental Management	Sweden	One SME network (Sweden)	Eqn (case analysis): discussion of findings	S. EI M. network SM. EMS	focus on one SME network
[136]	(Terlaak et al. 2018)	BG	Journal of Business Ethics	USA, South Korea	Emerging market (South Korea)	Eqn (experiment): logistic regression, correlations	S. environmental performance M. generic economic variables (ROA, leverage)	focus on an emerging country
[133]	(Panicker 2017)	BG	Social Responsibility Journal	India	Emerging market (India)	Eqn (experiment): descriptive stats, regressions (Tobit), correlations	S. CSR M. ownership SM. generic economic variable (profitability)	focus on publicly listed companies in an emerging country
[183]	(Murillo, Lozano 2009)	SME	Business Ethics: A European Review	Spain	One project (Spain)	Eqn (case analysis): discussion of findings	S. CSR M. network	focus on public policy perspective and one project, no MCS analysis
[163]	(Girella et al. 2019)	SME	Corporate Social Responsibility & Environmental Management	Italy	Italy (3 firms)	Eqn (cases analysis): discussion of findings	S. SD, integrated reporting (GRI)	focus on SMEs, limited empirical sample, no specific metric described, GRI



								economic metrics as dummy variable only
[184]	(Halme Korpela 2014)	SME	Business Strategy & the Environment	Finland	Nordic countries (Denmark, Norway, Sweden, Finland, Iceland)	Eql (cases analysis): discussion of findings	S. SD, responsible innovations	focus on SMEs, no MCS analysis
[185]	(Corazza 2018)	SME BG	Journal of Applied Accounting Research	Italy	Bulgaria, Italy, Spain	Eql (case analysis): discussion of findings	S. CSR, ISO 26000 SM. SER	limited empirical sample (6 firms in 3 EU countries)
[162]	(Laurinkevičiūtė, Stasiškienė 2011)	SME	Clean Technologies & Environmental Policy	Lithuania	One SME (Lithuania)	Eqn (case analysis): analysis of sustainability costs, NPV, CSDI	SM. SMS, EMA, SMA, CSDI	focus on one SME
[186]	(Moore, Manring 2009)	SME	Journal of Cleaner Production	USA	None	C (review): literature analysis	S. CSR, CER M. network SM. sustainable supply chain management	focus on SMEs, no MCS analysis
[187]	(Shashiet al. 2018)	SME	Benchmarking: An International Journal	India, Italy, The Netherlands	Emerging market (India)	Eqn (experiment): exploratory factor analysis, confirmatory factor analysis, structural equation modeling	S. sustainability orientation M. generic cost performance variable	focus on SMEs
[149]	(Nigri, Del)	SME	Sustainability	Italy	Italy	Eql (cases analysis):	S. CSR, SIA SM. SMA system, SPMS,	focus on SMEs, limited



	Baldo (2018)					discussion of findings	benefit corporation	empirical sample (7)
[169]	(Laurinkevičiūtė, Stasiškienė 2010)	SME	Environmental Research, Engineering & Management	Lithuania	One SME (Lithuania)	Eqn (case analysis): analysis of sustainability costs, NPV, CSDI	SM. EMA, SMA, CSDI	focus on one SME
[147]	(Lopez-Valeiras et al. 2015)	SME	Sustainability	Spain	Spain, Portugal	Eqn (experiment): descriptive stats, psychometric properties of measures, discriminant validity coefficient, regressions (PLS), correlations	S. SOI M. traditional (cost accounting, budget system) and contemporary (balanced scorecard, benchmarking) MCS	a limited number of MACS tools is considered
[188]	(Ciasullo, Troisi 2013)	SME BG	TQM Journal	Italy	One group (Italy)	Eqn (case analysis): discussion of findings	SM. sustainable value creation	focus on one BG
[144]	(Daddi, Iraldo 2016)	SME	International Journal of Sustainable Development & World Ecology	Italy	One SME network (Italy)	Eqn (case analysis): discussion of findings	M. industrial cluster policies SM. EMS, eco-management and audit	focus on one SME network
[189]	(Dávila, Dávila 2014)	BG	Australian Economic History Review	Colombia	Emerging market (one group, Fundación Social, Colombia)	Eqn (case analysis): discussion of findings	S. CSR	focus on one BG in an emerging country, no MCS analysis
[190]	(Sudthana 2016)	BG	UTCC International Journal of Business	Thailand	Emerging market (Thailand)	Eqn (cases analysis): content analysis	S. CSR M. IMC	focus on an emerging country, limited CSR analysis



&  
Economics

[191]	(Stekel orum et al. 2019)	SME	Applied Economics	France, Morocco	France	Eqn (experiment ): descriptive stats, multiple mediation analysis, correlations	S. CSR M. supply chain, generic economic variable	focus on SMEs
[166]	(Johnso n, Schalte gger 2016)	SME BG	Journal of Small Business Manageme nt	German y	None	C (review): literature analysis	SM. generic (benchmarking , sustainability , BSC and reporting, QMS, EMS, social management systems) and SME-specific (eco-mapping, EPM-Kompas, SAFE, SERS) sustainability management tools	focus on SMEs, only brief mention of the facilitating nature of group and network- oriented tools

Abbreviations: 2SLS = two-stage least squares; BSC = balanced scorecard; C = conceptual research; CBA = cost-benefit analysis; CSR = corporate social responsibility; CER = corporate environmental responsibility; CSD = corporate social disclosure; CSDI = composite sustainable development index; CSP = corporate social performance; CSS = corporate sustainability strategy; EDA = environmental disclosure and accountability; EI = environmental innovation; EMA = environmental management accounting; EMS = environmental management system; EqL = empirical qualitative research; Eqn = empirical quantitative research; ERC = earnings response coefficient; ESA = environmental and sustainability accounting; ESG = non-financial disclosure; FAHP = fuzzy analytical hierarchy process; FDM = fuzzy delphi method; FIS = fuzzy inference system; GRA = grey relational analysis; IMC = integrated marketing communication; MAC = management accounting and control; MCDM = multi-criteria decision making; MCS = management control system; MEC = monitoring and environmental control; MFCA = material flow cost accounting; NPV = net present value; OLS = ordinary least squares; PLS = partial least square; QMS = quality management system; RST = rough set theory; SAFE = sustainability assessment for enterprises; SD = sustainable development; SER = social and environmental reporting; SERS = sustainability evaluation and reporting system; SIA = social impact assessment; SMA = sustainability management accounting; SMS = sustainable management system; SOI = sustainability-oriented innovations; SPMS = sustainable performance management system; TOPSIS = technique for order preference by similarity to ideal solution. References in grey were further analyzed in their content (section 4.2).





## Chapter 3. Accountability through sustainability data governance: reconfiguring reporting to better account for the digital acceleration

*Accountability assessment is a highly relevant challenge for companies nowadays. The Covid-19 pandemic prompted a digital acceleration in business environments, which in turn brought more focus on sustainability practices that could help organizations better demonstrate their accountability, thus making them more resilient to the ever-changing socio-economic context. Therefore, the chapter aims to evaluate how to further improve corporate accountability (on a strategic and operational level), taking advantage of the digitalization changes that companies are being forced to go through and applying them to the sustainability evaluation process, including the reporting as its final output. The first research outcome is a combined framework, based on data governance and sustainability literature models, seeking to optimize the manageability of sustainability data. The second outcome is a matrix, based on a content analysis of 20 sustainability reports, representing eight possible types of behavior that companies adopt when integrating digitalization practices into their sustainability evaluation process. The chapter aims to explore how the communication of digital activities could refine the diligence of the sustainability assessment process, with disclosure representing its last step. Finally, the “leading” case was broken down into the general strategic components that could potentially be included in a balanced data-sustainability reporting strategy.*

### 3.1. Accountability relevance in the wake of the digital acceleration

Corporate digitalization is a currently relevant topic that, up until recently, has been dictated by regular competitive dynamics. Market leaders, seeking to align their productivity levels to the market’s evolving needs (and having the investment capacity to do so), introduce innovations that transform conventional business models and set benchmarks. This has a ripple effect on the digital transformation of the remaining companies, which begin to apply advanced technologies that would enable them to seize the novel market opportunities, also by adapting to the changing digitalization expectations of consumers [1].

At the beginning of 2020, however, the entire world was forced to undergo a sudden transition. The outbreak of the Covid-19 pandemic prompted the implementation of a series of containment measures that resulted in the acceleration of the digital transformation globally [2–4]. Such interventions greatly increased society’s reliance on digital systems, with internet traffic growing up to 60% [5]. In the business context, specifically, such a rushed digitalization became the new imperative for companies’ continuity, both in terms of growth of operations and survival in the market, with Small-Medium Enterprises (SMEs) struggling the most [6–8]. Several firms subsequently began acquiring digital tools more intensively (e.g. +3% surge of e-commerce in 2020’s share of global retail trade) [5].

Despite being perceived as highly coercive in the business context, many firms were receptive to this digital “migration”, as they realized the long-term benefits that it could bring to their activity. The SMEs that are now actively transitioning, for example, do so because this could (i) greatly improve their organizational resiliency to potential future crises of similar scope, (ii) make their decision-making process more time-efficient, and (iii) help them communicate with clients more transparently and effectively (57% relevance cumulatively). In fact, in a good 44% of SME cases, Covid-19 represented a stimulus for making the implementation of new technologies semi-permanent, among which those for remote and flexible working will be carried on in a cumulative 58% of occurrences [5].

Nevertheless, digital transformation does not follow one linear path of enactment. It is rather a dynamic and unique strategy for each firm that needs constant readjustment for delivering higher market value. The decision of one path over the other largely depends on a company’s learning capacity, as well as the degree of its digital maturity and technology adoption [9], which (in the European context in particular) is what ultimately determined the level of resilience and response of SMEs to the Covid-19 crisis [5,9]. Businesses that managed to invest in digitizing their core operations (e.g. through cloud migration, data security, artificial intelligence, smart-working) have also helped, in their aggregated form, to partially reverse the slowdown of



the global economic activity, while setting the world on a digital shift acceleration that is deemed to last until after the recovery period [10–13].

The prioritization of all digital initiatives in response to the breakout of Covid-19 was, however, not the sole requirement companies had to adapt to. In order to achieve greater business impact and value, especially under such rapidly changing market conditions, businesses would eventually need to implement a data-driven culture built upon an adaptive and agile data governance program [14–16]. Data governance is a key supporting element of digitalization, enabling barrier-less knowledge flow and sharing within an organization [17]. Managing this change process would allow firms to address two key challenges, namely increasing Data Literacy and embedding Data & Analytics (deemed to be the number one game-changer against the pandemic crisis) into company-wide strategies, decision-making and results [14–16].

It should be noted, however, that the digital transition is not the only element that intensified during the pandemic. A second key variable needs to be added to this scenario in which firms feel under increasing pressure, and namely accountability. This corporate governance concept relates to businesses recognizing the responsibility for their decisions and activities towards the entirety of their stakeholders (investors, customers, governments, etc.), which expect a positive societal contribution of companies. Sustainability, through assessment (and the related sustainability reporting output), allows organizations to demonstrate this commitment and report to stakeholders on their sustainability performance [18–20]. The pandemic only accentuated the public need for corporate accountability, placing firms under increased scrutiny [21]. Moreover, similarly to the consequences of digitalization, this helped the companies with a higher sustainability performance to alleviate the damaging effects of the Covid-19 crisis [22].

The digital transformation itself that was prompted by the novel pandemic also helped to bring more attention to the sustainability transition, with a focus on the importance of certain pressing practices related to social responsibility, such as remote working and workplace health safety [16], as well as on new sustainable technologies addressing digital optimization, with various ethical implications [23,24]. This was an unexpected outcome that aligned with the twin digital-green transition promoted by the European Green Deal, under which digital technologies are considered to be essential enablers of global sustainability achievements and should be leveraged as such [25]. The subsequent European Industrial Strategy [26] and Circular Economy Action Plan [27] for supporting the Green Deal emphasized that innovation models are additional levers for enhancing competitiveness through this twin challenge.

Besides, given that companies can provide evidence of their accountability through sustainability data, processed during sustainability evaluations, the introduction of corporate data governance alongside the sustainability culture could potentially improve the assessment of sustainability results [28], overcoming such problems as the time required to complete the assessment (mostly manual data processing) [29] and the lack of sustainability data quality [30]. In fact, data governance itself is founded on the critical principle of company-wide accountability, which has the function of making corporate data practices more flexible and adaptable to emerging market demands and business models [31–33]. The European Commission, thus, reiterated its commitment through the Next Generation investment plan, in order to help the European society and businesses become more resilient by using the recovery funds to expedite the twin transition even further [34]. In light of the “twin transition” path set forward by the European policy context, and considering that the Covid-19 pandemic has only intensified the need for digitalization and accountability, while at the same time providing an opportunity to improve both (through the tools that companies began using more intensively), this study aims to provide an answer to the following question:

How can the tools and practices that have been normally applied to support digitalization be of service to making sustainability assessment more rigorous, thus helping companies to better demonstrate their accountability?

In order to gain an in-depth understanding of this aspect, it is to use a macro-micro corporate perspective in the analysis:



- on a macro-strategic level: how can data governance, a digitalization construct built on the accountability approach, be combined with the sustainability assessment process to further improve the accountability of a business?
- on a micro-operational level: how do companies communicate their digitalization efforts to strengthen sustainability reporting, the ultimate outcome of the sustainability assessment process, ultimately increasing their accountability to stakeholders?

This chapter will be therefore making two main contributions, respectively. First, by resorting to the elements of data governance and sustainability assessment found in the extant literature, an integrated framework is proposed. Second, a matrix of the reporting behaviors adopted by companies is developed based on an empirical analysis of sustainability disclosure documents, with the “leading” case being then analyzed more in depth.

The remainder of the chapter is structured as follows: section 2 presents the theoretical concepts that are at the core of data governance and sustainability assessment; section 3 describes the adopted research method and information gathered; section 4 presents the main outcomes of the chapter, the framework and matrix; section discusses the results and concludes the chapter.

### ***3.1.1 Digital transformation and business strategy***

Covid-19 brought along several challenges for businesses – including in the domains of management of employees and supply chain, planning budgets, inventory management, production and definition of suitable business models [35], and knowledge management [36]. Nonetheless, emerging technologies (e.g. big data, Artificial Intelligence – AI) have disrupted business as usual, proving to be efficient tools in driving the business innovative capacity [37], promoting high performance levels [38], and providing operational guidance to firms in the present scenario, and possible similar situations in the future [35]. The nature of accounting and auditing, in particular, was profoundly changed in the way they are administered, requiring a new digital skillset and the right digital technologies to increase their reliability [39,40].

A digital transition at the corporate level, in order to be successfully carried out, requires businesses to develop an integrated and interdisciplinary approach [41] while supplementing the adoption of new technologies with a strategic change. A company can pursue a digital strategy that either focuses on the digital solution itself (data and product/service) or the excellence in customer experience. Whatever the focus, a digital strategy will simultaneously take into consideration the organizational culture and business model, employee preparedness, networks (e.g. partnerships, strategic alliances, supply chain agility and automation), customer engagement, operations (decision-making, process efficiency and automation) [42], as well as portfolio innovation [43] and digital risks (obsolescence, unauthorized data use, inefficient business processes, lacking digital skills, etc.) [44]. These elements eventually define the digital performance level of an organization [1]. A digital strategy performs six main functions: (1) setting a long-run vision for the digital transformation path; (2) dividing the digital vision into different objectives; (3) assessing the current digital maturity level of the company (identifying strengths, weaknesses, opportunities for improvements, competitive environments and gaps in capabilities, resources and technologies); (4) selecting and prioritizing technologies, capabilities and methods for allowing employees to adjust to the new/re-engineered way of working; (5) defining how the new digital culture will be created; (6) monitoring progress and effectiveness of the strategy [43,44].

The ability of the digital strategy to be efficient also depends on how digital architecture can align the Information Technology (IT) function and the overall organization strategy and provide the necessary methods and tools (e.g. frameworks, system development and management) to manage the digital transformation complexity (costs, system rigidity, delays in change deliveries, etc.) [45].



### 3.1.2 Digital transformation and data governance

The uptake of the digital transformation led to an increase in available data, which is nowadays becoming a progressively strategic commodity, comparable to a currency that “fuels” the digital transition itself and demonstrates its advancement. It should be, hence, handled properly, similarly to facility and people assets [46–49]. However, its abundance brings along several issues related to security breaches, reputation, intellectual property rights, management costs and unsure returns from technology investments, which all call for the adaptation and improvement of management capabilities [47,50,51].

One fundamental principle of data management that should be addressed in the first place to optimize the value of corporate data assets is data governance [52], which purpose is to ensure that company targets can rely on accessible, complete, relevant, shareable, and qualitative data across the entire organization. Data governance helps to manage the collection, integration (from various sources), monitoring, analytics and modeling (for data-driven decisions), and control of data throughout its life cycle [46,47,50,51], ensuring the maximization and ethical-regulatory compliance of the data potential [53].

At its very core, governance builds upon a data strategy that, similarly to the more comprehensive digital transformation strategy, helps to define a vision with the related objectives, the strategic principles against which every strategic decision will be validated, as well as a set of clearly defined and easily measurable performance metrics for assessing the impact of each activity or project [51]. Data policies represent an extremely useful instrument in circulating the data vision across the functions, but especially in making the company commitment more explicit [47,54]. Furthermore, three other important data management capabilities support the efficient execution of data governance: namely data stewardship, data-oriented organizational culture, and data architecture. The first concept refers to the internal assignment of responsibilities for the various digital change activities [50,55], while the second deals with the engagement of workers, making them willing to accept the new digital transition and mindset [50,56] while reinforcing their digital skills and literacy to allow for a smoother transition [47,57]. For what concerns data architecture, it refers to the technology infrastructure and the practical aspects of mapping, handling and combining various technologies (e.gg software, hardware, monitoring tools) [47,51,54] for managing the lifecycle (acquisition, storage, processing and disposal), quality across the lifecycle [58], and value of data resources [59]. The complexity of data governance increases when dealing with inter-organizational relationships, such as in the case of business groups or networks. Such entities are composed of various organizations that share data and resources amongst each other, therefore data governance must take a different conceptual form. In fact, in these instances, it is often referred to as data ecosystem governance, a type of interactive and collaborative environment for co-creating service value based on data. The evolution of such data ecosystems strictly depends on the success of the technical infrastructures, which, in this particular instance, are platform-based [60].

The above concepts have been gathered into comprehensive data governance frameworks (DGF), both in academic and practice literature. The most complete ones are the DGF for the industry 4.0 environment [61], the DGF from the Data Governance Institute [62], the data quality process framework [63], and the enterprise DGF [64], which follow the same structure. At the very top there is the strategic planning, with a definition of the vision, goals, key performance indicators (KPIs), and data policies/rules. These elements are supported by the identification of process owners and stakeholders, the organizational culture (managing the change for employees), and the technologies adopted. Data life-cycling ensures quality and risk management through periodic controlling procedures on the key attributes’ completeness, accuracy, consistency, timeliness, and security. The results and sources of data quality discrepancies and inconsistency between goals and results are analyzed to then implement any improvement plans.





### 3.1.3 Sustainability data, reporting and digital tools

The sustainability performance of a company is usually measured through the triple bottom line (TBL), which refers to the accounting of financial, social, and environmental variables [65]. Every topic belonging to each of these three sustainability dimensions can be converted into a distinct sustainability data item [66] by referring to sustainability accounting. This is an integrated financial system that defines the principles and procedures for measuring sustainability metrics [67,68]. The Global Reporting Initiative (GRI) – currently cooperating with the European Financial Reporting Advisory Group (EFRAG) to foster international convergence in sustainability reporting [69] – represents the most common methodology in practice to compute these evaluations [70]. Sustainability data is presented to stakeholders in a corporate sustainability report [70], representing the final product of the sustainability assessment process [71,72]. Such conventional management evaluations as KPI, when combined with the TBL approach, become the sophisticated building blocks of nonfinancial (or sustainability) reporting [19].

A sustainability report is a publication through which the majority of firms (around 80% globally) respond to the growing demand by stakeholders (e.g. investors, non-governmental organizations, customers, regulators) to assess the non-financial performance of businesses [73,74], along with their ability to manage sustainability risks [75], making it the main reporting reason in around 50% of cases [76]. This is strictly related to the ability of stakeholders to influence an organization's reputation and subsequent capacity to attract investments, customers, and talents.

Sustainability results are deemed credible by stakeholders only if they are comparable across years and firms and if the collected information is verifiable through the use of widely adopted frameworks (such as the aforementioned GRI), and is also balanced, hence considering both negative and positive impacts, but also includes completeness of data perspectives (social-environmental, short-long term, quantitative-qualitative) [73,74]. Sustainability disclosure is also an important feedback mechanism for the entire sustainability strategy, that allows to assess outcomes and reset goals if needed [75].

The reporting process consists in defining the material topics (corporate sustainability impacts that are considered critical by both the company and its stakeholders) [20], collecting and aggregating data, developing the content and publishing it. These tasks are somewhat time-consuming for a firm, especially considering that most organizations manually gather and elaborate information through legacy systems (e.g. spreadsheets or surveys for enquiring on stakeholder materiality). This is where digital solutions for data mining, such as artificial intelligence for data extraction, software, blockchain, and XBRL technologies, can help automate and speed up the entire reporting process, while at the same time improving data accuracy and transparency [29]. Additionally, digital technologies can be incorporated into the sustainability reporting process downstream, with respect to communication formats. This helps companies to move beyond the traditional PDF file, which does not provide an efficient ground for an open dialogue with the reader, towards more interactive and tailored reports for each stakeholder category, with engaging data visualization, animation, and storytelling [77].

In both cases, a cultural shift is deemed mandatory, since it would introduce the workforce of a certain company to a new data-driven mindset [29].

The sustainability assessment process has also been analyzed from a framework perspective in literature. It is interesting to note the similarities of certain of its constructs to those found in DGFs: the sustainability strategy sets a vision and targets, declining the sustainability values, policies, and indicators, along with the stakeholders and processes responsible for them and defining the internal sustainability culture. In addition to the DGF, organizational sustainability assessment frameworks [78–80] and the business excellence model



for sustainability [81] found in literature contribute in terms of the methods and tools for evaluating sustainability data, as well as the reporting and controlling of results.

### 3.2 Methods and data

Given that digitalization and sustainability are challenges that go hand in hand in the present societal context, companies could leverage the existing data governance paradigms to improve the overall management quality of their economic, social and environmental accountability. Under the previous assumptions, this chapter will seek to test the following propositions:

P1) Companies can improve the clarity and solidity of their sustainability assessment process as a whole by making use of data governance principles and structure.

P2) When dealing with the last phase of the assessment, reporting, businesses adopt various degrees of integration between information on their sustainability initiatives and digitalization efforts to demonstrate their accountability to stakeholders.

P3) Among such reporting attitudes, certain company cases are interesting to be analyzed in depth because they provide a good content balance between overall company data/digitalization and sustainability data.

The methodological approach adopted in this chapter was based on a two-fold qualitative analysis, both on a corporate macro-strategic and micro-operational level.

The first assessment relied on a literature analysis of conceptual frameworks on data governance and sustainability assessments, carried out in the theoretical background section. The objective of this analysis was to find the parallels between the digitalization and sustainability strategy, and therefore the points of “contact” between the two, as well as the additional factors that could help improve the solidity of the sustainability assessments process through certain constructs which support the accountability of corporate digitalization (data governance). The criteria used to select the frameworks in literature were (1) comprehensiveness of the DGFs (that include all the most common elements of data governance found in literature) and (2) fit of sustainability assessment frameworks with DGF structure (presence of common elements). This resulted in the proposal of a framework for improving the quality of sustainability data governance, based on the integration of various models found in literature into a new, unified model.

As for the operational level, secondary data was collected from a sample of 20 selected corporate sustainability reports, retrieved through the search engine. The sample size was chosen according to expert recommendations [82], whereas the search engine was picked as a retrieval method due to the fact that the sustainability report is a digitalized tool, hence requiring publication on the corporate website (traditional pdf or digital content) for transparency to external audiences [77]. Also, considering that search engine optimization (SEO) ensures a competitive advantage in visibility, firms in the first positions are the ones willing to promote the quality of sustainability web content more [83], therefore guiding the disclosing attitude in their market of reference [84].

For this reason, the companies that constituted the sample are leading companies, whose example is interesting to study due to their capability to determine the speed and mode of adaptation of the rest of the market players, and especially SMEs, which tend to get inspired in their actions by the leaders [1].

The following table (Table 1) presents the sampled companies and their sectors, linking each to their respective reporting behavior, described under section 4.2.

**Table 1.** Features of analyzed companies.

Type of reporter	Digital domain in report	Scope	Content example	Companies (sectors)
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1. (5%) Keyworder	None (scattered throughout the document)	Keywords in environmental progress report	Data privacy and security	Apple (software, hardware)
2. (30%) Checkmarker	Privacy and data security	1 paragraph or statement in sustainability report	Data collection, confidentiality, protection, security, or privacy	<ul style="list-style-type: none"> <li>Credit Suisse (financial services)</li> <li>Biesse (industrial machines)</li> <li>Fincantieri (shipbuilding)</li> <li>Sunlife (financial services)</li> <li>Trimble (technology)</li> <li>ManpowerGroup (professional services)</li> </ul>
3. (5%) Planner	Strategic and economic development	2 pages in digital sustainability report	Digital roadmap for digital vision with partners	Kaefer (industrial insulation, surface protection)
4. (10%) Lister	Data privacy and cybersecurity	1 page in ESG report	Dedicated cyber emergency response team, threat intelligence center, cybersecurity risk management framework, and training	<ul style="list-style-type: none"> <li>Digital Reality (cloud, IT, communication services)</li> <li>Lenovo (technology)</li> </ul>
5. (20%) Supporter	Projects sections	Scattered throughout report sections	Core digital services, data accuracy improvement, recycling and reuse of hardware assets, employee digital “university” training platform, digitalization of communities	<ul style="list-style-type: none"> <li>DXC Technology (B2B IT services)</li> <li>Microsoft (technology-digital tools for impact reduction)</li> <li>Tetra Tech (engineering consulting)</li> <li>TIM (telecommunication)</li> </ul>
6. (15%) Best practice generator	Data privacy and cybersecurity or digital transformation/ethos/inclusion chapter	1 chapter in sustainability report	Digital principles, data protection management process, training and threat prediction, cybersecurity framework, security development life cycle process	<ul style="list-style-type: none"> <li>Samsung Electronics (electronics)</li> <li>VMware (cloud computing, virtualization)</li> <li>ASUS (electronics)</li> </ul>
7. (10%) Twin integrator	None (scattered throughout the document)	Entire digital impact and sustainability report	Digital ambitions connected to SDGs for building better digitally inclusive lives, transparent description data governance/management/use	<ul style="list-style-type: none"> <li>BT (communication services)</li> <li>PepsiCo (beverages bottler)</li> </ul>
8. (5%) Leader in responsible data governance practices	Entire report	Stand-alone data balance sheet and integrated reporting	Data management strategy, data-driven advice to customers, cybersecurity and data protection	OP Financial Group (financial services) Finland’s biggest financial services group

The selection criteria adopted to identify suitable reports were: (i) availability, within the document, of any information on the digitalization practices adopted by the company (with at least a mention through a



keyword); (ii) English or Italian as the reporting language; (iii) publication of the full-text in pdf format on the company's website or dedicated web page combining digitalization values and sustainability initiatives. The keywords used to find such reports were: sustainability report and digital/digitalization/data governance.

A content analysis was performed on the reports to identify the differences between how companies reported on their digitalization activities within their sustainability disclosures, as additional information to what the most mainstream sustainability disclosure frameworks usually require. The aim of this second evaluation was to understand the degree of integration of the two "twin-concepts" of sustainability and digitalization in the final output of the assessment process, assuming that a higher integration also means a better demonstration of accountability. Afterward, the reports were compared to summarize any common patterns of disclosing behavior, assigning a label to each. This screening served as a basis to draw a matrix illustrating the typical digital disclosing positions that a company might find itself in (degrees of integration of data governance into sustainability reporting). Finally, the most extreme company case was further broken down to extrapolate the characteristics of its sustainability-data reporting strategy, which, among the sampled firms, appeared to be the most integrated.

Summing up, based on the above propositions, the outcomes that resulted from this study are:

- P1) A sustainability data governance framework
- P2) A matrix of reporting behaviors
- P3) An analysis of the leading case from the matrix

### 3.3 Theoretical framework for sustainability data governance

Data is an indispensable component in the success of corporate sustainability projects, including reporting effectiveness and sustainability assessments of supply chain procurement requested by clients. Especially because the larger the volume, the more potentially valuable insights can be derived from data about a company's sustainability performance, which in turn enables decision-making on whether a certain sustainability aim is worth pursuing or if the path should be slightly adjusted. The challenging part, however, comes with sustainability data governance, because any kind of information needs to be processed in order to become useful, but given the time-consuming nature of data management (e.g. cleaning data, computing indicators), organizations tend to neglect its importance [85].

Sustainability data is indeed peculiar, due to the non-immediate measurability of environmental and social metrics, as well as a set of other specific issues. These include, but are not limited to the lack of data credibility perceived by stakeholders [86], inaccuracies and inconsistency of reporting metrics, wrong data imputation [30], gaps in data [87], poor data transmission between functions [85], no clear assignment of data responsibility [88], inconsistent methodologies for data normalization [89], and diverse data provision frequencies and details required by different stakeholders [29].

Most companies (58%) are aware that data reliability represents a fundamental challenge for their sustainability reporting, closely following the definition of company impact indicators (78%), which can be easily overcome through a materiality analysis. The lack of data credibility builds upon an inefficient collection (56%), analysis and use (53,7%) system. Such inefficiencies can, however, be explained by the fact that, in over half of the cases (60%), firms keep on relying on Excel for manually managing the complexity of sustainability data (increasing error likelihood), with a mere 30% adopting a dedicated sustainability reporting software and 20 % an internal customized software [76].

When it comes to aggregating data from various entities (e.g. in a supply chain, network, or business group), the additional issues of data consolidation, coordination, and retrieval add up because each organization sticks to its own methods, tools, and schedules [29].



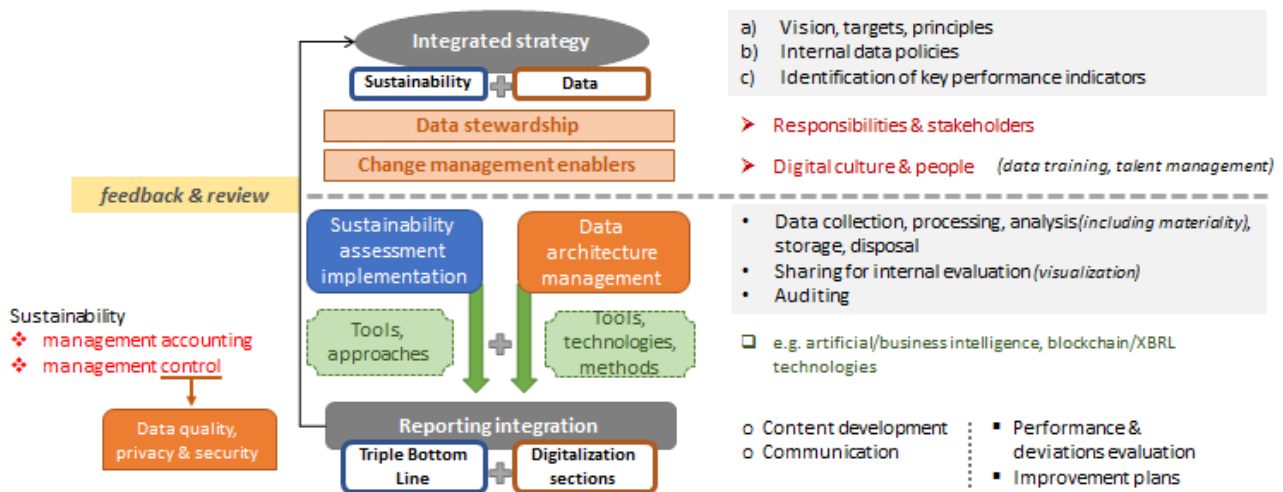


Only data quality (accuracy, timeliness, comprehensiveness, comparability) can help derive the most value out of sustainability indicators and provide support to successfully pursue the goals defined through the sustainability strategy. Should a company fail to account for quality, it would risk incurring expenses of up to 30% of its profit [85].

A solution offered by literature is to adopt technologies for data visualization (filters, graphs, comparing charts) and data collection automation, for simplifying the summarization and manipulation of large data volumes, improving cross-functional coordination and transparency, as well as cutting out time to dedicate to more strategic activities (e.g. stakeholder communication, management of sustainability projects) [85].

Nevertheless, the effectiveness of the entire disclosing process can only be achieved if data governance concepts are incorporated starting from the sustainability strategy and throughout the entire sustainability assessment procedure [28]. Therefore, based on the analysis of frameworks from the theoretical background (2.2, 2.3), this study proposes an integration of sustainability evaluation and data governance elements (Figure 1), to derive a new sustainability data governance framework.

**Figure 1.** Corporate sustainability data governance and assessment framework.



Source: author's elaboration based on findings in 2.2, 2.3, 4.1

At the very top, the integrated strategy represents the core element of the model. One of its main functions is to help a company define a vision, splitting it into goals, as well as the strategic benchmarking principles of its corporate sustainability and data. This will allow company-wide and sustainability-related data to accurately support the sustainability assessment process while moving in the same direction. In order to formally ensure this commitment, companies can develop specific internal data policies (or rules) that will guide the management of sustainability information within the organization, and through which a business can become more accountable to its stakeholders. Given the centrality of key performance indicators in the assessment process, these are to be defined as a strategic element at the very beginning of the evaluation. Within this layer, the data management function will assist in finding those metrics that can transmit a firm's sustainability impact in the most immediate and comprehensible way.

Once the strategy is defined, it will be then necessary to establish data stewardship, by assigning the responsibilities and supervision roles for sustainability data within the company (which business functions provide, elaborate, and collect data), while at the same time mapping the (potential or actual) stakeholders to the type of sustainability data they expect the company to monitor.



Additionally, the organization in question should properly handle the essential but, at the same time, sensitive topic of corporate culture (which revolves around the people that are part of an organization), both throughout the recurring implementation of the assessment process in time, as well as whenever a change occurs within the system (introduction of new methods, switching strategic directions, etc.). To control for this aspect properly, the company would need to appoint the most appropriate internal specialists to the new roles, but also train the entire workforce on the themes of sustainability and digitalization, so that the strategic change can occur without much struggle.

Sustainability and digital culture are relatively novel concepts for companies [90,91], meaning that industry best practices on how to deal with them are still under development, and it will take time to understand how to properly manage this aspect. Accordingly, a firm should carefully consider the best approaches to engage and involve employees in the change process, through training and distribution of new tasks that fit with individual aspirations and abilities, for example.

The ones seen so far are the most higher-level elements of the assessment process. Once they are defined, they will serve as a reference for all the operational activities. The company can, thus, move on to designing (new) or running (existing) operational activities. On the digital side, this translates into the development of the organizational data architecture, that is to say, the management of data resources across their entire lifecycle (acquisition, processing and analysis, warehousing and disposal). It is at this stage that the identification of material topics should also take place. Data architecture additionally allows companies to leverage on internal data sharing and visualization to support their decision-making, as well as to provide relevant information to external auditors. During this phase, the best technologies (for example artificial intelligence and blockchain), tools and methods are also selected to allow for automated and flawless data operation management.

The sustainability function supports this phase by deploying its own tools, namely sustainability management accounting and control, both increasing the rigor and accuracy [92] of digital architecture. Particularly, sustainability controlling, through its scrupulous methodology, is what has a greater impact on improving the reliability and quality of data (completeness, accuracy, consistency, timeliness of attributes), ensuring that data security and privacy are equally preserved.

This cross-operation between the sustainability and digital departments allows creating valuable data insights, that have been internally audited and are, therefore, ready to be gathered and communicated to external stakeholders. The integrated disclosure approach will then allow the company to develop both accurate and engaging content for the sustainability report. This document will not only describe the efforts carried out in the triple bottom line of the financial, social, and environmental accounts but will also largely cover how the firm is able to leverage its digital transformation initiatives to deliver those positive sustainability impacts. Each company will choose the most appropriate way to disclose and incorporate the digital and data supporting elements into their sustainability report, depending on their level of digital maturity and the preferred strategy, choosing out of the best practices described in the next section.

The last step of the assessment process will be to review the entire flow together with the reporting outcomes, which will help the company under assessment to learn about any inefficiencies (e.g. discrepancies between results and goals or data quality causes) in their management of digital sustainability and deploy corrective plans, feeding this information back into the strategic level, where the strategic direction will be readjusted, when appropriate and viable.

### **3.4 Reporting behaviors of reporting companies**

From a practical point of view of the content in sustainability reporting, it appears that companies behave in a number of different ways when it comes to integrating information on digital initiatives or data management into their sustainability reports. Based on the analyzed sample, the sectors that were most proactive in doing



so are the ones primarily involved in software and hardware development, electronics, financial services, IT and communication services, and industrial insulation.

By analyzing the reported contents of a sample of selected firms (Table 1) – and considering the digital domain, and related type and extension of content on digital initiatives – it was possible to observe that they followed eight common patterns of reporting behavior when deciding to include additional information on their digitalization progression. Each attitude has been mapped out into a matrix, labeling each type from the least to the most complex. Figure 2 provides a summary of the characteristics of each type of behavior. The horizontal axis represents the extent to which digital management initiatives become part of pre-existing sustainability report sections or form an innovative component of it. The vertical axis, on the other hand, shows the depth and extension of digitalization information, in terms of the complexity of initiatives, details disclosed, and portion of the report dedicated to them. The simplest strategies can be observed in the first quadrant, featuring the highest reliance on traditional sustainability disclosing strategies and the lowest complexity of the digitalization activities.

1. At the very basic level, firms tend to simply include a few relevant keywords on data”, “privacy”, and “security”, scattered throughout the text of the document (key-wording).
2. The 2nd group of companies would figuratively “checkmark” that they have done the minimum that was required of them, according to frameworks like the GRI, etc. They may, hence, dedicate a one-statement paragraph, at most, to a specific data privacy and security paragraph, including only a statement on data collection, confidentiality, and protection, or a one-page paragraph with the general internal data policy on data privacy. This category represents the majority of businesses in the sample.
3. On a step higher are those businesses that have already planned a (2-page) roadmap for the implementation of new digitalization projects for the following year, despite not having deployed any concrete actions to that point (road-mapping).

Quadrants II and III represent slightly more advanced strategies.

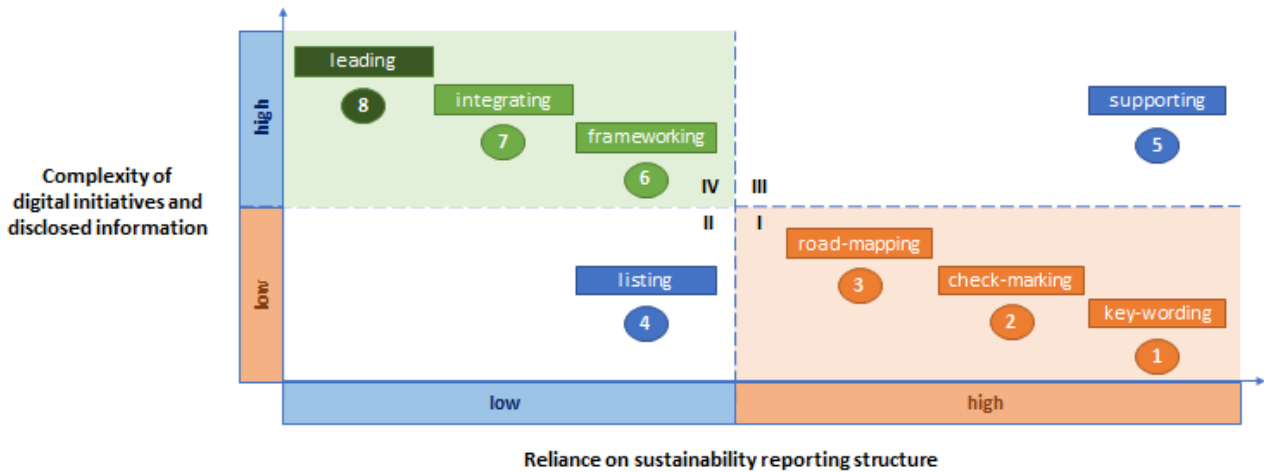
4. Firms in the second quadrant understand the importance of listing a variety of specific and more significant digital activities that are carried out by a dedicated cybersecurity team (e.g. developing a threat intelligence center, managing cybersecurity risks through a new framework, third party audits, special training for employees, consumers and vendors). They can do so within one page. They usually add a new paragraph in addition to the pre-defined reporting scheme, however, they do so all in one page (listing).
5. Other firms, in the third quadrant, highly rely on the popular “projects” section of the report for social-environmental impact, but only to support the disclosure and measurement of sustainability initiatives by describing the value of more complex initiatives that have been developed for the company’s specific purposes, like new digital services and tools (supporting). This represents the second most popular type of behavior in the sample.

And finally, quadrant IV of the matrix shows the reporting solutions created by the most innovative companies.

6. Some of them provide an archetype of digital expertise that other players in the industry can adopt as a best practice for framework development: they normally include a dedicated chapter detailing their digital transformation journey, ethos, and expertise (frameworking).
7. Then, other businesses produce a unified annual document, or feature a dedicated page on their website, where their digital and sustainability strategies are completely intertwined (e.g. data governance for sustainability data), with digital ambitions serving as leverage to contribute to specific Sustainability Development Goals (SDGs), for promoting societal and environmental change at every step of the way (e.g. better digital lives for families, digital skills mentorship for jobseekers, SMEs support in the digital economy, advocating for green recovery through campaigns and platforms) (integrating).

8. And finally, at the very extreme of the reporting efforts, we find those of the role assigned to one specific company, OP Financial Group (OPFG), the largest Finnish provider of financial services (leading).

**Figure 2.** Matrix of corporate reporting behavior, integrating data governance into sustainability assessment.



Source: author's representation

OPFG takes the time to produce two different reports each year: a stand-alone data balance sheet, in addition to an integrated reporting, merging both financial and sustainability results. Despite all the afore-presented reporting behavior being equally viable according to each specific corporate context, this company can be categorized for the convenience of definition as a “leading” example in balancing sustainability and digitalization governance, thus integrating the respective strategies. It processes the overall corporate (and specific sustainability) data responsibly, putting their main digitalization efforts (events, services, advanced analytics through artificial intelligence applications, etc.) under the spotlight and treating data as a value-adding asset, while at the same time dedicating equal importance to the disclosure of sustainability initiatives. OP Financial Group’s model can be taken as one potential way of dealing with accountability on both the sustainability and digitalization side, and its model can be adopted by other companies, in its entirety or in some of its sections, to develop their own reports or some additional sections in it. OPFG’s model can be summarized in the following structure (Figure 3):

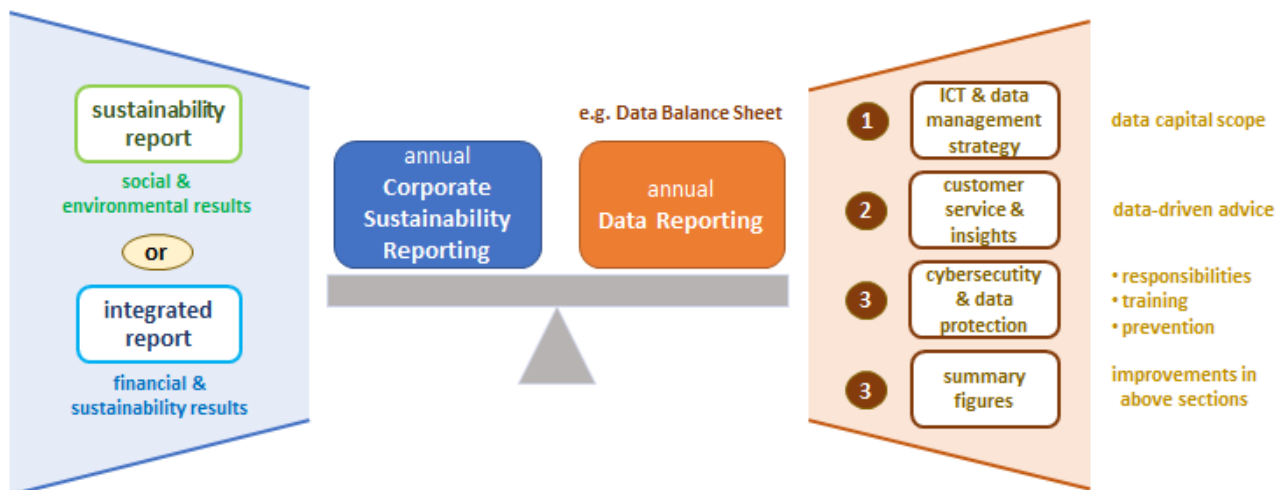
1. A breakdown of the general ICT strategy (e.g. mobile, Application Programming interfaces-API, cloud, technology competencies, agile working, cost management) and data management strategy, defining the scope of the company’s data capital (distinction between internal and external data available, e.g. databases, e-documents) and data assets (processes and services/products that use data capital for the benefit of sustainable value and the business/customer/operating environment).
2. A focus on how the defined data capital can be used to better serve customers, create benefits for them and gain customer insights.
  - a. Which service channels have been digitized and how services have been automatized (digital services performance and technologies adopted -e.g. API, mobile, chatbots, cash flows management through a corporate hub).
  - b. Use of the obtained customer insights for providing fact-based support, data-driven recommendations and marketing communications on services/products of interest, as well as for guiding company operations (e.g. real-time services that can be connected directly to the firm’s systems, like automated payments).
  - c. How the company’s data capital can support and simplify responsible investment.





3. Illustration of the data governance framework of reference (as a strategic component), along with all the elements taken into consideration (e.g. data capital life cycle/availability, quality/reliability, security and risk management, architecture and models, databases, documents and content, data warehousing -if decentralization or centralization of data on the cloud or in data centers).
4. Focus on data protection and security.
  - a. Cybersecurity operating model (e.g. integrated for self-managed and agile working, boosting app development).
  - b. Control (corporate bodies responsible for coordinating data protection activities, third-party auditing, use of external white hat hackers for testing system vulnerabilities).
  - c. How the organization intends to increase the data protection competence internally (internal roles, personnel digital training, regular internal cyber security drills to simulate and prevent cyber-attacks).
  - d. Mechanisms in place to protect rights of data and timely respond to the data security breaches detected (e.g. central processing, reporting to authorities and data subjects, monitoring, cookie consent, responding to customer complaints and requests to access personal data).
5. Some summary key figures, showing improvements in each of the above areas [93].

Figure 3. Reporting structure of a “leading” company.



Source: author's representation

### 3.5 Conclusions

The purpose of the present chapter is to investigate how companies can take advantage of currently relevant and emphasized notions, procedures, and tools to improve their accountability towards stakeholders. In fact, the Covid-19 crisis brought a renovated concern to corporate digitalization [2–4] and corporate sustainability as the most suitable means to provide accountability effectively [21,22]. According to research, the integration of sustainable practices into financial reporting will have to become compulsory and more structured in the post-pandemic scenario, with the aim of showing how value is created over time [94], while at the same time proving the internal and external validity of the collected data [95].

Therefore, more specifically, this research sought to explore the ways in which the constructs supporting digitalization (data governance and communication of digital activities) could refine the diligence of the sustainability assessment process, of which the last reporting step generates the communication output to stakeholders [71,72]. To summarize, this research uncovered three principal outcomes, as follows.



First, a new sustainability data governance framework was derived by combining existing data governance and sustainability assessment frameworks from literature. The evaluation allowed to find the alignment between processes belonging to each separate domain, given that the two concepts have similarities in their structures (strategy of data and sustainability, supporting responsibilities and culture, operational data analysis, presentation of results). The main levels of this novel model develop from strategy definition to reporting of activities and outcomes. Given that the accountability principle is at the basis of data governance [31–33], the incorporation of its phases into the integrated sustainability data governance process here described has the potential to improve the overall sustainability assessment of a company [28]. The above-described new framework represents, therefore, an attempt to corroborate the first proposition (P1).

The second result described the present sustainability reporting trends with regards to additionally communicating digital change. It was found that businesses disclosing a formal document on their sustainability performance may follow one out of eight main behavioral patterns in describing their social and environmental impacts through digital activities and projects. The majority of the sampled cases presented at least a general description of what cybersecurity and data privacy means to them. This attitude can be explained by the fact that the most common reporting framework that they adopt, GRI, explicitly requires companies to disclose on customer privacy protection. However, companies are free to choose whether to provide specific data on privacy breaches complaints, data leaks or loss occurrences, or simply by writing a free form description of commitments on data protection [96], which appears to be the most encountered case. Other organizations allocate the sections dedicated to the projects implemented over a year to describe the digital tools, services, and initiatives they have started focusing on. A rarer type of disclosing attitude is to dedicate an entire chapter to cybersecurity, having come to realize how crucial it is to monitor risks starting from the very inception of the digital transition. This makes sure that remedial actions can be promptly implemented in case of breaches, without letting digitalization compromise business security [10]. The digital transformation stimulated by the pandemic has prompted a rise in phishing, scams, and malware events to the detriment of companies, underlining the need for more robust data security [97]. Summing up, this section presented a detailed description of various strategies for integrated sustainability-digital reporting behaviors by company, thus providing evidence for the second proposition (P2).

In one case only, the enterprise created a stand-alone report for disclosing on its digital activities and protection of data assets, in addition to its sustainability-centered document. The integration between digital and sustainable activities can be interpreted on a more strategic level (despite not having the two integrated into one unitary report), hence referring to the fact that both aspects are dedicated equal attention and effort to within the same organization. Assuming this, it makes sense to then deduce that an organization having a structured procedure for assessing the management of its overall corporate data is equally well equipped to filter its sustainability assessment process through the same lenses, therefore potentially achieving better accountability in general. Whatever the case, a firm can choose to adopt either of the presented behaviors, as long as it is in line with the degree of its digital maturity. To this scope, the data report of the “leading” case was broken down into the main elements that could be mix-and-matched to create the most suitable sustainability data reporting solution for each firm needing to review its strategy. This validates the third proposition (P3) that leading firms can set the example for the industry through a well-balanced strategy, and the example selected represents a leading company because it “governs” its sustainability and digitalization strategies equitably.

The above findings are consistent with the literature’s conclusion that data governance fosters the relevance, completeness, accessibility, shareability, and quality [46,47,50,51] of sustainable knowledge creation, which, in turn, leads to higher accountability and, therefore, transparency of information and performance [98].

In conclusion, the Covid-19 crisis represented an unprecedented chance to optimize business operations, and sustainability operations, in particular, making them more easily adaptable to digital practices, resilient to risks that cannot be easily accounted for, and strengthening their accountability. Businesses were forced to



revise their sustainability reporting strategy and adjust to the new recovery scenario, as they are now transitioning from facing the pandemic impact for the first time to providing societal relief to the most affected stakeholder groups, resuming and optimizing expenses and operations, and finally entering the post-Covid-19 world in a more resilient state. The novel sustainability assessment scheme will have to centrally consider the risks faced during the pandemic, while also enabling engagement with stakeholders by means of more agile technologies and platforms [99]. Thus, this chapter aimed to explore how businesses could better control and coordinate this process while making it more robust through the addition of data governance mechanisms.

Implications: the presented outcomes could be beneficial to companies in various terms. Firms can refer to the integrated sustainability data framework to improve their overall sustainability assessment and data management process, both at the strategic level and in their daily operations. Moreover, this study contributes to helping companies to better understand their competing environment and what other players in the market are doing at present to make their sustainable business models more innovative. This will allow them to assess their digital readiness and draw some inspiration for integrating data-driven concepts into sustainability reporting.

These models may also be of use to the research community to develop empirical studies that test and extend the matrix of reporting behaviors further by analyzing the evolution of corporate behavior in the post-pandemic period, but also the practical applicability of integrated framework within the current corporate scenario.

Limitations: the limited sample of reports used might not have accounted for all possible cases. As for the frameworks applied for building the sustainability data governance model, some of them provided a generic overview, not allowing to determine the specifics of the model.

Future research: literature presents inadequate empirical evidence of the integration between digital tools and sustainability responses. Upcoming studies could, thus, focus on testing the model outlined in this chapter through empirical research (e.g. case studies), in order to further detail the theoretical process based on corporate experiences to see if it indeed benefits companies. A larger number of digital-sustainability reports should also be evaluated to further develop the behavioral matrix according to the future post-pandemic scenario.

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## **Leadership and cultural maturity in an organizational context: internal drivers affecting the transition to sustainability**

*The critical social situation caused by the Covid-19 pandemic, combined with the complexity of the challenges that characterize today's society, requires businesses to pursue a transformational journey to adopt more sustainable and responsible organizational practices. To successfully go through such change, they need to embrace innovative leadership models that can help them to migrate to the most suitable sustainability practices, while overcoming the internal cultural barriers that tend to emerge. The aim of this chapter is, hence, to compare literature and perceptions of specialists working closely with sustainability on the elements that influence the capacity of sustainable leadership to address the transition to more sustainable corporate practices and operations. Research and practice seem to converge in this domain, leading to the identification of eight influential factors: 1) drivers of sustainability transition at corporate level; 2) initiating role of TMT, experts and civil society; 3) role of innovation and digitalization; 4) tackling employee barriers to acceptance; 5) leadership style; 6) cross-departmental collaboration; 7) leadership position, career development and learnings, 8) characteristics and paths of exemplary leaders. Each influencing variable is then described in further detail. A practical implication of these results is the presentation of the transition stages of development, the most commonly adopted tools and the required leadership competences that would allow managers to successfully initiate a process of transition towards sustainable growth.*

### **4.1. Defining the need for sustainable leaders**

Corporate Sustainability and Responsibility (CSR) can be seen as a transformational journey that has repercussions on the way organizations interact with both local communities, but also their internal cultural variables. A successful transition to corporate sustainability largely depends on the sustainable leaders' perception and articulation of the aims and barriers of organizational change, and on how skilled they are at accounting for the psychological and cultural context in which their employees operate [1].

The crisis caused by the Covid-19 pandemic had a particularly severe impact on the well-being of workers around the globe, as well as on the general social, environmental and economic sustainability [2]. This critical situation, combined with the complexity of the challenges that characterize today's society, calls for businesses to switch to new leadership models that can help them migrate to the most suitable sustainability practices in the most effective way [3,4]. With this regard, a change of mindset is required, from that of an individualistic leadership – mainly driven by financial motives – to that of an altruistic one – where co-creation and common well-being represent the core principles [5]. Transitioning to a sustainable leadership style with these features, means having the ability to build trust and consensus with a broad range of (internal and external) stakeholders, in order to engage them in joint problem-solving that translates into sustainability-oriented innovations at business level, including cultural innovations based on sustainability values [6,7].

In fact, sustainability leadership also defines the effectiveness of a firm's corporate culture [8]. The advantage of implementing a culture of sustainability lies in the possibility to resort to collective effort – driven by common goals – to avert those risks and uncertainties that typically arise in the management of organizational sustainability [3]. Furthermore, the presence of a strong sustainability mindset in an organization, and thus an already established sustainability culture, represents the basis and stimulus for engaging in a variety of sustainable activities that lead to positive sustainability performance, both at firm level, as well as across the entire supply chain, inducing suppliers to adopt environmental and workforce management systems of their own by carefully monitoring and evaluating their operation [9,10].

Besides, sustainable leadership tends to ground corporate culture on values that provide the highest opportunity to foster sustainable growth, which, in the present socio-economic context, also includes the prioritization of digital capabilities and innovations [11]. Digitalization brings one extremely important advantage to leadership, and namely the potential to speed up the change towards sustainability through push and save impacts. These mainly refer to the digital optimization of resources that can be achieved by





introducing cleantech (e.g. solar panels) or circularity practices (recycling, refurbishment, reuse, etc.) into industrial processes. This way, the acceleration of industrial production and consumption actually becomes beneficial to business sustainability – instead of resulting in companies producing further socio-environmental damage – and resources can be both saved and circulated [12]. Conversely, the integration of such clean technologies with CSR strategies will prevent the incorrect use of digital solutions, which could potentially result in a negative impact on global sustainable development (high energy use and carbon footprint) [11,13]. Those companies that manage to implement “digitainability” – a sustainable digital transformation that strategically combines digitalization and sustainability innovations into mutually beneficial activities – will be able to maximize their organizational leadership efficiency [12,13].

An efficient leadership for sustainability additionally depends on the personal characteristics of the individual CSR leaders. These are normally exceptionally talented individuals who act as intermediaries between businesses and their respective socio-economic and ecological surroundings. These types of leaders can solve organizational (and information) complexity – including by properly managing employees’ emotions during a change – through effective and systemic problem-solving, engagement of people and emotional intelligence, and passion for community challenges [14,15]. The top management team (TMT), or C-suite/senior executives (e.g. Chief Executive Officer, Chief Financial Officer, Chief Marketing Officer, and Chief Operative Officer), is normally recognized having these traits [14–16]. They have the ability to enable the successful achievement of any sustainability project through outstanding managerial and intellectual competences (having a direct impact), as well as through emotional and social capacities (which influence the outcome of a project outcome indirectly through the managerial ability) [17]. More specifically, Chief Sustainability Officers (CSO), when freshly appointed to their role, can influence the financial performance of a company and improve the firm’s sustainability reputation [16]. Other important figures in leadership for sustainability are the members of the Board of Directors. Insider directors, in particular, have a positive influence on the environmental leadership and governance performance [18], whereas independent directors are found to be more beneficial to the accuracy and efficiency of sustainability disclosure [19]. Nonetheless, middle managers, technical staff, and external stakeholders can also have a substantial influence on the corporate sustainability strategy and can become change leaders in specific instances [14–16].

All in all, sustainability leadership appears to be highly relevant in the current socio-environmental and economic context, having the ability to affect corporate culture and make use of new technologies to encourage the most efficient change to CSR in the long-term perspective, advancing the global transition to sustainable development. Given the importance of sustainable leaders, it is therefore interesting to understand more thoroughly how they can make a difference in the corporate sustainability domain of an organization. With this regard, the present chapter seeks to analyze the currently relevant factors that influence the organizational sustainability leadership, how they specifically affect the business culture of sustainability and, as a consequence, the change to more sustainable practices.

For this purpose, the chapter first presents some essential concepts that are indispensable for understanding the variables behind the analysis, such as organizational leadership and culture, professionalism and education in sustainability leadership, and digital skills for leadership. Then it assesses the specific attributes of sustainability leadership that are found in literature, and finally introduces the perspective of the professional world on it by, through a discussion on the aspects that a pool of interviewed sustainability experts found more relevant.

## 4.2 Research approach

The main analysis is based on a pilot study conducted in preparation of a questionnaire on corporate sustainability leadership (which is a currently ongoing work). This research gathers the opinions of sustainability professionals from six different companies and fields (Table 1), who were virtually interviewed (through a semi-structured format) on the general domains of leadership in CSR – as found in a qualitative



overview of the literature content – trying to investigate their perception of the traits that determined successful leadership in sustainability. The representatives asked to respond anonymously, so as not to attach their own view to their respective company’s names. Their contribution will, therefore, be reported in general terms, not characterizing each individual input. The main goal of this study was not to statistically categorize companies, but to have an initial empirical ground of comparison against the findings from literature, as well as to assess whether there are additional elements, not currently accounted for in literature, that are important in practice and that should be further empirically evaluated through a statistical analysis based on surveying.

**Table 1.** Details of interviewees.

Representative	Gender	Industry	Role of the expert
A	M	Tobacco	Chief sustainability officer
B	F	Consulting and communication on sustainable strategy and transformation	Founder & head of sustainable communication
C	F	Consumer electronics and accessories	Social compliance manager
D	M	Diesel and fuel	Vice president of R&D and circular solutions
E	M	Manufacturer of paints and lacquers	Director of sustainability
F	F	Construction and urban development	Head of management systems

Table 2 lists some example questions that were posed during the interviews, relating them to each domain of analysis.

**Table 2.** Sample interview questions.

Topic	CSR domain	Example question
Drivers of transition	Sustainability transition / change management	Was the initial change towards sustainability activities primarily driven by external factors (fulfillment of normative requirements, etc.), or was it internally motivated and initiated (people from the company)?
Role of TMT, experts and civil society	Sustainability transition initiation (leaders)	Who in the company played the major role in the pioneering of the sustainability transition?
Role of innovation and digitalization	Innovation / Digitalization-driven sustainability change	<ul style="list-style-type: none"> <li>• Would you say that innovation is the prime driver of sustainability at your company?</li> <li>• What role have digital technologies played in redefining your sustainability culture, both prior to and during the pandemic?</li> </ul>
Tackling employee barriers to acceptance	Sustainability culture	How did your company manage the impact of the organizational culture shift on employees?
Leadership style and degree of formality	Sustainability culture	Has your company adopted more formal (defined rules and procedures) or informal (reliance on internal social norms and values) approaches for managing the sustainability culture?
Cross-departmental collaboration	Distribution of sustainability duties	What are the collaboration dynamics between your department and the other functions dealing with corporate sustainability?



Leadership position, career development and learnings	Sustainability leadership	<ul style="list-style-type: none"> <li>• What are the main responsibilities in your role?</li> <li>• What crucial milestones in your career helped you to support your company more actively in its journey towards the ultimate sustainability transition?</li> <li>• What sustainability topics did you most recently receive training on that helped you become a better professional?</li> </ul>
Characteristics and paths of exemplary leaders	Sustainability leadership	<ul style="list-style-type: none"> <li>• What are the most impactful personal characteristics of the leaders you personally admire?</li> <li>• Which departments they most likely be associated with?</li> </ul>

#### 4.3.1 Determinants of organizational leadership

Business leadership is a construct used by companies to match their strategy to the external conditions in which it operates, hence having the ultimate goal of fostering organizational development [20].

Organizational leaders rely on the core social process of influence to motivate their followers through informal and formal power [21]. Influence is not only exerted on the followers themselves (peers, subordinates, or even non-members), but also on the structural aspects of the company (management systems or programs) and its organizational strategy (for competitive advantage gains). All the three objects under influence must be coordinated for a positive performance [22].

Concerning the specific influence on followers, it can be achieved by leveraging its three components of instrumentalization (compliance to avoid punishment or obtain rewards), internalization (commitment resulting from the alignment between personal and corporate values) and identification (acceptance of tasks as a result of respect for the leader). This specific type of leadership influence can be exerted in a variety of ways, including through personal attractiveness and integration (loyalty and friendship), inspirational appeal (commitment because of enthusiasm for values that are close to the personal ones), pressure (coercion and threats), rational persuasion (using facts and logic), participation (inclusion of followers in decision-making, and exchange (conformity through rewards) [21]. Furthermore, wise organizational leaders are those who invest in upgrading the self-leadership of the people in the company, as this will allow to improve the overall creative, and hence innovative, capacity of the business [23]. Additionally, the management of employee conflicts has been proven to yield significant improvements also to the quality of the relationship with customer (commitment, satisfaction and trust), and therefore their loyalty [24].

Organizational leadership, in a way, is similar to the entrepreneurial activity, especially when it comes to assessing the internal social expectations and not being afraid to take on risks in order to provide solutions to such expectations and constantly changing conditions through effective and dynamic actions and thinking. The skillset of a leader includes effective communication and articulation of beliefs and values, observation of their surroundings (e.g. operating context, workplace climate, own potential for change), the ability to engage others in collaborative efforts (emotional and interpersonal skills), action competence (selecting inceptive actions of their own, not simply adapting their attitude based on external persuasion) [3,25], preservation of the confidence in their own competence, capacity to deal with stressful and threatening situations, as well as a high level of analytical skills [25,26].

The measurement of the capabilities of organizational leadership has become a key aspect recently, due to its aptness – intended as both members’ skills and corporate-wide knowledge – to strategically deal with changes of circumstances, improving at the same time the firm’s performance in the long-run. The major capabilities that an organizational leader is expected to have are (a) alignment and cohesion, (b) informal communication, (c) extent of centralization, and (d) control-feedback system [27].



Given the intricacy and unpredictability of the present operating environment, there has been an increasing call for leaders who can adapt their behavior to the novel challenges, combining rigid and dynamic practices according to the operative circumstances [22,28]. Moreover, distributed leadership has become a more prominent practice, since in most instances firms present numerous leaders – working in different functions and at multiple levels, not just limited to the CEO – who coordinate their efforts to increase company results even further [22].

#### **4.3.2 Organizational culture and its elements**

Leadership, as opposed to management, guide the creation of an internal culture. It is important to assess the elements of an organizational culture, as culture is strongly intertwined with business strategy, which comes first and requires subsequent cultural alignment [29,30].

A business culture consists in an intricate pattern of basic assumptions (group beliefs developed in time, usually taken for granted), artifacts (physical spaces like offices and visible corporate processes), and values (part of the corporate philosophy) [25]. But it also features secondary components, such as social norms, rituals (e.g. meetings, disclosures) and symbols (e.g. logos), customs and behavioral patterns, narrative and communicative style (how messages and events are conveyed), stereotypes and taboos, corporate heroes and subcultures, monitoring systems and power hierarchies [31], corporate history, management control systems, internal policies, and the structure of rewards and penalties applied [32].

The main functions of corporate culture are creating the identification boundaries (and company image) that make members feel that they belong to the company, fostering shared insights on corporate decisions and actions, promoting a benevolent work climate to inspire commitment, setting the managerial and procedural approach [30,32].

Different types of culture have a specific degree of influence on various organizational elements. In strategic terms, organizational “adhocracy” cultures (emphasizing creativity, risk-taking and flexibility with respect to dynamic market contexts) have been found to promote innovation strategies, while “hierarchical” (oriented towards internal organizational control, compliance and efficiency) cultures are more likely connected to imitative strategies [33]. Also, knowledge sharing among employees (collaborating and disseminating experience) is positively associated with remuneration mainly in clan cultures (focused on internal flexibility, teamwork, and employee participation), but negatives associated in hierarchical cultures [34]. Clan cultures are equally fertile terrains for aligning information systems (e.g. ERP) strategically, especially after implementation [35].

Concerning the human determinants of organizational cultures, their establishment is associated with the initial founders, however, it is the leaders that succeed to adapt the cultural fit to the evolution and requirements of the external environment [36]. The attitude of CEOs, in particular, can be seen as one major determinant of the business culture of their respective companies. The less agreeable (competitive, skeptical) the senior director, the more result-oriented the corporate culture will be. Detail-oriented cultures (significance of quality) are typically driven by conscientious leaders, while highly adaptable cultures (seizing opportunities quickly) are influenced by CEOs that are open to experience. The last two types of cultures are also the most likely to increase revenues [37]. Not only the personality, but also the values in which CEOs personally believe closely impact the cultural context of a firm. For instance, CEOs that appreciate self-direction (thus making one’s own choices and self-learning), are keen on rewarding creativity and establish a culture of innovation, which also results in higher sales. Security and stability CEO values define a bureaucratic culture, with formalized rules and procedures, fostering efficiency at the expense of employee satisfaction. And finally, CEOs who act by benevolence tend to cherish a culture of welfare, collaboration and support to workers, which increases job fulfilment [36]. Functional managers were also identified by researchers as another key factor that can define the type of corporate culture [32].





#### *4.3.3 Expertise and education for leadership in sustainability*

Given the complexity of the sustainable development “wicked” issues, leaders must equip themselves with an upgraded skillset and demonstrate to have an innate propensity to deal with uncertainties, as well as enough emotional intelligence to connect internal and external dimensions of sustainability [38].

The qualities of sustainability leadership at individual level are, therefore, also fundamental to consider, in order for an organization to be able to activate innovative solutions. Sustainable leaders have exceptional abilities in planning and guiding the implementation of sustainability projects, assigning roles and delegating tasks, educating (through experiential and peer-to-peer learning) on the importance of human-nature coexistence, thus fostering concern, through personal role modelling, for environmental and social problems among internal and external stakeholders, accurately and appropriately managing information and data on sustainability performance [3].

In particular, people working at the executive level have the greatest potential to become the leaders in sustainability, given the peculiarity of competences they have (managerial, intellectual, emotional and social). In managerial terms, they are skilled at transforming targets into actions, coordinating teams (guidance to align with goals) and project resources, empowering individual workers in the autonomous completion of their tasks and proposal of strategic ideas or critical advice, putting managerial experience at the service of a project to enhance its successful outcome, and disseminating clear and passionate internal communication. Their intellectual competence involves critical analysis and judgment (assessing the feasibility of a project, providing recommendations for enactment, applying dynamic problem-solving and offering decision-making based on project information availability, and providing insights into the involvement and cooperation of project participants), cognitive ability (creative thinking and awareness of the advantages, disadvantages and risks of projects), and strategic vision (apprehension of the direction of the project and forecast of likely changes, prioritizing the next steps, and ability to manage project trade-off in terms of short and long-term, or eco-socio-economic benefits). And finally, emotional and social competence determines the degree of self-awareness and belief in their own capacities, organizational awareness (helping team members feel like firm partners), emotional resilience (control of own emotions under pressure and criticism), intuitiveness in taking decisions in spite of informational asymmetries, interpersonal relationships (fostering trust, motivation and commitment of participants through empathy, active listening, and knowledge sharing), influence (persuasion to mirror own work ethics), and conscientiousness (ability to raise commitment to a project despite facing challenges) [17].

Apart from Chief Executive Officers (CEOs), Chief Sustainability Officers (CSO) are the best-known example of executives that are directly involved in sustainability. When they are freshly appointed to their role, they are able to influence the financial performance of a company – and specifically the Return On Assets (ROA) indicator. Moreover, getting a CSO onboard can improve the firm’s image, as it signals its social, economic and environmental commitment to all stakeholders equally – including workers, shareholders and customers (higher sales). However, to yield such positive results, the chief officer in CSR should be selected among internal staff with previous functional experience in sustainability-related activities, and ideally be a female. On the contrary, hiring outsiders to cover role of a CSO can negatively reflect on the performance. In general, when the focus is solely on marketing, junior applicants with an MBA degree are considered enough to induce a raise in sales [16]. The Board of Directors (BOD) is another highly influential group of individuals when it comes to the advancement of sustainability in a firm. The insider experts that are part of the BOD support the company in generating more prominent results in terms of governance and environmental leadership, as opposed to external general directors or investor activists [18]. In terms of sustainability disclosure to stakeholders, the larger and more independent the Board of Directors (and the higher the female representation), the more structured the reporting policy and the more prominent the disclosing activities are [19].



Indeed, the global movement to achieve sustainable development has demonstrated that technology and science on their own might not be sufficient for progress, given the seriousness of certain socio-economic and environmental issues. Hence, education on sustainability has emerged as a novel concern with the goal to cultivate the indispensable competencies of the new sustainability leaders who are able to drive transformative change [39]. The learning sources of knowledge in sustainability are various, the most popular being academic and professional practices, but they can also relate to personal lifestyles and social imitation, as well as digital actions. But especially educational programs appears to have a potentially substantial impact on change, as they help to raise awareness, even though they do not always result in clear behavioral outcomes [40]. In particular, the development of leadership through a transformational (instead of transmissive) education on sustainability is a very important step to empower learners to genuinely feel as leaders, with the capacity to enact a positive global change towards sustainable development [3]. The currently existing training programs aim at fostering the identity (values), perspectives (systemic thinkers with a holistic mindset capturing opportunities by managing sustainability capitals – human, social, natural, knowledge, technological assets), capabilities (expertise that helps to overcome challenges and successfully interact with multiple stakeholders), and agency (ability to enable identity, perspective and capability for developing collaborative contexts for the greater good) of sustainable leaders, as well as their adaptability to and decision-making for leading change, capacity to develop mechanisms of resilience, capability to guide impactful innovation and not simply comply, ability to problem-solve in complex environments, which requires courage to take high risks (dealing with particularly uncertain scenarios) [39]. Campuses are becoming great examples of training grounds where the future leaders of sustainability transitions achieve the required skillset and confidence to make a positive difference in society [41]. Nevertheless, there still is a lot of room for improvement in sustainability education, as it seems that academic degrees only prepare graduates for management supporting and sustainability promotional roles instead of real leading ones when employed, [42].

#### ***4.3.4 Digital competencies for sustainability***

The challenges of digitalization and sustainability are gradually becoming intertwined, leading to companies and public institutions to look for new solutions that can tackle both simultaneously [43].

Within the business context, the new paradigm of corporate digital responsibility is slowly taking place, calling for companies to respond for the risks, impacts and opportunities they generate, while digitally transforming their operations by embedding a culture of digital development into their strategies [44]. Such practice can be closely inspired by the values that drive corporate sustainability, applying them to emerging technologies with the aim of moving towards digital-sustainable development (or digital sustainability) [43]. In this context, competences in the digital environment are seen under a new light. The general ones required nowadays include the ability to use digital devices, manage digital identity and online reputation, digital rights (protecting intellectual property and privacy), literacy, security (detecting and solving hacking threats, as well as reducing cyber-bullying and violent/obscene content) [45]. This concept also accounts for the digital literacy of individuals – in addition to the classic three pillars of sustainability – pertaining not only to the practical utilization of computers and technology literacy (applying novel technologies on learning and production processes to improve performance), but also to the management of media (accessing, communicating on and analyzing various digital platforms), information (summarizing, assessing the credibility, effectively formulating research questions based on different digital sources), visual literacy (interpreting graphical representations and converting data into visual outputs) and competences in ICT [43,46]. The Sustainable Development Goals explicitly consider the improvement of such technical skills as crucial for global sustainability convergence [43].

The new societal need for digital literacy is also one important consequence of Covid-19, and it is now seen as a crucial element for resilience and maintenance of the path towards sustainable development, but also for preventing the widening of the digital divide gap [46], subsequently implying more job inequalities due to the



barriers to accessibility to the digital organizational environment [45]. Successfully overcoming the latter (through focus on digital sustainability learning) also means to promote social inclusion through the digital one, given that the lack of digital skills in the current scenario risks to reduce the pool of efficient professional that can contribute to sustainability [46].

This issue is strictly interconnected with the competitiveness of leading organizations in sustainability, which also depends on how good they are at strategically fostering knowledge-building in the workplace through ICT-related skills (or e-skills). E-skills allow to create a prosperous climate for mutual learning, cooperation, exchange of expertise, and generation of creative solutions. These capabilities can be classified into ICT user skills (individual abilities), ICT practitioner skills (high-level administration, development and maintenance of ICT systems), e-literacy (for the development of local communities), and e-business (conducting operations so as to exploit the chances for operational improvement provided by ICT). Five levels of employee digital literacy have been recognized in practice: basic user level (using well-know, user-friendly tools for simple tasks, e.g. Excel, Word, PowerPoint, Outlook), middle practitioner level (planning, designing, researching, integrating, and providing support to systems in ICT), specialist level (handling advanced ICT instruments to operate, develop, and maintain related systems, e-leadership level (making sure that systems work and perform effectively, and provide new opportunities for growth), professionalism level (highest degree of expertise demonstrated by qualification, experience and a variety of learning sources, which allows to have up-to-date and well-rounded ICT knowledge) [47].

Supply chains are particularly sensitive to the topic of digital competences. Their global performance efficiency (given their international relevance) could be compromised, considering that veterans might not be familiar with the novel tools, while the newer generations might lack the ability to link their innate digital skills to business acumen. Nevertheless, seeing how dramatically unemployment grew over the last period, workers recognize their shared responsibility in learning, and are usually grateful to receive qualitative training as a workplace benefit, in that it can allow them to improve their individual performance at the current job position. The most popular formats for digital training at the workplace are individual/group courses online (chance to attend on a flexible schedule, e.g. MOOC platforms), webinars and conferences, in-presence learning, self-studying, receiving advice from colleagues, one-on-one or group training organized by consulting companies (e.g. Accenture). Experts agree that the most crucial disruptive skills that need to be achieved to yield a market advantage are: internet of things, artificial intelligence, automation and robotics, cloud computing, distributed ledgers (e.g. blockchain), predictive analytics, inventory and network optimization, sensors and automatic ID, wearable and mobile technology, additive manufacturing [48].

On a regional development level, the green specialization of regions can also be spurred through digital infrastructures and the foundation of e-skills in the personnel. This can be explained by the fact that newly developed sustainability-related technologies tend to exploit a wider know-how base [49].

#### **4.4 Attributes of sustainable leaders found in literature**

The implementation of sustainable initiatives that can contribute to the societal, ecological, and economic prosperity, calls for leaders who can effectively deal with sustainability management at a corporate level, transferring the long-term values pertaining to sustainable development from the performance in the business environment to that of the entire society. Indeed, sustainable leaders have the ability to account both for the financial stability of their company (protecting shareholder interests), as well as the life quality of all stakeholders [50], following a unique path of development and discovery. Once they find a cause they believe in, they activate their intrinsic potential to impact change and motivate their audience to do the same (empathic people management). Through continued self-discovery and self-empowerment, they develop their expertise (education, training, self-teaching) and build purposeful careers that ensure both the global and their personal growth [38].



Leaders have the great ability to co-develop sustainability strategies with internal and external stakeholders (etc. workers, communities, other organizations, the environment), who then positively reward the company's image. Moreover, they represent a source of inspiration, psychological empowerment and psychological safety (free transfer of ideas) for their employees, which they demonstrate high levels of empathy for (work-life balance, unity, potential development) [4]. In fact workforce engagement is one of the central components of sustainability leadership that helps an organization to convert its efforts into quantifiable outcomes [51]. Because of this, sustainable leadership has a positive influence on the employees' self-development and problem-solving abilities, and thus organizational learning (a strategic variable for competitiveness) [50], which helps workers to generate more value through sustainable innovations. This, in turn, increases the sustainable leader's ability to improve the overall sustainable performance of the organization [4,50,52,53]. These are typical features of ethical, transformational or authentic leaders, who drive CSR through their personal values (and consider the consequences for all stakeholders) and are normally the ones operating in highly successful firms, both in financial and social terms (positive corporate climate and high job performance). Each corporate environment will, however, need a different leadership style, that is suitable to the peculiar human, ecological, and financial concerns. Some may even have autocratic or strategic (mostly focusing on the interest of shareholders) leaders (less numerous), who, although controlling, coercive and limiting collective decision-making, can constructively avert social dilemmas. Therefore, the staff that is part of such leading systems eagerly gives up its power but does not feel part of a group or internal culture and is thus less loyal and unwilling to engage in voluntary work activities [15].

In terms of the actual competences, sustainable leaders balance all those required to manage sustainability: they can think systemically (evaluating the scope of complex systems and relationships), clearly anticipate both risks stemming from change and the organizational vision they want to achieve, assimilate norms and negotiate principles and targets (normative competence) where trade-offs (or uncertainty) exists, use their strategic thinking to promote the sustainable development of the society as a whole, collaborate (solving problems collectively and additionally learning from others) and demonstrate empathic leadership (respecting and understanding others' perspectives, as well as solving group conflicts), thinking critically by questioning established practices and defining own values, being self-aware of their role in local and international communities, and problem-solve sustainability issues through the adoption of a variety of models [46].

The identification of a sustainable leader – who has the real potential to make a difference in the world – does not rely on a formal position, recognized socio-economic/political authority or role. The individuals that qualify can be instead distinguished through certain personal characteristics they have. Such figures are willing to accept carefully weighed risks and responsibilities for the management of corporate sustainability. Additionally, they are keen on taking action, selflessly and through strong personal ethics. Moreover, they are humble enough to believe in continuous learning and training, and do not limit their knowledge to the previously received formal education, recognizing the need to adapt to any shift of paradigm, but also to exchange knowledge and share their expertise for the benefit of a bigger cause. Finally, they strongly believe in mutually instrumental partnership, collaboration, and inclusivity, opting to guide change instead of controlling [14].

Sustainability leaders develop their influence in sustainability change management by resorting to a series of strategies. Seven have been identified empirically, each connected to the operational aspects of organizational culture. An (1) active participation strategy is used to coordinate sustainability best practices and activities across departments and subsidiaries through ad-hoc working groups, as well as to compare the firm's sustainability impacts to top-performers. The adoption of (2) persuasive communication is done to inspire commitment and awareness, in either written (emails, internal memorandums or newsletters on company-wide sustainability), face-to-face (meetings and presentations), or remote (teleconferencing or calls) form. Leaders also take care of the (3) management of internal (evaluation of sustainability performance data on emissions, energy and water consumptions, etc.) and external information (gathering global sustainability





trends and their influence on the corporate financial accounts to internally advocate for the transition). Through the enactment of (4) human resources management, it is also possible for leaders to tie corporate sustainability results to senior leadership and make them accountable for the initiation of the sustainability transition (e.g. integrating sustainability metrics into the balanced scorecards of the TMT), but also to arrange for employee learning and development (e.g. training on sustainability-related themes from a practical point of view). Diffusion strategies (5) are useful when there is a need to cascade the sustainability practices across functions or the group which the organization in question (i.e. holding) is part of (e.g. pilot implementation programs in key offices, incorporating environmental and social metrics into corporate ICT systems). In order to grow company-wide the transition mentality (6), leaders also resort to business ceremonies (company forums or events for sharing knowledge) and rites (driving changes locally and supporting the implementation of novel ideas). And finally, the (7) formalization of sustainability activities should assist a firm in substantiating its commitment (e.g. BOD to develop an explicit strategy and policies for governing sustainability internally, along with processes and control systems to legitimize them) [14].

#### **4.5 Relevance of sustainability leadership traits in practice**

The following section gathers inputs from different experts in sustainability on how companies enforce sustainability leadership in practice to a point where they manage to integrate sustainability into their core values. Each of the identified determinants is separately analyzed here below.

##### ***Drivers of sustainability transition at corporate level***

All the interviewed experts agreed that a mix of internal and external drivers motivated the corporate shift toward sustainable operations – subsequently shaping them – despite the real change happening internally and the publicly disclosed material representing only a historical snapshot of what has been done thus far. But the timing of the relevance of each driver has been sequential. In most cases the external motivation came first, either through pressures from non-governmental organizations – due to how prone the industry of reference was to social issues that could spread all the way through supply chains – that triggered a reputational alarm (through a sense of shame but also a newly acquired social responsibility), as well as consumers and clients (so the market-driven need to achieve differentiation by embedding the components of the sustainability value proposition into products and, in turn, brands; e.g. sustainability evaluations by clients on what is done in practice to become more environmentally friendly production sites) which had a direct impact on the profitable corporate growth. A second “motivational wave” then usually came from the passion of the CEO or a small group of people internally, who strongly believed in the difference that the firm could make (e.g. in environmental terms, carbon emissions reduction) and who could anticipate the sustainability path that the world was about to go through in a matter of decades. The only difference between propositions of employees and directors was the ability of the latter category to actually “get things moving”. At times the interest of the C-suite in sustainability was also (externally) motivated by their perception of the expectations of investors – ESG issues and green bonds are, in fact, deemed crucial for leveling up the change to more sustainable business models. The internal stimulus stemming from the TMT then normally prompted the decision to allocate ad hoc investments into the sustainability transformation of business operations (e.g. setting up formal strategies and programs), which gave rise to a novel series of obligations to comply with environmental operational requirements. Indeed, the development of the regulatory environment has always provided a very important driver for sustainability, given the speed and nature of its ever-evolving rules. The legal framework has, therefore, been deemed to be a fundamental element of the change process at every stage, and especially at industry level, including in the definition and successful management of standards and KPIs (e.g. prompting massive improvements in workplace safety levels over time). A few companies additionally mentioned that a more structured approach took place only when the organization proceeded to carefully identify and assess the material issues (negative impacts of the business operations on the environment and communities, as confirmed by stakeholders), which provided the firm with the necessary CSR awareness and “capacity”,



culminating in the yearly production of a sustainability report (formalization of what the company was already doing to analyze gaps in sustainability actions). Furthermore, the appointment of a formal CSO role as well as the evolution of the sustainability disclosure to an integrated one (merging financial and non-financial results) was mentioned as an advancement of the sustainability transition process itself.

### *Initiating role of TMT, experts and civil society*

According to respondents, there are different interest groups that can trigger the sustainability journey of a company. The Board defined the long-term sustainability goals that are then also externalized to the public. Then comes the TMT (heading the business units) which is led by the CEO who must report about the progress of the sustainability activities to the Board and deploy action plans based on a combination of corporate and societal needs. The prerogative of a CEO is, in fact, the actionability of goals and plans, however their perception of customer expectations might be biased by the sectors they have previously worked in. This, at times, leads to incompatibilities in the strategic focus, consequently requiring employees and historical managers to promptly adjust their thinking to the CEO's perspective (especially if recently hired). Specialized senior directors from the TMT (e.g. chief sustainability officer, director of sustainability) have in some cases influenced the decision of the CEO to undertake the sustainability transition. They engaged in a constant dialogue with the CEO – with whom they had to find an agreement on whether to build a stand-alone function or integrate it across departments, as well as on what would the resulting challenges of each structure be – and the other functions, handling the constant feedback mechanism with the people in the organization. They are also responsible for building up the whole framework and related components of a comprehensive sustainability program. Apart from having the retrospectively wise and visionary intuition about the sustainability change, making the initial decision (a bold one, seeing how long it usually takes for the new venue to yield profits) to migrate to an innovative business model and invest in it and the related technologies, the BOD and TMT played a key role in providing an authoritative direction to the entire labor force, and especially to the middle management. The execution of a sustainability program, indeed, required then efforts and inputs of various people within the organization. A formal Sustainability Team, for example, was needed to manage all related initiatives and evaluations in a well-structured manner. Nonetheless, an official Sustainability Committee was not deemed a necessity for the successful outcome of sustainability-related projects, if sustainability was a deeply embedded belief at the top of the company hierarchy (e.g. corporate and sustainability strategies tend to converge), and thus already strongly supported by the Board itself. Potential recruits, and especially young people, also had the power to define whether firms would pursue sustainability, and that is because they were increasingly expressing their interest for sustainability themes during job interviews and their will to work for firms that can make a difference in the world. In the case of newly created activities (e.g. startups, which are normally sustainable from the very first minute) and entrepreneurial ventures, their founders were the ones in charge of establishing the special identity, sustainability values and vision of their modern organizations. One company case focused such identity on sparking a continuous discussion among different target groups (especially younger ones) – all external to the organization – which did not otherwise have a common ground for sharing their (similar) thoughts on sustainable growth on an organizational level. Nevertheless, discussion was deemed to not be enough on its own, it had to be complemented by the development of real projects and prototypes.

### *Role of innovation and digitalization*

Regarding research and innovation as a driver of sustainability, a few respondents confirmed that it indeed is, and this characteristic of the company's activity either dates back to almost the very beginning (renewable technology introduced decades ago as a product solution to become competitive in the market) or has been recently introduced as an added value component, also to enhance the brand (demonstrating a credible, visible and robust base through the sustainability program to eliminate brand risks). As for digital tools that



supported sustainability activities before the pandemic, the interviewed experts mentioned the efficient utilization of a large pool of data (e.g. for predicting the operability of sites dealing with sustainable operations), and the heavy reliance on software to provide such data and demonstrate the achievement of sustainability targets (e.g. Ecovadis to measure performance in operations, occupational health and safety software in procurement, life cycle assessment software to generate environmental product declarations and assess environmental product performance). People in the company received specific training for tools they specifically used for work (e.g. also voluntary participation in academy of learning machine), however no general digital literacy program was deployed, given the originally high level in the geographical area of operation. During the pandemic, the acceleration of remote connectivity allowed for the smooth continuation of activities, without serious slowdowns, despite certain industries requiring face-to-face meetings for generating innovations. Other than that, additional technologies have also been adopted faster in a sectorial case (e.g. drones for modelling and visualizing construction sites), given their intrinsic remote nature that made it safe to be implemented with the non-requirement of meetings.

#### *Tackling employee barriers to acceptance*

A few cases stated that they did not experience many barriers internally. That was either because the responsibilities were more distributed, or because the people dealing with sustainability mainly worked in the R&D department, hence being intrinsically eager to find innovative sustainable solutions. In general, however, the transformation of a company's objectives inevitably led to the disruption of existing and profitable business model, which challenged the culture internally, as the employees were not keen on immediately believing that the achievement of certain sustainability aims and the subsequent advancement of the entire industry was something that their company could achieve. Also shareholders at times represented a "brake" to visionary ideas of investing in sustainability operations (especially if done during crisis times). This required the definition of clear, common, company-wide objectives and cultural values (e.g. courage to make changes, care for environment and communities, and cooperation across functions and with external partners) to "bring everyone on the same boat", and a clear direction from the top. Because involving employees requires a strong leader (an authority), who can transmit the corporate sustainability values throughout the organization, making it easier to understand what the fit between new projects and what is already done is. Communication was also the absolute key to achieving cultural acceptance over time, both internally and externally. Internally, it was important to organize frequent interdepartmental meetings between the CSO and key managers to understand how each function could provide their expertise and feedback on materiality topics, new activities or urgent problems they encountered, but also through monthly organization-wide meetings that helped to get the sustainability message out internally and allowed employees to ask questions to the CEO. These encounters represented great opportunities to also share the results presented in sustainability reports. In case the documents were not disclosed internally prior to publication, the company circulated sustainability metrics through a series of internal managerial reports. Internal trainings were also popular means to increase employee engagement and awareness, either through specific lectures on sustainability themes (as part of the onboarding process through an informal conversation with the managers, or voluntary web-based courses that are freely accessible to everyone at any career stage and without using expert language). The cultural hurdle could also be partially abated by inviting external stakeholders (e.g. human rights NGOs) directly to the premises, to discuss with senior management. Yearly competitions among departmental teams on their best sustainability project or idea, was also found to be an excellent way to promote the inclusion of all employees in the objective to become a more sustainably innovative company. Other solutions that have been adopted to involve employees were volunteerism, selection of non-profit entities to which their designed company product would go, as well as codes of conduct (including for suppliers) to determine what issues are important at organizational level.



Cultural barriers were particularly prevalent in the case of a matrix organization, where people report to multiple leaders (and the accountability and responsibility is divided among functions) and usually have very limited time to dedicate to all projects. The solution in that case was to set the scene in a way for the different internal stakeholders to be convinced of the relevance of their contribution, also for their career. But it was also important to assign tasks gradually, without immediately providing a high workload. And finally, incentives that are part of people's performance objectives were also efficient measures to acceptability in these organizations.

### *Leadership style*

A few representatives said that their business culture is primarily one that highly relies on social norms and less set behavioral rules (informal). Nevertheless, all have emphasized the importance of both, and especially formal rules, procedures, project approvals, scheduling and process documents the more complex the organization becomes. Trust is needed to establish the functional dialog for a successful sustainability culture and overview of where the company is going. But to have that view and common direction, formal rules and control are also needed to be in place for a more fluid communication between internal stakeholders.

### *Cross-departmental collaboration*

Sustainability is a cross-departmental theme in the analyzed companies, meaning that often the specialists that work on it do so from different functions (e.g. procurement, operations, product R&D). The sustainability duties were, therefore, often distributed to several directors (e.g. environmental and social impact or corporate citizenship directors overseeing the employee engagement activities or anything that's public facing, like the website or the corporate responsibility report; social compliance manager dealing with suppliers and sustainability data collection; human resources gathering information on employee safety).

In case a formal sustainability team exists, it is (once again) usually composed by people who are not specialized in sustainability in title, coming from various backgrounds and expertise (e.g. environmental engineering, human rights, wellbeing management, sustainability reporting and analytics). This variety of skills helps to process, understand and elaborate the information provided by specific areas into a unitary format to be communicated. When the sustainability team is not created ad hoc but sources people from other departments as inputs, then the actions, requirements, performance, accountability and responsibility are integrated into the different functions through a matrix structure. The size of such teams varies greatly (e.g. 9 to 30 people). The definition of KPIs, data type to be collected, actions, and reporting rules are then normally assigned to each functional expert, instead of being centralized into the accounting department. Hence, internally, several reports end up being generated before the sustainability disclosure document. Softwares or formal systems are used to automatically collect data from manufacturing units, and then to portray how the firm is moving towards the targets it has set. This methodological information is then gathered into a document (resulting, once again, from a joint effort) defining the rules for carving out and managing sustainability data. Everything then comes together at the CSO or head of sustainability desk, who then combines the efforts from various departments and group companies into a final report.

### *Leadership position, career development and learnings*

One does not necessarily have to have a formal title of sustainability manager to deal with sustainability themes inside a company. The interviewed participants all had different titles. The ones that were more closely related to the direction of sustainability operations were typically located in the headquarters and had some quite similar tasks to follow. Their first and important role was to set up the architecture, operating and governance model of the sustainability program, i.e. a carefully defined sustainability strategy with the CEO. After that, all activities started revolving around decision-making and prioritization of actions, expanding such program and following its progress in terms of performance, budgeting, but also coordination of





activities in working groups (sourced from different organizational functions) or the official sustainability team, as well as internal collaboration with other business functions by providing advice, requesting their feedback, and engaging external stakeholders in dialog for the materiality assessment. Senior leaders in sustainability also took care of the reporting (both statutory and voluntary disclosures) and the regulatory and legal check-ups. The figure heading the R&D similarly ensures with a regular cadence that progress is made in the projects their office follows, by looking after the deliverables and directing the reports. The expert managing social compliance mainly focused on working directly with the suppliers and factories to make sure that human rights are preserved across the supply chain, also by examining reports and helping them deal with remediation. Another expert led the company ISO-certified management system concentrating on the gate model (project initiation efficiency and quality control practices), but also having the additional task of preparing their department and organization to explain (how their business will be affected, what practices will need to be integrated into projects and the management system) and incorporate the EU taxonomy regulations, and if needed be ready to identify gaps and how to fulfill them. And finally, the sustainable communication manager has the task to deliver the key message to clients that they are capable of seizing the momentum themselves and doing something meaningful for society.

As for the most determining career milestones, most respondents agreed that the initial (Bachelor's degree) education in fields unrelated to sustainability did not prevent them from working in sustainability projects later. In an instance, that was because the expert has been employed by the company for long and knew it extremely well, from an insider perspective. In other cases, the switch to a sustainability career happened because the participants decided to place themselves back behind the learning desk to get a more official qualification (Master's degree in sustainability standards or environmental economics, MBA with thesis on sustainability themes), a decision they all deemed to have been fundamental. This happened as a result of some years of professional experience that triggered an interest (also for personal career development) to study more about sustainability. Positions in previous jobs have also equipped the interviewed experts with either motivation to move to an organization dealing more closely with sustainable products (and industry with strong sustainability targets), or the critical skills (work methodology, ability to present complicated information in simpler form, understanding the challenges that size brings along) they are applying in their current roles. Based on personal experience, one respondent emphasized how crucial it was to take the leap and apply to positions they were interested in, even though they did not feel completely qualified for, as those previous positions supported them in landing their current role. Another interviewee stated that taking the effort to talk (open-mindedly) to various figures (e.g. CEO, young target groups, digital and creative experts) is what made the difference in gaining experience for them.

With particular regard to the process of learning, this took many other forms within the organizational context. For example, the observation of competitors equipped sustainability professionals with the knowledge on market-proven sustainability strategies, to be replicated in their own organization. The publication of the sustainability report made metrics available, not only to the public, but also to the internal departments themselves, which enabled them to get a broader overview of their specific operations and identify areas for improvements. The formal materiality analysis that led to the final disclosure document was also key to set priorities and achieve a business focus. Self-learning played a major role too in increasing contextual understanding and application of social and environmental principles to operations. This was done either through formal training (e.g. auditing class which provided a practical application), the consultation of and collaboration with good internal experts that could contextualize the technical terminology in a particular corporate environment (which leads to finding ways to compete against their time), or by being curious and continuously following what is happening in the field with regards to sustainability (green finance, risk management, legal and regulatory environment – e.g. Green Deal – etc.), at the same time reformulating that information into how it affects the organization in question.



### *Characteristics and paths of exemplary leaders*

The respondents provided similar answers on the personal features that leaders they admire most likely have. Regardless of their hierarchical status in an organization, they tend to be the most passionate individuals within each department, with a certain confidence in their expertise. They are normally persistent in their job, right from the very early years of their careers. Their charismatic identity can be pinpointed quite clearly, which makes them authentic (and, when needed, authoritative) in their actions and beliefs. Such personalities are both able to, in a way, influence others in their opinion, but also listen and accept being challenged by dissimilar ideas, if these are perceived to lead to a better outcome. They are great at creating clarity through communication and excellent capacities to crystalize complex concepts into self-explanatory ones (without deteriorating the meaning), as well as to tell stories in appealing ways, generating enthusiasm (not just by presenting bare facts) about what is fundamental for society and the values that the company builds their culture upon. Leaders tend to always behave a bit like activists, advocating for a sustainability cultural change. Wise leaders like to engage and motivate people in the corporate sustainability journey, as they know that this could mean a much more genuine and effortless contribution on their side. Nevertheless, they need to be equally capable of anchoring this soft approach into a systematic one (e.g. meeting cadency, structured planning) in a transparent way.

Corporate sustainable leaders can be found in a variety of organizational functions, and in each part of the value chain components of the sustainability program, as having them operate from only one would probably be not sufficient for the scope of sustainable development in the organization. The standard would be to appoint an expert (CSO, director of sustainability, sustainability manager, etc.) to the dedicated role (something currently missing in many big companies at least), who then takes control of the coordination of activities with internal and external stakeholders. The advantage of such function is its ability to solely focus on corporate sustainability management, without being responsible for duties pertaining to other departments. The second most important role was considered to be that of engineers and designers working in R&D and operations (people willing to put their technical knowledge at the service of sustainability and managing to actually produce the tangible outputs). To a certain extent also human resources, sales and marketing could be places where leaders are nurtured. Nonetheless, the marketing department, despite having the capacity to promote the company's vision and story to the outside world, should not be the only place where corporate responsibility sits, because it easily risks falling into the greenwashing case.

### **4.6 Discussion & conclusions: variables influencing leadership in sustainability**

The present study allowed to draw a comparison between the literature on the elements that affect leadership in sustainability and the hands-on business experience of a pool of sustainability practitioners, revealing a certain consistency between research and practice. In particular, a total of eight influential factors were drawn from literature and put under empirical test (Table 3): 1) drivers of sustainability transition at corporate level; 2) initiating role of TMT, experts and civil society; 3) role of innovation and digitalization; 4) tackling employee barriers to acceptance; 5) leadership style; 6) cross-departmental collaboration; 7) leadership position, career development and learnings, 8) characteristics and paths of exemplary leaders.

Concerning the corporate level drivers (1), either external or internal, their cadence and sequence determines the stages of development of a business transition to sustainability, which is perceived as a dynamic process that evolves over time. The "human" side is also worth considering in the change initiation, as various interest groups tend to take the role of internal leaders (2) that spark the corporate interest to become more socially-responsible and eco-friendly, in addition to being financially stable. It is not only the top level (BOD, TMT and founders) that have the power to intervene, the bottom level of an organizational is equally important in the execution and proposal of practical pathways to go about sustainability, including potential hires. Research and innovation (3) is gaining increasing attention as a means to achieve more sustainable products and operations, while digital tools enable speed, accuracy and safety even during pandemic times. Barriers to



cultural acceptance of organizational sustainability (4) vary by company and function. Generally they can be minimized through a clear and gradual assignment of responsibilities and various employee engagement activities. The style of leading (5) an organization has to combine both elements of formality (control mechanisms) and informality (trusting employees in their expertise) in order to ensure alignment between company and individual sustainability values. Moreover, leading a sustainability transformation of the business model requires a cross-departmental effort (6), with each function manager being responsible for the definition of their own KPIs, data collection and reposting rules, while the convergence and preparation of documents to disclose to stakeholders should happen in the ad hoc sustainability function. Actually, sustainability managers and directors do not necessarily belong to a formal sustainability function either (7). Their tasks involve the high-level establishment of the corporate sustainability model (strategy and governance, architecture and operations), as well as the maintenance of the program (prioritizing actions, budgeting, performance monitoring, reporting, alignment with regulatory requirements, coordinating teams and engaging in constant dialog with stakeholders to assess the evolution of material issues). The path to their current roles in sustainability management often began through work in an unrelated field (where they however gained the skills they apply in their current role), during which period they became interested in switching occupation to pursue environmental or social themes. This led them to seek further education (Master's or MBA) in sustainability. The learning of useful skills for sustainability management happened also thanks to the preparation to their current role (official courses, self-learning, experience in analyzing sustainability data and competitor benchmarks). And finally, as for the personal characteristics of good leaders in sustainability, they are usually the ones to cascade passion for sustainability to the people in the company and the outsiders, through clear goals, an engaging communication style, belief in own professional competence, and openness to new ideas. They are able to both motivate people and lead them in a structured way towards the achievement of sustainability goals. Leaders in sustainability typically work cross-functionally and can be found in a variety of hierarchical organizational settings (with increases the chances of a successful sustainability transition). However, it would be ideal to create an ad-hoc function that coordinates activities with stakeholders. People in operations and R&D are also fundamental as they generate the practical sustainable innovations in products and processes that prove the advancement in sustainability. The marketing department is important for disseminating the business efforts with regards to sustainability, however it should not work on these themes on its own to avoid giving the impression that the organization is only striving for reputational gains.

**Table 3.** Elements influencing organizational leadership in sustainability.

Topic	Elements
1) Drivers of sustainability transition at corporate level	Drivers and tentative stages of transition to sustainable operations: <ol style="list-style-type: none"> <li>1. External → Reputation (NGOs), profitability (market-dynamics)</li> <li>2. Internal → Belief in corporate ability to make a difference and anticipation of future relevance of sustainability themes (propositions by group of employees, or actions by directors) External → ESG issues (perception of investor expectations by CEO)</li> <li>3. External (after allocation of internal investment) → regulatory framework (facilitates the setting of industry standards and more responsible KPIs)</li> <li>4. Identification and assessment of materiality issues internally (with external and internal stakeholder consultations)</li> <li>5. Appointment of a dedicated figure (CSO) responsible for sustainability coordination and operations</li> </ol>



	6. Sustainability report (formalized actions and gaps) and its evolution to integrated reporting
2) Initiating role of TMT, experts and civil society	<p>Different interest groups:</p> <ul style="list-style-type: none"> <li>➤ Board of Directors (definition of public sustainability goals and vision)</li> <li>➤ TMT (provide authoritative direction to middle managers and employees) <ul style="list-style-type: none"> <li>○ CEO (report on progress to BOD, implement action plans, strategic focus might be biased by the sector they come from leading to more cultural barriers)</li> <li>○ CSO or Director of Sustainability (engage in continuous dialog with CEO and organizational functions, establish the framework of the corporate sustainability program)</li> </ul> </li> <li>➤ Sustainability team (structures and manages the sustainability initiatives and evaluations)</li> <li>➤ Sustainability Committee (creates convergence between company-wide and sustainability strategies, if not already supported by the BOD)</li> <li>➤ Employees (propositions according to their own sustainability beliefs) and potential recruits (younger generation wants to contribute to the society through their work)</li> <li>➤ Founders of startups or entrepreneurial ventures (spark discussion about sustainable growth, enact sustainability-related projects and prototypes)</li> </ul>
3) Role of innovation and digitalization	<ul style="list-style-type: none"> <li>• Innovation as a driver of sustainability (since the corporate origins or as a value-added component of the brand).</li> <li>• Importance of software for gathering and communicating sustainability data (e.g. Ecovadis, occupational health and safety, lifecycle assessment), and efficient management of large pools of data.</li> <li>• Digital training limited to the adopted digital tools, no deployment of an overall digital literacy program (high level within the countries).</li> <li>• During the pandemic, acceleration of remote working and use of remotely connected devices in operations (e.g. drones).</li> </ul>
4) Tackling employee barriers to acceptance (Managing an organizational culture of sustainability)	<ul style="list-style-type: none"> <li>• Internal barriers are minimal within the R&amp;D department, or when responsibilities/roles are evenly assigned.</li> <li>• Barriers depend on a misalignment between corporate sustainability goals/vision and the shareholders' or employees' belief in a successful outcome.</li> <li>• To overcome cultural barriers: employee engagement activities, clear direction from the top (values), communication (internal and external stakeholders) and meetings for two-way dialogue with CEO (and presentation of sustainability results), training (lessons on sustainability themes for onboarding or general literacy), competitions rewarding the best sustainably innovative idea, employee volunteerism and philanthropy, codes of conduct</li> </ul>
5) Leadership style	A successful organizational culture combines formal (control, rules procedures, project approvals, scheduling and process documents) and informal (employees are trusted in their expertise) leadership styles.
6) Cross-departmental collaboration	<ul style="list-style-type: none"> <li>• Corporate sustainability requires a variety of experts, from numerous functions, and sometimes even firms in a group.</li> <li>• Each is responsible for defining the data collection and disclosure rules.</li> </ul>





	<ul style="list-style-type: none"> <li>Final results are aggregated by a director of sustainability, if present.</li> </ul>
7) Leadership position, career development and learnings	<ul style="list-style-type: none"> <li>Direction of corporate sustainability operations: sustainability function, R&amp;D, operations, procurement, quality management system, social compliance, etc.</li> <li>Main common tasks: setting up and developing the sustainability strategy and architecture (coordinating teams, prioritizing actions, defining budgets, monitoring and reporting on performance).</li> <li>Career milestones: work experience (in non sustainability-related positions but providing transferrable skills) and subsequent formalization through a Master's or MBA degree (environmental or social themes).</li> <li>Learning process: self-learning (remaining up-to-date with relevant industry information, e.g. green finance, environmental laws and how they affect businesses), official courses (e.g. auditing), observation of competition, experience in materiality analysis, assessment of sustainability reports to understand gaps.</li> </ul>
8) Characteristics and paths of exemplary leaders	<ul style="list-style-type: none"> <li>Leadership personality traits: strongly believes in sustainability themes and advocates for a sustainability cultural change, confident in own knowledge, persistent in their career pursuit, clear and charismatic identity, ability to influence but also respect opinions, excellent/concise communicators and storytellers, engage with people and transmit enthusiasm, ability to balance informal approach with structured planning transparently.</li> <li>Multiple departments of affiliation (efficiency): dedicated sustainability function (focus on sustainability action), R&amp;D and operations (generate tangible results), human resources (employee safety and wellbeing), sales (interaction with clients), marketing (promoting corporate vision, but risk of becoming greenwashing).</li> </ul>

This research yields implications for managers who seek to initiate a process of transition towards sustainable operations. The thoroughly analyzed implications of sustainability leadership provide insights into all the major influencers, relevant in the current socio-economic context. Stages of development, tools and competences are equally outlined. The major limitation pertains to the small pool of participants, hence a future research direction should consider expanding the pool of interviewees, and also standardizing the interview questions into a formal survey in order to be able to draw more generalized conclusions by increasing the comparability of replies.

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## Thesis conclusions

The focus of this thesis has been on modern sustainability challenges at macro, mezo and micro level that SMEs are called to face nowadays. The work presented gathers a series of insights and contributions on the global challenged on Covid-19 and digitalization, as well as the internal corporate barriers of accounting coordination and sustainability leadership.

The first chapter gave an overview of the changed relevance of the classic (economic, social, environmental) and extended (digitalization, international trade, reputation) sustainability pillars under the novel pandemic circumstances in which companies are still called to implement their sustainability initiatives. The main difference is that the reputational aspect is now considered an inseparable component of the social pillar, which has been divided in two equally relevant part (social wealth and social performance). Digitalization and employment are also merged together and assume higher relevance, given the new two-fold metric (digital growth and digital employment). And finally, the environmental impact is measured through the filter of innovations (environmental innovations).

Chapter two contributes to research through three outputs. The first one is a scheme on the implications of the CSR implemented by BGs/networks at the macro (leadership/political influence), mezo (sustainability-oriented innovation networks) and micro (removal of operational barriers for SMEs) levels. Secondly, the most popular sustainability accounting and control tools are listed with regards to the SME setting. And finally, the chapter proceeds to describe the process flow that aggregations of SMEs can incorporate into their own practices to integrate sustainability activities (with the help of accounting and ICT) into group or network operations.

The third chapter attempts to support the improvement of a firm's accountability through the integration between sustainability and digital tools. In particular, the first contribution is a strategic-level framework to align the processes belonging to data governance and sustainability assessment. The matrix of reporting behaviors then shows the possible paths that companies follow to incorporate their digitalization within existing sustainability reports, in order to obtain an enriched final disclosure document.

Lastly, chapter four delves into sustainability leadership and the related influencing variables, compiling a scheme with options per each, as per testimony by industry aspects. The elements that differentiate one sustainability leader from the other have been found to be: 1) drivers of sustainability transition at corporate level; 2) initiating role of TMT, experts and civil society; 3) role of innovation and digitalization; 4) tackling employee barriers to acceptance; 5) leadership style; 6) cross-departmental collaboration; 7) leadership position, career development and learnings, 8) characteristics and paths of exemplary leaders. Stages of development, tools and competences are equally outlined in the process of defining each variable.

The results provided throughout the chapters can be found to be of use mainly by the companies seeking to initiate or improve an existing sustainability management program. Despite the research project being primarily targeted at SMEs, since the best practices analyzed have been mainly those of larger corporations, the latter will also be able to find it beneficial, receiving some inspiration for their sustainability operations, since these organizations also lag behind in certain formalities. As for SMEs, the main advantage would be to find solutions to prevent their internal barriers and worldwide issues from tampering their ability to engage in a correctly structured CSR approach.

Some limitations restrained the information presented to reach its full potential, and that is largely because of the limited scope of the empirical studies. Therefore, by increasing both the sample size and also the reference to primary data instead of secondary one or information found from literature, each chapter could be further improved through future studies and therefore provide answers to more in-depth and customized questions.