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Building a Taxonomy of Sustainable Business Models for Impact Investing: A Literature Review

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1 Abstract

Impact investors need more than a simple label such as *sustainable*: they need to understand what type of sustainable business model a company adopts, as different models create value in different ways and involve distinct risks and opportunities. In the absence of a shared framework for describing these differences, portfolios become more difficult to compare and it becomes more difficult to understand how companies actually try to create sustainable value. Over the past decade, researchers have proposed numerous approaches to classifying sustainable business models. Some studies describe common business model types, while others present general frameworks or focus on specific sectors. However these studies often use words and different levels of detail which makes it hard to compare them. Because of this, the literature stays fragmented. There is no single framework that can bring all these approaches together.

This thesis aims to address this gap. Twelve selected academic contributions related to sustainable business models, published between 2014 and 2025, are reviewed and compared through a structured process. Together, these studies represent a wide range of research traditions, from qualitative coding of company examples to expert validation panels and large scale surveys. For each paper the categories or activities proposed are identified and extracted. The criteria they rely on are also reported. The concepts extracted are then compared across studies to identify total overlaps, partial overlaps or gaps. The analysis also separates the concepts that help directly classify a company from those that are more helpful for distinguishing companies or for studying the structure of a business model or for understanding the impact and context.

Based on this comparison, the thesis develops an integrated taxonomy through two stages. The initial comparison produced twenty-three preliminary items. A second conceptual consolidation separated core business model mechanisms from subtypes, enabling factors, outcomes and analytical lenses, resulting in nine final categories. Each final category is clearly defined, linked to the academic sources that support it, and supported by practical criteria to identify it in real companies.

The outcome is a single framework that combines different ideas from the literature reviewed into a common way of explaining how sustainable business models work. The taxonomy is then tested on 30 Italian companies that are listed on the stock market across ten ICB Supersectors. The analysis looks at how they are spread out and puts the categories into three main sustainability orientations. By offering an useful classification this thesis gives a common starting point for finding out and comparing the sustainability methods that different companies use. From an impact-investing perspective, it can support the first stages of company analysis by showing how sustainability is built into the business model and which aspects require further investigation. The taxonomy is therefore

intended as a classification and decision-support tool. It identifies documented business model mechanisms but does not measure the magnitude of the impact produced.

2 Introduction

2.1 Background and motivation

Impact investing is a type of investing that helps society or the environment while still earning a return. According to the Global Impact Investing Network the total amount of money managed in this field has increased by an average of 21 percent each year over six years. In the last year that number grew by 11 percent. These results come from the 2025 Impact Investor Survey, which included 429 organizations from 54 countries [1]. This growth highlights a more fundamental challenge: *how can investors understand how a company aims to create impact and which business model mechanisms support this objective?* Not all companies pursuing sustainability operate in the same way. One company may reduce the use of raw materials, another may improve working conditions in its supply chain, while another may provide products or services to underserved communities. These companies pursue sustainability in different ways and through different business models. These differences can also lead to different risks, opportunities, and forms of social or environmental value. For this reason, simply describing all of them as sustainable may hide important differences for investors. This challenge is particularly important in the context of impact investing. In the GIIN's 2025 survey, impact washing was identified by 62% of respondents as the leading challenge facing the impact investing industry [1]. Impact washing refers to the risk that a company's claimed impact does not accurately reflect its actual activities or outcomes.

These findings show the need for a more consistent ways to describe and compare sustainable business models. A shared framework with recognizable categories could help investors understand how sustainability is built into a company's business model. Researchers in academia have already tried to build this kind of work. Since Bocken et al. [2] introduced a set of sustainable business model archetypes, many other studies have proposed different categories and frameworks. However, these studies use different terms and methods and provide different levels of detail. As a result, there is still no common framework that can be applied to different companies and contexts. This gap provides the starting point for the present thesis, which aims to integrate different approaches to sustainable business models into a common and operational taxonomy that can support the identification and comparison of sustainability mechanisms in real companies.

2.2 Research gap and objective

The reviewed literature provides several classifications and frameworks for sustainable business models, but these approaches are not directly comparable because they use different categories, levels of analysis and methods. The reviewed studies also differ in what they classify. Some focus on

complete business model patterns or strategies, while others examine activities, structural elements, innovation mechanisms or external challenges. The aim of this thesis is to try to address this gap. Twelve selected academic studies on sustainable, circular, and regenerative business models are reviewed and compared in terms of categories and criteria they propose. Therefore this thesis gives an integrated taxonomy that brings together the relevant contributions of the reviewed studies. The aim is to integrate their useful elements. Similar concepts are combined, important differences are maintained, and ideas that appear only in specific studies are considered separately. The taxonomy is then tested on 30 large Italian listed companies across ten ICB Supersectors, allowing the identified mechanisms to be compared at company and sector level. The taxonomy is also designed to be useful in practice. Each category is therefore defined through clear criteria that make it possible to recognize it in a real company. The taxonomy identifies the documented business model mechanisms through which a company aims to create sustainable value. It does not measure the magnitude of the impact produced.

2.3 Structure of the thesis

The thesis is organized as follows.

Chapter 3 presents the theoretical background needed to understand the rest of the thesis. It first introduces the concept of impact investing and explains why a shared way of describing sustainable business models is needed. It then defines the concept of the sustainable business model and briefly traces its development over time.

Chapter 4 presents the state of the art. It gives an overview of the twelve academic papers analyzed in this thesis and highlights the main differences between their approaches. Some studies propose specific business model categories, others develop broader conceptual frameworks, while others focus on a particular industry or aspect of sustainability. The chapter also compares the methods used in the reviewed studies and explains how this thesis relates to the existing literature.

Chapter 5 is the core of the thesis. It describes the methodology used to select and compare the twelve papers. It explains how the concepts from the different studies were extracted, organized, compared, and integrated. It then explains how the comparison was developed through several iterations, first producing twenty-three preliminary items and then consolidating them into a final taxonomy of nine categories. For each category the chapter gives a definition and identifies the original sources. It also shows practical criteria that can help identify it in a real company. It also expalins how additional lenses can help understand better each company.

Chapter 6 shows the test of the taxonomy on 30 Italian companies that are listed on the stock market and cover ten ICB Supersectors. It also reports the results obtained for each company and for the overall sector. Finally, it summarizes the nine categories through three sustainability orientations and discusse how useful the test was and what problems came up.

Chapter 7 concludes the thesis by summarizing its main contribution, limitation and by presenting possible directions for future research.

3 Theoretical background

3.1 Impact investing and the need for a shared business model language

The term *Impact investing* was introduced in 2007 at a meeting held in Bellagio, Italy, and organized by the Rockefeller Foundation. The event gathered investors, philanthropists, and entrepreneurs to discuss how private investments could be used to support social and environmental goals [3]. This meeting contributed to the development of the impact investing field and eventually led to the creation of the Global Impact Investing Network (GIIN) which has since become one of the main reference organizations for the sector [3]. Today GIIN defines impact investing as investments made with the intention of generating positive and measurable social or environmental impact alongside a financial return [4]. Three elements are particularly relevant for this thesis. First, impact must be intentional: investors should actively aim to generate a positive social or environmental outcome, rather than simply accepting it as a possible side effect of an investment. Second, the investment must generate a financial return, which can range from below-market to market-rate returns. Third, the impact generated should be measured and reported in a transparent way [4]. *Impact investing* is therefore different from *philanthropy*, which mainly aims to create social or environmental benefits and does not usually focus on generating financial returns and *traditional investing* which, instead, mainly aims to generate profit. Impact investing combines these two ideas by trying to achieve both a financial return and a positive social or environmental impact. This dual objective makes it important to understand how sustainability is connected to the company's business model. A company's sustainability claims alone do not explain how its activities are expected to create environmental value. Investors therefore need to understand the mechanism, behind these claims and how it is connected to the company's activities. This distinction matters a lot because companies can say they are sustainable. The way they try to create value can be very different. One company might focus on cutting down waste to reduce its harm to the environment. Another company may provide products or services to people who are not well served by markets. Both companies may pursue sustainability, but through different business model mechanisms. Without a framework capable of identifying and comparing these mechanisms, investors risk comparing labels rather than the substance of the underlying business models. The impact investing industry has already made progress in tackling part of this challenge. GIIN's IRIS+ system gives investors a set of metrics that they can use to measure and report impact. These include indicators such as the number of jobs created or the amount of emissions avoided which makes it easier to compare impact, across companies and sectors [5]. However IRIS+ mainly focuses on measuring impact through indicators and evidence that are linked to company activities and outcomes. It does not provide a classification of the underlying business

model through which impact is generated. This distinction is important because two companies may report the same impact metric while relying on completely different business models, mechanisms, activities, and business risks. This distinction helps define the specific focus of this thesis. The aim is to develop a common framework for identifying and comparing the sustainability mechanisms used within different business models. The resulting framework complements existing impact measurement standards and provides investors with an additional tool for examining whether a company's sustainability claims are consistent with the way its business model is designed. By examining the sustainability mechanisms built into the business model, investors can move beyond broad labels and analyze possible impact-washing risks more systematically [1].

3.2 Sustainable business models: concept and evolution

The sustainable business model literature includes different ways of understanding how sustainability can be integrated into a business. Earlier approaches placed greater attention on extending value creation beyond economic value to include environmental and social considerations. Later studies also focused on protecting natural and social systems, considering different stakeholders, and understanding the link between sustainability and business growth. These studies show that the idea of sustainable business models has become broader over time. An important starting point is Bocken et al. (2014) [2]. Their contribution places sustainability directly within the business model rather than treating it as an activity separated from the core business. From this perspective, value is not exclusively economic. Society and the natural environment also become relevant stakeholders, and business model innovation can support sustainability by reducing negative environmental and social impacts or by generating new forms of value for these stakeholders. This idea becomes broader in the work of Schaltegger, Lüdeke-Freund and Hansen (2016) [11]. Their definition of a business model for sustainability includes a sustainable value proposition for customers and other stakeholders, together with the mechanisms through which value is created, delivered and captured while natural, social and economic capital is maintained or regenerated. The introduction of the concepts of *maintaining* and *regenerating* is particularly important because it broadens the meaning of sustainability. Sustainability therefore involves not only reducing harm, but also preserving or restoring the systems on which the business depends. Lüdeke-Freund et al. (2018) also adopt a broad view of sustainable business models [6]. They describe sustainable business models as models in which business interests are deliberately aligned with contributions to the sustainable development of society and the natural environment. In this perspective, economic viability and sustainability are not treated as separate objectives. Instead, they should be integrated within the same logic of value creation. Their perspective therefore connects the business model with the joint creation of economic, environmental, and social value.

Within this broader discussion, circularity represents an important but more specific perspective on sustainability. Circular business models concentrate primarily on the way resources are used and retained within economic activity, for example through reuse, longer product lifetimes and the closing, narrowing or slowing of material loops [7]. They therefore offer ways to use fewer resources and create less waste. However circularity is not a step that takes the place of a sustainable business model. Instead it can be seen as one of the methods used to reach sustainability goals with a lot of attention on materials and resources. Regenerative business models offer a view by looking at more than just reducing bad effects. Importantly, regeneration is not completely new at this point: the need to maintain or regenerate natural and social capital was already present in earlier definitions of sustainable business models [11]. More recent research, however, gives regeneration a much more central role. Das and Bocken (2024) place regeneration at the centre of the business model [7]. They argue that reducing negative impacts may not be enough when natural and social systems are already damaged. Regenerative businesses therefore aim to improve these systems and create a positive impact. This can include restoring nature, supporting communities and creating fairer supply chains. The regenerative perspective therefore places greater emphasis on how a business model can actively improve environmental or social systems, rather than only reduce harm.

As this understanding of sustainability becomes broader, the literature also develops a more detailed interpretation of what *sustainable value* actually means. Lüdeke-Freund, Froese, Dembek, Rosati and Massa (2024) identify three overarching value functions: *maintaining value*, *unlocking value* and *sharing value* [8]. Maintaining value concerns the preservation and restoration of natural resources and human-made assets. Unlocking value refers to enabling sustainable forms of value to become accessible to customers and other stakeholders, while sharing value concerns the distribution of the value created among the different actors involved. Stakeholders are becoming more important. This pushes the limits of the sustainable business model. Mais and Bauernhansl (2024) bring an openness perspective into the study of business models [9]. Their framework shows how companies can bring in actors such, as customers, suppliers, research institutions, competitors and other partners into their activities and value creation processes. Openness is not a required trait of every business model. Instead Openness works as a tool that lets relationships help build sustainable value creation.

A further perspective appears in recent research on strong sustainability and degrowth. Chevrollier et al. (2025) question an assumption that remains largely implicit in conventional business models: the idea that continuous economic growth should always be pursued [15]. From a strong sustainability perspective, economic activity must remain compatible with ecological limits, which requires considering not only how efficiently resources are used but also the total amount of resources and production involved. At the individual company level the authors show that being sustainable does

not mean every company must cut its revenues or shrink in size. The companies studied can still grow economically while using materials making products last longer improving repairability sharing resources and switching away from less sustainable ways of producing. The authors call this approach quality growth [15]. This way of thinking brings up a question: it's not just about how value is created but also what kind of growth the business model relies on. It also asks whether that growth fits within the limits of the environment. Overall the research shows that sustainable business models can generate value in social and economic areas. They can lower resource use help protect or heal social systems include outside stakeholders and rethink the link, between sustainability and growth. These ideas have some overlap. They focus on different ways things work and different levels of analysis. This variety makes it important to have an consistent way of talking about these models. That’s why Chapter 4 looks at how the selected studies define and study business models.

4 State of the art

4.1 Overview of the reviewed literature

The literature reviewed in this thesis consists of twelve selected academic contributions published between 2014 and 2025. They include studies that directly classify sustainable business models, as well as contributions focused on regenerative business, circularity, social enterprises, industrial symbiosis, open business models, strong sustainability and other closely related perspectives. The studies differ in their focus, methodology, type of evidence, and final output. Some are mainly based on literature, while others use company cases, expert input or surveys. Table 4.1 provides an overview of the twelve studies included in the review.

Table 1 - Overview of the reviewed literature

ID	Study	Focus	Methodology	Output	Scope or context
P01	Bocken et al. (2014) [2] *Journal of Cleaner Production*	Sustainable business model innovation	Literature and practice review; iterative qualitative coding	8 sustainable business model archetypes	Cross-industry examples
P02	Lüdeke-Freund et al. (2018) [6] *Sustainable Production and Consumption*	Sustainable business model patterns	Literature-based taxonomy development supported by an expert card-sorting process	45 SBM patterns organized into 11 groups	Cross-industry
P03	Das & Bocken (2024) [7] *Sustainable Production and Consumption*	Regenerative business strategies	Practice review of 84 business cases; qualitative coding	6 regenerative business strategy archetypes and a case database	15 sectors (mainly food, consumer goods, fashion)
P04	Lüdeke-Freund et al. (2024) [8] *Organization & Environment*	Characteristics of sustainable business models	Literature review of 390 articles; active categorisation	106 activities → 26 activity groups → 12 design themes → 3 value functions	Cross-industry
P05	Mais & Bauernhansl (2024) [9] *Sustainability*	Sustainable and open business models	Literature review; iterative taxonomy development; and expert assessment	64 design options across 9 dimensions and 4 metadimensions	Energy-intensive manufacturing industries
P06	Brenner & Drdla (2023) [12] *Sustainability*	Business model innovation for sustainability and circularity	Literature review and qualitative content analysis	3 sustainable BMI types and 5 circular BMI types	Cross-industry
P07	Armstrong & Grobbelaar (2023) [13] *Management Review Quarterly*	Sustainable business models for social enterprises	Literature review and conceptual framework development	Two-layer conceptual framework for social enterprises and their business models	Social enterprises
P08	Chuah et al. (2025) [14] *Asian Journal of Business Ethics*	Regenerative business and systems thinking	Mixed methods: concept mapping and survey validation	4 clusters: environmental impact, social impact, innovation practices and regenerative business models	Southeast Asian context
P09	Chevrollier et al. (2025) [15] *Journal of Business Models*	Strong sustainability and degrowth	Qualitative study of 12 companies	Degrowth-oriented value-creation practices, including quality growth	Dutch fashion industry
P10	Albino & Fraccascia (2015) [16] *Procedia Environmental Science, Engineering and Management*	Industrial symbiosis business models	Inductive analysis of secondary industrial-symbiosis cases	6 industrial symbiosis business models	Industrial symbiosis
P11	Bocken et al. (2025) [17] *Strategic Entrepreneurship Journal*	Business model innovation and grand challenges	Editorial and conceptual development	ABC classification and BMI-GC concept	Cross-industry
P12	Süß et al. (2021) [18] *Sustainability*	Sustainability-oriented business model evaluation	Literature review	4 categories of evaluation methods	Cross-industry

The table shows that the twelve studies do not all analyze the same aspect of sustainable business models. Some contributions give classifications of business models. For example Bocken et al. in 2014 organize business models into eight archetypes [2]. Meanwhile Lüdeke-Freund et al. in 2018 create a detailed structure with 45 patterns arranged in 11 groups [6]. Das and Bocken in 2024 use a classification method, for regenerative business producing six strategy archetypes based on observed company practices [7]. Albino and Fraccascia (2015), in turn, identify six business models within the more specific context of industrial symbiosis [16].

Other studies examine sustainable business models from a different perspective and do not provide directly comparable sets of business model types. Lüdeke-Freund et al. (2024), for instance, analyze sustainable business models through activities, design themes and value functions [8], while Mais and Bauernhansl (2024) identify design options that combine sustainability and openness [9]. Brenner and Drdla (2023) focus instead on the types of innovation that support the transition towards sustainable and circular business models [12]. Armstrong and Grobbelaar (2023) focus specifically on social enterprises [13]. These contributions can therefore provide useful analytical dimensions without necessarily offering complete company-level business model categories. Other contributions examine more specific perspectives or contexts. Chuah et al. (2025) examine regenerative business through a systems-thinking perspective and organize the resulting concepts into four empirical clusters [14]. Chevrollier et al. (2025), instead, connect business model innovation with strong sustainability and degrowth by examining how companies in the Dutch fashion industry create value while reducing resource use and production pressures [15].

Finally, two studies address related aspects without directly classifying sustainable business models. Bocken et al. (2025) focus on the external challenges that business model innovation can help address, proposing the ABC classification of artificial intelligence, business and global unrest, and climate change [17]. Süß et al. (2021), by contrast, focus on how sustainability-oriented business models can be evaluated and organize the assessment methods into four main categories [18]. Taken together, the twelve studies are connected by the broad topic of sustainable business models, but they differ in what they analyse and in the type of output they provide. Section 4.2 examines these differences in greater detail.

4.2 Diversity of approaches

The twelve studies address sustainable business models or closely related concepts, but they do not form a homogeneous research stream. Some provide business model classifications that can be applied directly to companies, while others examine activities, innovation mechanisms, external challenges, perceptions of impact or evaluation methods. They also use different forms of evidence,

including literature reviews, company cases, expert input and surveys. To clarify these differences, this section groups the papers into five descriptive clusters based on their primary analytical contribution and applicability to company analysis. The purpose of the clusters is to separate different analytical levels before comparable mechanisms are integrated in Chapter 5.

4.2.1 Cluster A - Ready-to-use business model taxonomies

This first cluster includes studies that develop classifications directly applicable to company business models. Bocken et al. [2] brought together a literature review and real business examples to find eight sustainable business model archetypes. These archetypes go from improving material and energy efficiency to changing the business to serve society and the environment better. Lüdeke-Freund et al. [6] extended this work by integrating fourteen existing classifications, including Bocken et al. [2]. Their five-step method included a two-round Delphi card-sorting exercise with ten international experts and produced forty-five patterns organised into eleven groups, each linked to ecological, social and economic value creation. Das and Bocken [7] followed a different method, identifying eighty-four regenerative businesses across fifteen sectors through purposive sampling. Cases had to represent active businesses with ongoing regenerative activities and transparent evidence of positive impact. From these cases, the authors derived six regenerative business strategy archetypes, while acknowledging the possible selection bias associated with purposive sampling. Despite their methodological differences, all three studies provide clearly defined categories that can be used to describe company business models and therefore represent direct inputs to the taxonomy developed in Chapter 5.

4.2.2 Cluster B - Conceptual frameworks

This cluster includes studies that provide concepts, dimensions or analytical lenses rather than compact company-level taxonomies. Lüdeke-Freund et al. [8] reviewed 390 articles and identified 106 recurring activities, organised into 26 activity groups and 12 design themes. These themes were linked to three value functions, maintaining, unlocking and sharing value, which complement the conventional business model functions of proposing, delivering and capturing value. Their framework therefore explains the activities involved in sustainable value creation rather than defining distinct company types. Brenner and Drdla [12] conducted a PRISMA-guided systematic review of seventy-one articles and identified three types of innovation supporting the transition towards sustainable business models and five supporting circular business models. Circularity is treated as a specific case within the broader sustainability concept. Because these eight innovation types can coexist within the same company, they represent mechanisms rather than mutually exclusive business model categories. Armstrong and Grobbelaar [13] reviewed fifty articles on social enterprises and organized 121

concepts into thirty subcategories, nine categories and two layers: the social enterprise layer and the business model layer of a hybrid organization. Although they do not propose sustainable business model archetypes, they identify five criteria for distinguishing social enterprises, including the relationship between paying customers and social beneficiaries, social value spillover, the organization of social and commercial activities, the form of transaction and the country's development level. Overall, these three studies help explain the activities, innovation mechanisms and company-level distinctions underlying broader sustainable business model categories.

4.2.3 Cluster C - Sector or context-specific studies

This cluster includes studies focused on a specific industry, context or economic mechanism. Mais and Bauernhansl [9] examine energy-intensive manufacturing companies facing decarbonization pressures. They combine a PRISMA review of eighty-one articles with three rounds of theory-driven coding and one of data-driven coding to integrate separate taxonomies of open and sustainable business models. The resulting taxonomy contains sixty-four characteristics organized into four meta-dimensions, value creation, proposition, delivery and capture, and nine more detailed dimensions, including partners, activities, resources, customers, costs and revenues. It was examined through use cases and feedback from three sector experts, although the authors acknowledge the limited number of cases and experts and its focus on energy-intensive industries. Chevrollier et al. [15] study twelve Dutch fashion companies through interviews with senior managers. Rather than developing new categories, they apply the maintaining, unlocking and sharing value functions proposed by Lüdeke-Freund et al. [8] to examine strong sustainability and degrowth in practice. Their findings illustrate mechanisms such as product durability, repair and limits to production, but remain closely connected to the Dutch fashion sector. Albino and Fraccascia [16] focus on symbiosis, in which companies exchange waste materials and by products. By examining documented cases they found six business models. Each business model is distinguished by the source of benefit. Some business models lower disposal or input costs. Others generate revenue from by products. These three studies give evidence on how sustainability mechanisms operate in specific settings. However using their findings in sectors or contexts requires caution.

4.2.4 Cluster D - External context

This cluster includes two studies that examine aspects surrounding sustainable business models rather than classify their content. Bocken et al. [17] organize the external grand challenges that business model innovation can address into an *ABC scheme*: artificial intelligence, business and global unrest, and climate change. Combining these challenges with the antecedents, processes and outcomes of business model innovation produces a nine-cell framework. The study therefore provides an external-

context perspective rather than company-level business model categories. Süß et al. [18] focus instead on evaluation. Based on an in-depth review of eighteen articles, they classify sustainability-oriented business model evaluation methods into four approaches: single indicators, indicator systems or frameworks, simulation-based evaluation and multi-criteria decision-making. Thus, Bocken et al. help interpret the external challenges surrounding a business model, while Süß et al. provide methods for evaluating its sustainability. Neither study directly contributes company-level categories to the final taxonomy.

4.2.5 Cluster E - Perception-based evidence

Chuah et al. [14] differ from the other studies because they develop their regenerative business framework from the perceptions of Malaysian university students rather than from literature or company cases. First, twenty-eight participants completed a concept-mapping workshop, whose results were organized into four clusters using multidimensional scaling and hierarchical cluster analysis. This was followed by a survey of 238 students that was analyzed through exploratory factor analysis. The framework separates two core components, impact on the environment and impact on society from two enablers, innovation practices and the regenerative business model itself. The systems-thinking distinction is useful, for separating elements from the mechanisms that enable them. However the statistical analysis identified twelve factors of the original four clusters suggesting that the initial structure may be oversimplified. This difference with the use of a student sample limits the framework's generalizability and should be considered when comparing it with other studies [14]. Table 4.2 summarizes the five clusters. This difference, together with the use of a student sample, limits the framework's generalizability and should be considered when comparing it with other studies [14]. Table 4.2 summarizes the five clusters.

Table 2 - Diversity of approaches across the twelve reviewed papers

Cluster	Papers	What is classified	Directly applicable to a single company?
A - Ready-to-use taxonomies	P01, P02, P03	Business model archetypes/ patterns	Yes, as company-level classification inputs
B - Conceptual frameworks	P04, P06, P07	Activities, innovation mechanisms, concepts and company-level criteria	Mainly indirectly - provides additional analytical detail
C - Sector/context-specific	P05, P09, P10	Detailed dimensions, practices or models for specific settings	Yes, with attention to the original context
D - External context	P11, P12	External challenges and evaluation methods	No direct company-level classification
E - Perception-based evidence	P08	Perceptions of regenerative business	No direct company-level classification

4.2.6 Why diversity matters

The five clusters described above are not only an academic distinction. Two companies may receive the same sustainable business model label while differing in characteristics that matter to investors. The following hypothetical example show how concepts from different studies can reveal these differences.

Example: same archetype, different company characteristics. Companies A and B both sell small-scale solar home-lighting systems to communities without reliable access to electricity. Under Bocken et al.'s [2] classification, both would most plausibly be classified as *Substitute with renewables and natural processes* and *Re-purpose the business for society/environment*. These labels identify their common sustainability mechanisms but do not show who pays, who benefits or how the social benefit reaches its intended users. Armstrong and Grobbelaar's [13] criteria allow further differentiation. Particularly relevant are the transaction form, which identifies the parties involved in the financial transaction, and social value spillover, which indicates whether the benefit follows directly from the commercial activity or depends on an additional intervention. Suppose Company A sells directly to households: in this case the payer and the beneficiary are the same person and the social benefit appears when the product is purchased. Company B on the other hand sells its prdocuts to a government agency that is in charge of distributing and maintaining them. For Company B the payer and the beneficiary are different and the social benefit depends at least in part on an actor who is outside the company's direct control. Table 4.3 summarises the comparison.

Table 3 - Same archetype, different company profile

Dimension	Company A	Company B
Archetype under Bocken et al. [2]	Substitute with renewables and natural processes/ Re-purpose the business for society/environment	Same archetype as Company A
Transaction form [13]	Business-to-beneficiary: sells directly to the household	Business-to-government: sells in bulk to a public agency
Social value spillover [13]	Automatic	Contingent on the agency's distribution
Social-benefit pathway	Directly linked to the company's transaction	Depends partly on the government agency's subsequent distribution
Resulting financial/ business-risk profile	Revenue based on many individual household payments	Revenue based on a larger institutional contract

Once this additional information is considered, the two companies can be distinguished more clearly. Company A directly connects the transaction with the beneficiary, whereas Company B depends on an intermediary. Their revenue structures also create different questions regarding payment reliability, intermediary dependence and verification that the intended users are reached. This shows that Bocken et al. [2] identify the broad sustainability mechanisms, while Armstrong and Grobbelaar [13] reveal how the underlying social-enterprise model is organized.

The studies look at related questions. Cluster A focuses on company level categories. Cluster B adds details about activities, how innovation happens and criteria for differentiate companies. Cluster C goes deeper into specific context. Cluster D looks at factors which are external the company and how impacts are evaluated. Cluster E separates what people think the impacts are, from the things that make those impacts possible.

4.2.7 Methodological differences across the reviewed studies

The five clusters distinguish the papers according to what they analyze, while Table 4.4 compares how they were conducted. Three aspects are considered: the scale and transparency of the literature search or data collection; the technique used to develop the categories; and the presence of a separate validation or checking step.

Table 4 - Methodological characteristics of the twelve reviewed papers

Paper	Scale/ transparency of search or data	Analytical technique	Validation/checking of the result
P01 - Bocken et al. [2]	Broad literature and practice review; exact total not numerically reported	Iterative qualitative coding	No separate external validation reported
P02 - Lüdeke-Freund et al. [6]	14 prior classifications synthesized	Modified Delphi card sorting with quantified agreement measures (PAW/ GAW/ AAW)	External expert assessment: 10 international experts over two rounds
P03 - Das and Bocken [7]	84 selected business cases across 15 sectors; explicit inclusion criteria	Qualitative coding of practice cases	No separate external validation; case selection required transparently communicated evidence of positive impact
P04 - Lüdeke-Freund et al. [8]	8.342 articles screened to 390	Independent coding within the research team	Internal checking; no separate external validation
P05 - Mais and Bauernhansl [9]	574 articles screened to 81	Iterative taxonomy development: deductive and inductive coding	Use-case application and feedback from three sector experts
P06 - Brenner and Drdla [12]	440 articles screened to 71	Qualitative content analysis	No separate external validation reported
P07 - Armstrong and Grobbelaar [13]	1.146 articles screened to 50	Qualitative/conceptual framework development	No separate external validation reported
P08 - Chuah et al. [14]	Primary data: 28 participants in concept mapping followed by a survey of 238 students	Concept mapping, cluster analysis and exploratory factor analysis	Second-stage statistical testing on a student sample
P09 - Chevrollier et al. [15]	12 companies selected using explicit screening criteria	Interviews with senior managers; qualitative coding	No separate validation; empirical framework based on company interviews
P10 - Albino and Fraccascia [16]	Number of reviewed cases not reported	Inductive analysis of documented industrial-symbiosis cases	No separate validation reported
P11 - Bocken et al. [17]	Three literature searches; 122 articles retained	Literature mapping and conceptual development	No separate validation; conceptual framework proposed for future research
P12 - Süß et al. [18]	215 articles screened to 18	Literature review and categorisation of evaluation methods	No separate external validation reported

Lüdeke-Freund et al. [6] use a two-round modified Delphi card-sorting procedure with ten international experts. They measure agreement through pattern, group and anchor agreement weights, which respectively assess agreement on pattern placement, group composition and the most representative pattern within each group. Chuah et al. [14] also use formal quantitative techniques, applying hierarchical cluster analysis to develop four clusters and exploratory factor analysis to a second sample, with a KMO value of 0.953. However, the two studies involve different participants and purposes: the former uses sustainable business model experts, whereas the latter examines

Malaysian university students' perceptions of regenerative business. Other studies illustrate the distinction, between checking and external validation. Lüdeke-Freund and his team screened 8.342 articles. Kept 390. They disagreed on 11 percent of the articles. Worked out the disagreements by reading the full texts and having a third author help. This shows checking, not external validation. By comparison, Mais and Bauernhansl [9] applied their taxonomy to use cases and collected feedback from three sector experts, while Das and Bocken [7] used company cases to develop their framework rather than as a separate validation sample. Reporting transparency also varies. Albino and Fraccascia [16] explain their inductive analysis of industrial-symbiosis cases but do not report the total number reviewed. Bocken et al. [17] document three database searches that produced 391 articles and a final sample of 122. However, their ABC framework remains a conceptual structure that was not independently tested through an expert panel or separate company cases. Search transparency, evidence type, analytical method and validation should therefore not be combined into a single judgement of methodological quality. These differences also influence the interpretation of the final categories. The count of papers from which a category come from treats each paper in the same way, even though the studies are different in research designs. The number of papers that support a category therefore shows how often a mechanism appears in the chosen literature, not how strong its evidence is.

4.3 Positioning of this thesis

The reviewed studies differ both in what they analyze and in how their results are developed. Some provide business model archetypes, patterns or strategies, while others examine activities, innovation mechanisms, company characteristics, sector-specific practices or external challenges. They also rely on different evidence, including literature reviews, expert input, company cases and surveys. The gap addressed by this thesis is therefore the absence of a common structure that makes these contributions comparable while preserving their different analytical roles.

Chapter 5 addresses this gap by extracting and comparing the concepts, dimensions and criteria found in the twelve papers. The comparative matrix identifies forty-three comparison points based on total overlaps, partial overlaps and gaps. These were initially organized into twenty-three preliminary items and subsequently consolidated into nine final Sustainable Business Model categories. All categories and analytical elements remain traceable to their original sources. The methodological differences examined in Section 4.2.7 are not used to weight the papers. The number of studies supporting a mechanism therefore indicates how frequently it appears in the selected literature, not the quality or methodological strength of the evidence. The final categories are also not presented as completely

new business models derived from the company sample. They result from the comparison, reorganization and consolidation of concepts already present in the reviewed literature.

Chapter 6 applies the nine-category taxonomy to thirty listed companies across ten ICB Supersectors. This empirical application tests whether the categories can be identified consistently through public company information and used to compare sustainability configurations across companies and sectors. The contribution of the thesis is therefore a common and operational language for identifying sustainable business model mechanisms, supported by additional criteria that help investors examine company structure, beneficiaries, dependencies and evidence. The remaining limitations are discussed in Section 7.2.

5 Methodology and taxonomy development

5.1 Introduction to the methodology

This chapter shows how the papers reviewed in Chapter 4 were compared and used to build an integrated Sustainable Business Model taxonomy. Since the studies focus on different analytical objects, not every concept that was pulled out was treated as a company-level category. The methodology makes a difference between mechanisms that help with classification and concepts that are better suited as subtypes distinguishing criteria or analytical lenses. Section 5.2 outlines the process used to select the papers. Section 5.3 explains how the concepts, from each study were identified and coded. Section 5.4 looks at the underlying dimensions, criteria and analytical roles of these concepts. Section 5.5 presents a matrix that identifies forty-three points of comparison based on full overlaps, partial overlaps and gaps. Section 5.6 explains how these findings were organised into twenty-three preliminary items and subsequently consolidated into nine final categories. Finally, Section 5.7 presents the integrated taxonomy, its definitions, recognition criteria and operational procedure for the empirical application developed in Chapter 6.

5.2 Selection of the papers

The twelve papers were selected through a two-stage purposive, expert-guided process. The objective was not to conduct an exhaustive review of sustainable business model literature, but to identify a varied set of relevant studies suitable for comparison.

First a focused search found two known and often referenced works: Bocken et al. [2] who present business model archetypes and Lüdeke-Freund et al. [6] who bring together earlier classifications into a wider taxonomy of business model patterns. These two studies became the starting points for the analysis. The rest of the papers were chosen the with help of the thesis supervisors. They expand the review to include business, circularity, social enterprises, open business models, industrial symbiosis, strong sustainability, degrowth, innovation and external challenges.Table 5.1 lists the selected papers.

Table 5 - The twelve reviewed papers

Paper	Authors	Year	Paper	Authors	Year
P01	Bocken, N.M.P.; Short, S.W.; Rana, P.; Evans, S.	2014	P07	Armstrong, R.M.; Grobbelaar, S.S.	2023
P02	Lüdeke-Freund, F.; Carroux, S.; Joyce, A.; Massa, L.; Breuer, H.	2018	P08	Chuah, C.; Homer, S.T.; Loo, W.H.	2025
P03	Das, A.; Bocken, N.	2024	P09	Chevrollier, N.; Levelt, L.; Argyrou, A.; Meijer, F.	2025
P04	Lüdeke-Freund, F.; Froese, T.; Dembek, K.; Rosati, F.; Massa, L.	2024	P10	Albino, V.; Fraccascia, L.	2015
P05	Mais, F.; Bauernhansl, T.	2024	P11	Bocken, N.M.P.; Heidenreich, S.; Spieth, P.; Tucci, C.; Zott, C.	2025
P06	Brenner, B.; Drdla, D.	2023	P12	Süß, A.; Höse, K.; Götze, U.	2021

The papers pay attention to regeneration, ecological limits and certain environmental and social problems. Even though the papers are different all twelve papers still talk about regenerative business models or ideas that are closely connected, to how they are classified and studied. The final selection therefore combines established reference studies with recent and diverse contributions. Its purposive nature supports the comparative objective of the thesis but means that it should not be interpreted as an exhaustive or systematic review of the entire literature.

5.3 Extraction and coding of business models

Chapter 4 compared the twelve papers at the level of the overall study. This section explains how each business model, pattern, strategy or other relevant element was extracted and recorded as a separate row in the Business Models sheet. Each row contains a unique ID, such as BM01; the source paper and original name; a short description; any examples and relevant sectors identified by the authors; the value-creation, delivery and capture mechanisms; practical company-recognition criteria; and notes on relationships with previously extracted entries.

The main challenge was the different levels of detail used by the papers. Armstrong and Grobbelaar [13], for example, organize 121 concepts into thirty subcategories and nine categories, while Lüdeke-Freund et al. [6] organise forty-five patterns into eleven groups. Extracting every framework at its

most detailed level would have allowed the most granular papers to dominate the comparison. Each study was therefore extracted at the level closest to a mechanism that could realistically be identified in a company, generally an archetype, strategy or pattern group. Table 5.2 presents the level selected for each contributing paper.

Table 6 - Level of extraction selected for each contributing paper

Paper	Extraction level (= rows in the BM sheet)
P01 - Bocken et al. (2014)	8 archetypes
P02 - Lüdeke-Freund et al. (2018)	11 pattern groups
P03 - Das and Bocken (2024)	6 regenerative strategies
P04 - Lüdeke-Freund et al. (2024)	12 design themes
P05 - Mais and Bauernhansl (2024)	9 structural dimensions
P06 - Brenner and Drdla (2023)	8 innovation types
P07 - Armstrong and Grobbelaar (2023)	5 consolidated themes
P09 - Chevrollier et al. (2025)	12 value-creation strategies
P10 - Albino and Fraccascia (2015)	6 business models

The nine contributing papers produced 77 rows. Chuah et al. [14], Bocken et al. [17] and Süß et al. [18] do not appear in the Business Models sheet because they respectively classify perceptions of regenerative business, external grand challenges and sustainability-evaluation methods. Their contributions were retained as complementary analytical lenses. The availability of examples also differed across the studies. Of the 77 extracted rows, 58 contained an example and 19 did not. All entries extracted from Bocken et al. [2], Lüdeke-Freund et al. [6], Das and Bocken [7], Brenner and Drdla [12], Chevrollier et al. [15], and Albino and Fraccascia [16] included examples. By contrast, the twelve entries from Lüdeke-Freund et al. [8] and the five from Armstrong and Grobbelaar [13] contained no specific examples. Mais and Bauernhansl [9] provided examples for seven of their nine dimensions, with no example for strategic cooperation or cost structure. The examples ranged from named companies, such as Toyota in Bocken et al. [2], to anonymized company cases in Chevrollier et al. [15] and general business practices in Brenner and Drdla [12].

The notes field recorded preliminary relationships between new entries and those already extracted. It highlighted concepts not previously treated as separate categories, including customer segments and cost structure in Mais and Bauernhansl [9], digital technology as an innovation driver in Brenner and Drdla [12], and the tension between economic growth and reduced production and consumption

in Chevrollier et al. [15]. It also identified similar ideas expressed through different terms. For example, Bocken et al. [2] discuss how conscious consumption may still increase total consumption through the rebound effect, while a similar tension appears in Chevrollier et al. [15]. These notes provided an initial record of possible overlaps, differences and new elements. Overall, the Business Models sheet standardized information originally presented at different levels of detail and provided the basis for the subsequent comparison.

5.4 Dimensions and criteria identified across the reviewed studies

Section 5.3 created a common structure for the concepts extracted from the twelve papers. However, these concepts concern different analytical levels, including business model types, activities, innovation mechanisms, structural elements, value creation and external challenges. They therefore cannot all be treated as equivalent taxonomy categories. This section separates them according to four questions: (1) what each paper contributes; (2) which criteria distinguish companies with apparently similar models; (3) where and how sustainability modifies the business model; and (4) how each mechanism relates to expected value, impact-related elements, enabling conditions and external context. These questions create complementary analytical layers around the final taxonomy. The nine core categories identify the sustainability mechanisms used by a company, while the additional dimensions and criteria help explain which business model elements are affected, who pays and benefits, how the company generates revenue, which dependencies exist and what evidence supports its claims. This distinction provides investors with more information than a broad label such as circularity, regeneration or social inclusion. The following subsections organize the contributions of the twelve papers according to these analytical roles.

5.4.1 Mapping the analytical contribution of the twelve papers

The first step was to identify the analytical contribution of each paper. Table 5.3 summarises the main object examined, the output produced and the role assigned to each study within this thesis.

Table 7 - Analytical contribution of the reviewed papers

Paper	Main object analysed	Main output	Main role in this thesis
P01 - Bocken et al. (2014) [2]	Sustainable business model archetypes	8 archetypes, grouped mainly into technological, social, and organizational innovation	Direct classification input + Structural analysis
P02 - Lüdeke-Freund et al. (2018) [6]	Recurrent sustainable business model patterns	45 patterns organised into 11 groups, with expected economic, ecological, and social value effects	Direct classification input + Impact interpretation
P03 - Das and Bocken (2024) [7]	Regenerative business strategies	6 regenerative strategies based on 84 company cases (with information on purpose, networks, ownership, regeneration, and impact)	Direct classification input + Company-level differentiation
P04 - Lüdeke-Freund et al. (2024) [8]	Activities that make business models sustainable	Activities organized into 26 activity groups, 12 design themes, and 3 value functions	Cross-cutting interpretation
P05 - Mais and Bauernhansl (2024) [9]	Sustainable and open business model design	64 characteristics organized into 9 dimensions and 4 broader meta-dimensions	Direct classification input + Structural analysis
P06 - Brenner and Drdla (2023) [12]	Innovation types supporting sustainable and circular business model innovation	3 sustainability-oriented and 5 circularity-oriented innovation types	Direct classification input
P07 - Armstrong and Grobbelaar (2023) [13]	Sustainable business models for social enterprises	121 concepts organized into 30 subcategories, 9 categories, and 2 layers, (with criteria for differentiating social enterprises)	Company-level differentiation
P08 - Chuah et al. (2025) [14]	Perceptions and components of regenerative business	4 main clusters: Environmental Impact, Social Impact, Innovative Practices, and Regenerative Business Model	Impact interpretation
P09 - Chevrollier et al. (2025) [15]	Degrowth-oriented value creation in the fashion industry	Interview-based value-creation strategies and higher-level themes interpreted through sustainable value functions	Direct classification input + Impact interpretation
P10 - Albino and Fraccascia (2015) [16]	Industrial-symbiosis business models	6 business model configurations and hybrid combinations	Direct classification input + Company-level differentiation
P11 - Bocken et al. (2025) [17]	Grand challenges around business model innovation	ABC classification: Artificial Intelligence, Business and Global Unrest, and Climate Change	External-context interpretation
P12 - Süß et al. (2021) [18]	Sustainability-oriented business model evaluation	4 families of evaluation methods	Sustainability assessment

Note: Direct classification input identifies business model types, strategies or mechanisms used to develop the final taxonomy. Company-level differentiation provides criteria for distinguishing apparently similar companies, while structural analysis identifies the business model elements affected. Cross-cutting and impact interpretation explain expected value, impact-related elements and enabling conditions. External-context interpretation connects business models to broader challenges, whereas assessment concerns methods used after classification to evaluate sustainability outcomes.

The mapping shows that the papers often complement each other than compete. For example Bocken et al. [2] Offer clear business model archetypes. At the time Lüdeke-Freund et al. [8] Highlight the activities design themes and value functions that support sustainable value creation. The first paper helps sort out the sustainability mechanisms into categories. The second paper helps explain what those categories really mean. By keeping these two roles separate it becomes easier to bring the studies without treating all their results as the same kind of classification.

5.4.2 Company-level criteria for distinguishing apparently similar businesses

The second analytical layer concerns company-level differentiation. A taxonomy identifies the general sustainability mechanism, but companies within the same category may differ in their business model, relationship between revenue and intended impact, and level of sustainability integration. Table 5.4 includes criteria from the reviewed literature that can meaningfully describe or distinguish these differences.

Table 8 - Company-level differentiation criteria identified in the literature

Criterion	Source	What it helps distinguish
Degree of regenerative integration: entire company vs individual initiative	Das and Bocken (2024) [7]	Whether regeneration is part of the core company logic or limited to a specific project or activity
Ownership structure	Das and Bocken (2024) [7]	Whether ownership and control may support or constrain the sustainability purpose
Social value spillover: automatic vs contingent	Armstrong and Grobbelaar (2023) [13]	Whether social impact arises directly from commercial activity or requires an additional intervention
Customer-beneficiary relationship	Armstrong and Grobbelaar (2023) [13]	Whether the paying customer and the person receiving the social benefit are the same actor
Transaction form: B-B/ B-C/ B-G/ B-Be	Armstrong and Grobbelaar (2023) [13]	Who actually pays the company
Integration of social and commercial activities: integrated/ differentiated/ separated (> missions tension/drift)	Armstrong and Grobbelaar (2023) [13]	How closely the social mission and revenue-generating activities are connected
Source of economic benefit in industrial symbiosis	Albino and Fraccascia (2015) [16]	Whether economic value comes mainly from lower disposal costs, lower input costs, additional revenues, or a combination

Das and Bocken [7] distinguish between regeneration embedded throughout the company and regeneration limited to an individual initiative. They also identify private, listed, cooperative, family, foundation-, trust-, association- and steward-owned businesses, where control is given to people responsible for protecting the company's purpose rather than maximizing personal financial returns. These structures indicate who controls the company, how profits are allocated and how strongly its purpose may be protected over time. However, ownership alone does not demonstrate impact and must be considered together with activities, evidence and the financial model. Armstrong and Grobbelaar [13] add criteria concerning the relationship between customers and beneficiaries, the transaction form, social value spillover and the integration of commercial and social activities. These activities may be integrated within the same process, differentiated within one organization or separated between different organizations. Albino and Fraccascia [16] further distinguish industrial-symbiosis models according to whether their economic benefit comes from lower disposal costs, lower input costs, additional revenue or a combination of these sources.

Example 1 - Two companies providing healthcare. Both companies would be classified as C9 Inclusion oriented models because they help reduce barriers to healthcare. Company A sells a lowcost telemedicine subscription directly to low income users. The customer and the beneficiary are the same person and every paid subscription directly delivers a social benefit. The social value spillover happens naturally in this case. Company B sells a software platform to large employers and uses part of the revenue to fund free medical consultations for vulnerable groups. Here the paying customer and the beneficiary are not the same. The social benefit depends on a step to make it happen. Even though both companies may look similar under C9 their impact logic and how they rely on revenue is different. The risks in execution are also different. For Company A, affordability and user access may be central. For Company B, the investor should also understand how much revenue is transferred to the social programme and whether that mechanism is protected over time.

Example 2 -Two companies claiming to be regenerative food businesses. Company C was created around regenerative agriculture. Its contracts with farmers, sourcing choices, product design, mission and use of profits are all connected to restoring soil and supporting farming communities. Company D is a food company. It has only started one regenerative sourcing project, which covers 5% of one product line. Both Company A and Company D could share a connection with agriculture but the way they embed it is very different. The distinction between entire company regeneration and initiative level regeneration therefore prevents an investor from treating the two cases as equivalent. The relevant question becomes not only *Does the company have a regenerative activity*? but also *How much of the company actually depends on this logic?*

Example 3 - Two circular manufacturing companies. Company E uses production waste internally as a replacement for virgin raw materials. Its main economic benefit comes from costs for waste disposal and material purchase. Company F collects waste from other businesses, converts it into a new product and sells it. Its sustainability mechanism still relates to circularity. Its economic logic is different because making extra money is central. Company E may rely mainly on efficiency. Meanwhile Company F may face supply risk and requires a steady stream of external waste. Albino and Fraccascia [16] show that industrial-symbiosis models can generate different combinations of cost reductions and additional earnings.

A single taxonomy category is therefore insufficient to describe an investment case. Company-level criteria provide a second analytical layer that distinguishes companies according to mission, revenue, beneficiaries, ownership, operations and the degree to which sustainability is embedded in the business model.

5.4.3 Structural lenses: where and how sustainability modifies the business model

The third analytical layer asks where the sustainability mechanism is located within the business model and what it change. Table 5.5 summarises four structural lenses that address this question at different levels.

Table 9 - Structural lenses for sustainability in business models

Structural lens	Source	Main analytical use
Value Proposition/ Value Creation & Delivery/ Value Capture	Bocken et al. [2]	Identifies which fundamental part of the business model is changed
Purpose/ Networks/ Ownership/ Regeneration/ Impact	Das and Bocken [7]	Provides a broader organizational view of a regenerative business
Four meta-dimensions → nine dimensions → 64 characteristics	Mais and Bauernhansl [9]	Provides detailed mapping of sustainable and open business model design
Core models and hybrid combinations in industrial symbiosis	Albino and Fraccascia [16]	Shows that multiple circular mechanisms can be combined in the same business model

Bocken et al. [2] provide the simplest lens, distinguishing between Value Proposition, Value Creation and Delivery, and Value Capture. These elements show what the company offers, how it produces and delivers that offer, and how it generates revenue. Mais and Bauernhansl [9] examine the same areas through 64 characteristics organized into nine dimensions and four meta-dimensions. Das and Bocken [7] take a broader organizational perspective by considering purpose, networks, ownership,

regeneration and impact. Finally, Albino and Fraccascia [16] distinguish different industrial-symbiosis mechanisms and show how they can form hybrid models. The following examples illustrate the practical value of these lenses.

Example 1 - Two companies offering washing machines as a service: Bocken et al. [2]. Company A and Company B both provide washing machines through a monthly subscription instead of selling them. Both use an access arrangement and therefore initially appear relevant to C3 *Access-and-service-oriented models*. Bocken et al.'s framework shows differences: for Company A the value Proposition is the ability to use a washing machine without owning it. For Company A, value Creation and value Delivery have been redesigned: Company A makes machines, offers maintenance and repairs, then collects the machines when each contract ends and reconditions them for another customer. For Company A value Capture is based on recurring subscription revenue. For Company B a similar subscription is offered so Company B also has a Value Proposition and a similar revenue mechanism. However, it purchases standard low-cost machines, outsources maintenance and replaces broken machines instead of repairing or reconditioning them. Its operating system therefore remains close to a conventional linear model. The two companies offer similar access arrangements, but only Company A provides clear evidence that this arrangement supports durability, reuse and lower replacement. For Company B, the subscription alone would not be sufficient to confirm C3 without evidence of a sustainability benefit. Company A may therefore present a more strongly embedded circular logic, although it also faces greater operational complexity related to maintenance, logistics and asset ownership. The lens asks: *Does the access arrangement change only ownership and payment, or does it also change operations in ways that create a sustainability benefit?*

Example 2 - Two regenerative agricultural companies: Das and Bocken [7]. Two food companies sell premium products made from crops grown using regenerative practices. At first sight, they may appear similar. The framework from Das and Bocken [7] however makes it possible to compare companies through five elements. Company A was started specifically to bring soil health and help local farmers, which means that regeneration is a main part of its Purpose. Its Networks consist of long-term partnerships with farmers, local groups and people who work in agriculture. Its Ownership structure gives a lot of control to the founders and people who believe in the mission. Regeneration is about improving soil quality and the variety of life in the soil while Impact is shown through data about the soil certificates, from groups and updates that come out regularly. Company B sells a similar product, but regenerative agriculture represents only one sourcing programme within a much larger conventional business. Its Purpose is not specifically regenerative, its Networks are mainly conventional supplier relationships, and its Ownership structure contains no mechanism for

protecting the initiative. Regeneration involves a small part of the supply chain while Impact is usually shared through general sustainability statements that don't have much outside checking. The key difference is whether regeneration is at the heart of the company or just part of one project. The question is: *How much is regeneration part of the company, who's behind it and in charge of it, what exactly is being regenerated and how good is the proof, for it?*

Example 3 - Two circular packaging companies: Mais and Bauernhansl [9]. The framework of Bocken et al. [2] can first identify the broad parts of the business model affected by sustainability. Mais and Bauernhansl [9] can then examine those parts through nine dimensions: Strategic Collaboration, Key Partners, Key Activities, Key Resources, Value Proposition, Customer Relationship, Customer Segments, Cost Structure and Revenue Stream. Consider two companies that produce packaging using recycled materials. Both may initially be classified under C2 *Circularity-oriented models*, but the more detailed dimensions reveal important differences.

Table 10 - Structural comparison of two circular packaging companies

Meta-dimension	Detailed dimension [9]	Company A	Company B
Value Creation	Strategic Collaboration	Develops collection and recycling solutions together with external partners	Limited collaboration; mainly purchases recycled material from the market
	Key Partners	Retailers, customers and waste-management companies are important to the circular system	Mainly conventional material suppliers
	Key Activities	Collection, recycling, reuse and collaboration are central activities	Standard packaging production using purchased recycled material
	Key Resources	Waste and recovered materials, recycling technology and specialized knowledge are important resources	Purchased recycled material is the main sustainability-related resource
Value Proposition	Value Proposition	Offers packaging together with a broader circular solution aimed at reducing waste and maintaining material use	Offers packaging containing recycled material
Value Delivery	Customer Relationship	Maintains close and transparent relationships with customers involved in the circular system	Mainly conventional supplier-customer relationship
	Customer Segments	Primarily targets customers actively looking for more sustainable packaging solutions	Sells to a broader conventional market
Value Capture	Cost Structure	Bears additional investment and operating costs related to collection, recycling technology and circular infrastructure	Mainly bears conventional production and material costs
	Revenue Stream	Can combine product revenues with longer-term services or contractual relationships	Mainly generates revenues through individual product sales

Company A has integrated circularity across several parts of its business model. It depends on external partners, performs dedicated circular activities, requires specialized resources and infrastructure, and maintains closer relationships with participating customers. Company B introduces circularity mainly through one resource: purchased recycled material. This does not automatically make Company A the

better investment. Company A's model may be deeply embedded and difficult to replicate but it is also more complex and dependent, on partners, infrastructure, customer participation and operational execution. Company B may be easier to manage. Company B's sustainability approach may also be easier for competitors to copy. The lens asks: *Which parts of the business model make the sustainability mechanism work and what opportunities, costs, dependencies and risks follow from them?*

Example 4 - Two companies using industrial waste: Albino and Fraccascia [16]. Two manufacturing companies both create economic value from industrial waste and may therefore be classified under C2. Company A turns waste from one of its production lines into a useful input for another line inside the same plant. This circular mechanism lets Company A cut down on waste disposal costs. Reduces the need for fresh raw materials. Company B takes waste that other businesses throw away, cleans it up and turns it into a product. Company B's model depends on having a steady stream of the right kind of waste from outside. Albino and Fraccascia [16] point out that industrial symbiosis models can use different economic tools and can even mix them into hybrid setups. From an investor's point of view Company A looks mainly like an operational efficiency mechanism. Company B offers a revenue stream but brings extra supply and processing risks. The question we should ask is: *Which circular mechanism links waste to value and what operational ties does it bring?*

These structural lenses add to the taxonomy by showing how deeply a sustainability mechanism is built into a business and which parts of the model help it work. Bocken et al. [2] give a examine the organization and Mais and Bauernhansl [9] provide a finer structural picture, while Das and Bocken [7] look at the organization that drives regenerative work and Albino and Fraccascia [16] explain the setups of industrial symbiosis. Together, these lenses help an impact investor investigate the operations, dependencies and financial risks behind a taxonomy classification.

5.4.4 Cross-cutting lenses for interpreting impact

The fourth analytical layer concerns interpretation. After classifying a company and locating the sustainability mechanism within its business model, an impact investor must still understand what the mechanism is expected to achieve, whether it directly represents impact or only enables it, and what evidence is needed. Table 5.7 summarises the cross-cutting lenses provided by the reviewed studies.

Table 11 - Cross-cutting lenses for impact interpretation and assessment

Lens	Source	Main question for the investor
Expected economic/ ecological/ social value effects	Lüdeke-Freund et al. (2018) [6]	What forms of value is the mechanism expected to support?
Maintaining/ Unlocking/ Sharing value	Lüdeke-Freund et al. (2024) [8]	What role does the mechanism play in sustainable value creation?
Core impact component vs enabling mechanism	Chuah et al. (2025) [14]	Does the element directly represent an impact, or does it mainly enable impact?
Strong-sustainability and degrowth interpretation	Chevrollier et al. (2025) [15]	Does the business reduce dependence on increasing physical production and resource use?
Country context: developed/ developing economy	Armstrong and Grobbelaar (2023) [13]	Does the context affect the social-enterprise model, payer structure, or market conditions?
ABC grand challenges: AI/ Business and Global Unrest/ Climate Change	Bocken et al. (2025) [17]	Which major external challenge is the business model exposed to or trying to address?
Evaluation method families: indicators/ frameworks/ simulation/ MCDM	Süß et al. (2021) [18]	What type of method could later be used to evaluate sustainability performance?

The first two lenses concern sustainable value. Lüdeke-Freund et al. [6] consider the potential of business model patterns to create ecological, social and economic value. Lüdeke-Freund and colleagues [8] identify three value functions: Maintaining value means keeping or bringing back social or economic value. Unlocking value means offering value to customers or markets. Sharing value is about how the benefits are shared among people involved. Chuah and team [14] talk about core impact parts and supporting elements. Their model treats social effects as the main parts while new practices and business models that help the environment act as support. An innovative practice should therefore not automatically be considered evidence of impact. It may create the conditions for impact, but the resulting environmental or social change must still be demonstrated. Chevrollier et al. [15] add a strong-sustainability and degrowth perspective. Their study of twelve Dutch fashion companies shows that degrowth-oriented value creation does not require businesses to reject every form of growth. Companies may remain economically viable and pursue qualitative growth while reducing physical output or resource use and increasing product durability and repairability. This lens therefore distinguishes financial development from continuous growth in material production. The remaining lenses add context and assessment. Armstrong and Grobbelaar [13] show that the economic and institutional context can influence customer needs, payer structures and the design of social-enterprise models. Bocken et al. [17] examine Artificial Intelligence, Business and Global Unrest, and Climate Change as external challenges that can create both risks and opportunities for business model innovation. Finally, Süß et al. [18] identify four families of evaluation methods: single indicators, indicator systems or frameworks, simulation approaches and multi-criteria decision-making methods. These methods belong to a later analytical stage. The taxonomy first identifies the

mechanism; evaluation methods can then assess whether and to what extent it produces observable outcomes.

Example 1 - A platform for sharing electric vehicles. The company may initially appear compatible with C3 *Access-and-service-oriented models* because users receive access to vehicles without owning them. The structural analysis would show that the Value Proposition shifts from owning a vehicle to having access to mobility. The value-function lens would see this mainly as unlocking value because mobility becomes available through an asset. It could also help keep value if vehicles last longer and receive maintenance. However shared access is a mechanism rather than proof of impact. The outcome depends on indicators such as how much the vehicle is used, how long the fleet lasts, the electricity source, total kilometers travelled and whether shared trips replace private car rides, public transport or walking. C3 should only be confirmed when the access arrangement delivers a documented sustainability benefit. The lens therefore turns a good rating into clear questions, about how the asset is used or whether travel is replaced.

Example 2 - An AI company supporting energy efficiency in factories. The company may be classified under C1 *Resource-efficiency-oriented models* if its technology helps customers reduce the energy required by industrial processes. Under the ABC lens, Artificial Intelligence also represents an external technological challenge that may support business model innovation. Nevertheless, using AI is an enabling mechanism, not the impact itself. The relevant impact claim is the reduction in energy consumption. The investor must therefore distinguish between *the company uses advanced technology* and *the technology produces measurable energy savings*. Relevant evidence could include consumption before and after implementation, energy savings per unit of output, the number of customers using the system and the persistence of the savings over time.

Example 3 - A fashion company offering repair, resale and limited production. The company may be relevant to C2 *Circularity-oriented models* and C6 *Sufficiency-oriented models*. Repair and resale keep existing products in use, while limited production may reduce dependence on continually selling larger quantities of new garments. The maintaining-value lens highlights durability, repair and longer product life. The degrowth perspective adds a further question: *Does the business remain economically dependent on continuously increasing sales of new physical products?* If the company can generate sufficient revenue from repair, resale, services and durable products, it may reduce resource use while remaining financially viable. For an impact investor, this creates both an opportunity and a risk. The opportunity is a potential reduction in the production of new garments and the associated use of materials and energy. The risk is whether the company can maintain profitability and generate adequate returns without returning to a high-volume sales model. Evidence

should therefore cover both environmental outcomes and the financial contribution of the alternative revenue sources.

Taken together, the analytical layers presented in Section 5.4 perform complementary functions. The taxonomy identifies the sustainability mechanism used by a company; the company-level criteria distinguish businesses using similar mechanisms; the structural lenses show where and how sustainability modifies the business model; and the cross-cutting lenses help interpret the expected value, external context and supporting evidence. The taxonomy category therefore represents the starting point of the analysis. This layered approach can support the sustainability and impact dimensions of investment due diligence by identifying relevant questions, opportunities and risks. However, it does not produce an automatic investment decision or demonstrate the magnitude of the impact achieved. Financial performance, valuation, portfolio strategy and risk tolerance remain outside the scope of the taxonomy.

5.5 The comparative matrix

Section 5.4 showed that the twelve papers do not always analyse sustainable business models at the same level. The comparative matrix therefore focuses on concepts that can be meaningfully compared across the studies. Each idea was analysed to identify where different papers describe the same mechanism, where they address only partly related elements and where a contribution has no comparable counterpart. This process produced forty-three comparison points. These are not the categories but rather steps. They started as twenty three points and were then grouped into nine main categories. Each point was put into one of three types. When there is overlap it means that two or more papers talk about the same business model idea even if they use different words or show different amounts of detail. When there is partialoverlap it means that the papers look at similar ideas but focus on different parts. A gap means that an element has no sufficiently comparable counterpart in the other studies at the selected level of extraction. Table 5.8 presents the distribution of the forty-three comparison points.

Table 12 - Types of overlap across the comparison points

Type	Meaning	Comparison points	Share of the 43
Total overlap	More than one paper describes essentially the same idea	9	21%
Partial overlap	Papers touch the same idea but each adds something different	18	42%
Gap	The idea appears in only one reviewed paper and no sufficiently similar concept was identified in the others	16	37%
Total		*43*	*100%*

Total overlaps. A first example concerns material and energy efficiency. Bocken et al. [2] include an archetype based on using fewer resources, improving efficiency and reducing waste. Lüdeke-Freund et al. [6] describe the same principle through *Maximize material productivity and energy efficiency* within their Ecodesign Patterns. Related elements also appear in Brenner and Drdla's [12] eco-innovation category and among the characteristics identified by Mais and Bauernhansl [9]. Despite differences in terminology and structure, all these contributions describe the reduction of material and energy requirements that later contributes to C1 *Resource-efficiency-oriented models*. A second example is servitisation, in which a company provides the use or function of a product instead of transferring ownership. Bocken et al. [2] describe this through *Deliver functionality rather than ownership* and use Xerox's pay-per-copy service as an example. Lüdeke-Freund et al. [6] express the same principle through their Service and Performance Patterns, including product-oriented, use-oriented and result-oriented services. These concepts later contribute to *C3 Access-and-service-oriented models.* A third total overlap concerns circularity and value creation from waste. Bocken et al. [2] describe this through *Create value from waste*. Lüdeke-Freund et al. [6] include industrial symbiosis, recycling, remanufacturing, repair and reuse within their Closing-the-Loop Patterns, while Albino and Fraccascia [16] examine different industrial-symbiosis configurations. The level of detail differs, but all three approaches concern recovering value from waste, products or materials instead of discarding them. These concepts later contribute to C2 *Circularity-oriented models*.

Partial overlaps. One example concerns regenerative leadership. Bocken et al. [2] include part of this idea within *Adopt a stewardship role*. Its upstream form concerns working with suppliers to improve ethical or environmental standards, while its downstream form focuses on customer health and well-being. Das and Bocken [7] develop the upstream dimension further through regenerative leadership, including the use of purchasing power to support biodiversity protection, rewilding and other regenerative activities in the supply chain. The underlying idea of influencing suppliers is shared, but Das and Bocken give it a more explicitly regenerative purpose. A second partial overlap concerns nature regeneration. Bocken et al. [2] and Lüdeke-Freund et al. [6] include related mechanisms such as renewable resource use, closed material loops and biodiversity protection within broader sustainability categories. Das and Bocken [7], however, treat nature regeneration as a separate strategy covering soil regeneration, biodiversity restoration, forest restoration and the recovery of marine ecosystems. The studies therefore address related environmental mechanisms but differ in the importance and independence given to active ecosystem restoration. Transparency towards consumers provides a third example. Bocken et al. [2] include labels and consumer information within *Encourage sufficiency*, where transparency can support more conscious consumption. Das and Bocken [7] connect supply-chain transparency to regenerative leadership and informed consumer

choices. Chevrollier et al. [15] consider transparency about sustainability practices part of company behavior. The same general practice is therefore used to support different purposes: consumption reduction, supply-chain responsibility and evidence credibility.

Gaps. In the *Co-product generation from external wastes* model, Albino and Fraccascia [16] show that production depends on the quantity and quality of waste supplied by other companies. No equally explicit treatment of this dependency was identified in the other papers. The contribution shows that a circular mechanism can create environmental and economic value while also exposing the company to the availability of external waste inputs. The second example deals with the limitation of production volumes. Chevrollier et al.[15] describe practices such as keeping stock limited or making products when they are ordered. They also point out barriers: suppliers may set minimum order quantities and raise prices if those volumes are not met. This puts an operational challenge on companies that want to avoid excess production.

Overall 27 of the 43 comparison points, which is 63 percent, show either full or partial overlap. This suggests that most of the fragmentation seen in Section 4.2 comes from differences in words, detail or viewpoint. The remaining 16 comparison points, which is 37 percent are gaps. Gaps are especially useful because point out sustainability mechanisms, characteristics or risks that might stay hidden if we look at one framework. The distinction also helps interpret the support count presented in Section 5.7. Categories derived from overlapping concepts generally receive support from several papers, whereas ideas initially identified as gaps may have a narrower source basis. The support count records how many independent papers contribute to a category; it does not measure the importance or effectiveness of that category or the methodological strength of its supporting evidence. Finally, the three comparison types informed, but did not automatically determine, the consolidation process presented in Section 5.6. Total overlaps were usually brought together because they showed the same underlying mechanism. Partial overlaps were brought together when the differences added detail without change the same central idea. Gaps were looked at one by one: some gaps added a category or subtype while other gaps were kept as analytical dimensions or risks. For example the supply risk found by Albino and Fraccascia [16] was kept as a risk, for circular business models. The consolidation process therefore transformed the forty-three comparison points into twenty-three preliminary items, which were subsequently reorganized into the nine final categories presented in Section 5.7.

5.6 Development of the final integrated taxonomy

The comparative matrix presented in Section 5.5 showed that the reviewed studies contain many related concepts but do not always classify the same analytical object. Some describe business model

mechanisms, while others concern sustainability outcomes or enabling technologies. The first consolidation preserved these differences and produced twenty-three preliminary items, maintaining the detail and traceability of the original contributions. A second consolidation therefore reassigned each contribution according to its analytical function and produced nine core sustainable business model categories.

For this thesis, a core sustainable business model category is defined as a *recurring and generalizable mechanism through which a company changes the way it proposes, creates, delivers, captures or distributes value to contribute to environmental or social value creation while remaining connected to economic value creation*.

The unit of classification is therefore the sustainability-oriented mechanism. Consequently, the same company may use several mechanisms, and the same mechanism may support different environmental or social objectives. The taxonomy was initially grounded in Bocken et al. [2] and Lüdeke-Freund et al. [6], as both studies classify recurring sustainable business model mechanisms across industries. Bocken et al. [2] develop eight broad archetypes by combining academic literature with examples from business practice. Lüdeke-Freund et al. [6] consolidate forty-five patterns from fourteen previous classifications into eleven groups and analyze their expected economic, ecological and social value effects separately. This separation between the mechanism and its expected effects influenced the method used in this thesis. Each concept was examined through three questions: *What changes in the business model? How does the change occur? Why can it contribute to sustainability?* The other reviewed papers were then examined using the same questions and used to refine the core mechanisms or add detail concerning regeneration, social enterprises, business model structure and innovation. Five rules were used to transform the preliminary items into the final taxonomy.

1. Merge concepts describing the same mechanism. Concepts were combined when they changed the same part of the business model in substantially the same way. For example, *Create value from waste* [2], Closing-the-Loop Patterns [6] and industrial-symbiosis configurations [16] all recover or retain value from products, components or materials. They were therefore consolidated within C2 *Circularity-oriented models*.

2. Preserve meaningful differences as subtypes. Related concepts were not treated as completely identical. Material and energy efficiency, sustainable product design and the substitution of problematic inputs were grouped within C1 *Resource-efficiency-oriented models* but retained as distinguishable subtypes.

3. Do not merge concepts only because they produce a similar outcome. Differential pricing, microfinance and a value proposition designed for an underserved group may all improve affordability, but they modify different parts of the business model. They were therefore assigned respectively to C7 *Revenue-configuration models*, C8 *Financing-configuration* models and C9 *Inclusion-oriented models*.

4. Separate core mechanisms from enablers and outcomes. Digital technology, collaboration, transparency and traceability can support several mechanisms and were treated as cross-cutting enablers. Regeneration and expected economic, ecological or social value instead describe the orientation or expected result of a mechanism [7] [12].

5. Allow multiple categories for the same company. The categories are distinct but not mutually exclusive. A leasing model may combine access rather than ownership under C3 with a sustainability-linked payment mechanism under C7.

The rules reorganized the twenty-three items, into nine core categories. C1 combines efficiency, sustainable design and renewable or lower-impact inputs. C2 includes repair, reuse, remanufacturing, recycling, waste valorization and industrial symbiosis. C3 covers leasing, pay-per-use, product-service systems and shared access. C4 brings together sourcing, employee and customer well-being community relationships and environmental stewardship as different stakeholder targets. C5 concerns mission, governance and ownership. C6 includes durability, demand reduction, avoidance of overproduction and reduced dependence on physical-volume growth. C7 concerns pricing and customer-payment mechanisms, while C8 covers the financing of the company or activity. C9 includes business model changes designed to remove barriers faced by underserved groups. Other concepts were retained at different analytical levels. For example *Employee-focused* and *human-health strategies* remain visible as stakeholder targets within C4. Regeneration required specific treatment because it describes a level of sustainability ambition rather than one unique business model mechanism. Das and Bocken [7] distinguish strategies concerning nature regeneration, social regeneration, responsible sourcing, human health and employee well-being. However, nature regeneration may be supported through new agricultural inputs and processes under C1 or long-term sourcing relationships under C4. Similarly, social regeneration may result from fair supplier relationships under C4, mission-protecting governance under C5 or the inclusion of underserved groups under C9. The same logic applies to cross-cutting concepts. Transparency and traceability can help with sourcing, circularity or conscious consumption. Collaboration and co-creation can support systems, shared platforms or models that focus on communities. Digital technologies can improve efficiency, access or traceability. None of these elements is enough to define a sustainable business

model. Instead they show how a core mechanism is put into practice [9] [12] [15]. Section 5.7 outlines the nine categories and the recognition criteria used for the company analysis that follows.

5.7 Final integrated Sustainable Business Model taxonomy

The consolidation process explained in Section 5.6 ended up giving nine sustainable business model categories. A company can belong to more than one category, so the taxonomy is multi-label.

C1 - Resource-efficiency-oriented models

Resource-efficiency-oriented models redesign the resources, products or processes used by a company to reduce environmental pressure. The category includes three main subtypes: material and energy efficiency; sustainable product or process design; and the substitution of fossil, finite or environmentally problematic inputs with renewable, bio-based or lower-impact alternatives. Bocken et al. [2] make a distinction between efficiency and the substitution of renewable resources. In contrast Lüdeke-Freund et al. [6] group efficiency, design and substitution together under the concept of Ecodesign. The main question to consider is whether the company is actually changing its resources, products or processes in a way. *Are they redesigning things to use materials or less energy? Are they replacing non renewable inputs with better alternatives?* Supporting evidence can include measurable results. This might be a drop in how material or energy a product uses, changes in the way a product is built or switching from virgin or fossil based materials to more sustainable options or investments in cleaner production methods.

C1 primarily concerns inputs and process design, whereas C2 concerns the circulation and recovery of products or materials.

C2 - Circularity-oriented models

Circularity-oriented models keep products, parts or materials in use, getting value from them and putting them back into a new cycle of creating value. Some ways to do this are reuse, repair, remanufacturing, recycling, take-back systems, waste exchanges, co-product generation and industrial symbiosis. The category brings together Create value from waste [2], Closing-the-Loop Patterns [6] and the industrial symbiosis configurations studied by Albino and Fraccascia [16]. Core recognition question: *Does the company really keep, get back or put products, parts or materials back, into value-creation cycles?* A general idea of reducing waste is not enough. The proof needs to show a loop, a process of getting back something or an economic way to use the product or material that was recovered. Repair may also support C6 when its main purpose is to delay replacement and reduce consumption.

C3 - Access-and-service-oriented models

Access-and-service-oriented models change the relationship between customers and physical assets by providing access, use, functionality, service or performance instead of ownership. The category includes leasing, pay-per-use, product-service systems, result-oriented contracts and shared access. It develops the *Deliver functionality rather than ownership* archetype [2] and the Service and Performance and Community Platform patterns [6].

Core recognition question: Does the customer obtain access, use or performance instead of owning the physical asset?

Access is not automatically sustainable. The evidence must show a related benefit, such as higher asset utilisation, longer useful life, fewer assets required or access to a sustainable solution. C3 means access instead of ownership, whereas C9 means access instead of exclusion.

C4 - Stakeholder-oriented models

Stakeholder-oriented models change the relationships, collaborations or operating practices connecting the company with suppliers, employees, customers, communities, partners or natural systems. Relevant mechanisms include sourcing, long term supplier relationships, employee participation and employee well being, community development, environmental stewardship and collaboration to develop sustainability oriented solutions. This category builds on Bocken et al.'s stewardship archetype [2] and adds stakeholder related ideas, from regenerative business literature [7]. The core question is: *Has the company made changes in its relationships, collaborations or ways of working to protect stakeholder well being or to create a sustainability oriented solution?* The evidence must show a deliberate and material connection with value creation or delivery. C4 concerns how the company works with or affects stakeholders, whereas C5 concerns its purpose, governance and value-allocation rules.

C5 - Purpose-oriented models

Purpose-oriented models concern who or what the organisation is designed to serve and how that priority is protected. Social or environmental objectives materially influence the company's mission, governance, ownership, management incentives or allocation of economic value. Relevant mechanisms include a formal sustainability mission, ESG-linked remuneration, recurring profit reinvestment and governance or ownership structures that protect non-financial objectives. The category develops *Repurpose for society/environment* [2] and related patterns identified by Lüdeke-Freund et al. [6].

Core recognition question: *do objectives or environmental objectives materially influence the company's purpose, governance, ownership, incentives or allocation of economic value?* A one off donation is not enough because it does not change the business model. It must be structurally linked to the organization.

C6 - Sufficiency-oriented models

Sufficiency-oriented models change demand, production or growth logic to reduce consumption, replacement, overproduction or physical throughput. The category includes product durability, demand reduction, repair intended to delay replacement, on demand production designed to avoid unsold output and models that reduce dependence on physical volume growth. Bocken et al. [2] identify sufficiency as a separate archetype, while Chevrollier et al. [15] link durability, repair and production limits to sustainability and value creation focused on degrowt: *Is the business model designed on purpose to cut down on consumption, replacements, production or physical throughput?*

The purpose behind the practice matters. If production on demand is used to lower inventory expenses it doesn't count.

C7 - Revenue configuration models

Revenue configuration models focus on how customers pay and how the company makes money. According to Lüdeke-Freund et al.'s Pricing and Revenue Patterns [6] this category includes types of pricing, subscriptions and payments linked to environmental or social performance. The main question to consider is: *Does the pricing or revenue model really help deliver an environmental or social value proposition?*

Ordinary subscriptions or dynamic pricing used only for commercial purposes are insufficient. Differential pricing that makes an essential service affordable, outcome based payments or subscriptions supporting product recovery and extended use may qualify. C7 may coexist with C3 when the revenue mechanism supports access instead of ownership, or with C9 when pricing removes a barrier faced by an underserved group.

C8 - Financing-configuration models

Financing-configuration models concern how the company or a specific activity obtains equity, debt or operating capital. Relevant mechanisms include sustainability linked bonds and loans mission aligned or patient capital and microfinance. These arrangements qualify when access to capital or the financial terms are directly tied to sustainability performance or when they help support the sustainability logic of the business model. The key question to ask is this: *Does the financing structure*

or its cost specifically help enable, protect or grow the sustainability logic of the business model? Lüdeke-Freund et al. [6] distinguish financing from pricing and revenue because they affect different parts of the business model. C7 concerns how customers pay the company, whereas C8 concerns how the company or activity is financed.

C9 - Inclusion-oriented models

Inclusion-oriented models redesign a product, service, price, distribution channel, employment opportunity or market mechanism to serve groups excluded or underserved by conventional arrangements. The central mechanism is the removal of an economic, geographic, physical or institutional barrier. Examples include affordable housing or education, last-mile services, alternative credit systems, products designed for lower-income groups, inclusive employment or procurement channels and empowerment-oriented models. The category mainly develops the Access Provision Patterns identified by Lüdeke-Freund et al. [6].

Core recognition question: Does the business model deliberately remove a documented barrier preventing an underserved group from accessing a product, service, market or economic opportunity?

Both the target group and the barrier must be explicit. A conventional sharing service may qualify for C3 without qualifying for C9. A shared service specifically designed to provide affordable mobility to an excluded group may qualify for both.

6 Empirical application of the SBM taxonomy

6.1 Company sample selection

The empirical application of the taxonomy required the construction of a company sample that included different types of business models and sustainability challenges. The sample was not designed to be statistically representative of all Italian listed companies. Its purpose was to provide a sufficiently heterogeneous group of cases through which the practical applicability of the nine Sustainable Business Model categories could be examined. The sample was constructed using companies listed on Euronext Milan, including companies belonging to the Euronext STAR Milan segment. Euronext Milan is the regulated equity market operated by Borsa Italiana [21]. The use of a clearly defined market made it possible to identify a consistent population of listed companies and to apply the same selection criteria across the sample. Companies were grouped according to the Industry Classification Benchmark developed by FTSE Russell. The ICB system classifies companies according to their primary business activity and follows a four-level structure consisting of Industries, Supersectors, Sectors and Subsectors [20]. Borsa Italiana also uses the ICB classification for its industry and sector indices [22]. The formal classification level used in this thesis is the ICB Supersector.

The first step of the selection concerned the identification of the Supersectors to be included in the analysis. Ten ICB Supersectors were deliberately selected: Energy, Utilities, Banks, Technology, Industrial Goods & Services, Automobiles & Parts, Health Care, Consumer Products & Services, Construction & Materials, and Telecommunications. The ten Supersectors were selected to obtain variation across different business contexts. The sample includes manufacturing and service companies, physical and knowledge-based activities, business-to-business and business-to-consumer markets, and sectors associated with different environmental and social challenges. For example, the sustainability mechanisms that can be identified in an energy or manufacturing company may differ significantly from those found in a bank, a technology company or a health care business. The selection followed a purposeful sampling logic. Purposeful sampling is used when cases are deliberately selected because they are particularly useful for examining a specific phenomenon. More specifically, maximum-variation sampling seeks to include cases with different characteristics in order to observe how the same analytical framework operates under different conditions [19]. Not all the ICB Supersectors were included. The selection of ten Supersectors was therefore considered an appropriate balance between sector diversity and analytical feasibility. The objective was not to reproduce the exact sector composition of Euronext Milan, but to test the taxonomy in sufficiently different business environments.

After the ten Supersectors had been selected, a common rule was applied to identify the individual companies. Within each Supersector, companies were ranked according to their market capitalization, and the three companies with the highest market capitalization were selected. Market capitalization represents the market value of a company's listed equity and provides a comparable measure of company size. The use of this criterion reduced discretion in the selection of individual companies. The sample was constructed using market capitalization data as of 31 July 2026. Borsa Italiana calculates historical company market capitalization at the end of each month using the official share price [24]. Historical market information provided by Borsa Italiana and Euronext was therefore used to rank the companies within each selected Supersector [24][25]. This procedure produced a final sample of 30 companies, with three companies selected from each Supersector. The sample includes Eni, Tenaris and Snam for Energy; Enel, Terna and Italgas for Utilities; UniCredit, Intesa Sanpaolo and Banca Monte dei Paschi di Siena for Banks; STMicroelectronics, Technoprobe and Reply for Technology; Prysmian, Leonardo and Fincantieri for Industrial Goods and Services; Ferrari, Stellantis and Pirelli for Automobiles and Parts; Recordati, DiaSorin and Amplifon for Health Care; Moncler, De'Longhi and Brunello Cucinelli for Consumer Products and Services; Buzzi, MAIRE and Cementir Holding for Construction and Materials; and finally Telecom Italia (TIM), INWIT and Rai Way for Telecommunications.

The approached used preserves the heterogeneity required to examine the taxonomy across different business models while reducing discretion in the selection of individual firms. The use of the largest companies also increases the probability that annual reports, sustainability reports, documents and other public information are available in a sufficiently detailed and comparable form. This is particularly relevant because the empirical classification is based on documentary evidence. The company sample represents the empirical basis for the following stages of the analysis. Section 6.2 explains the documents examined, the evidence-collection procedure and the coding rules used to determine whether each of the nine Sustainable Business Model categories can be identified within the selected companies.

6.2 Pilot application of the taxonomy

Purpose and structure of the pilot test

Before applying the taxonomy to the complete sample of 30 companies, a preliminary test was conducted on three companies. The pilot was used to verify whether the taxonomy developed could be applied in a clear and consistent way to real companies. The pilot also made it possible to examine practical aspects, before extending the analysis to the remaining companies. First, it tested whether the information required by the framework could be found in publicly available corporate documents.

Second, it examined whether the nine categories were sufficiently distinct when applied to companies operating in different industries. The three companies chosen for the pilot were Eni, Intesa Sanpaolo and Moncler. Eni works in the energy sector, Intesa Sanpaolo offers banking and financial services and Moncler works in the luxury fashion industry. The selection therefore made it possible to test the taxonomy in three different situations. Each company was therefore examined in relation to all nine categories.

For each company-category pair, the evidence was classified as:

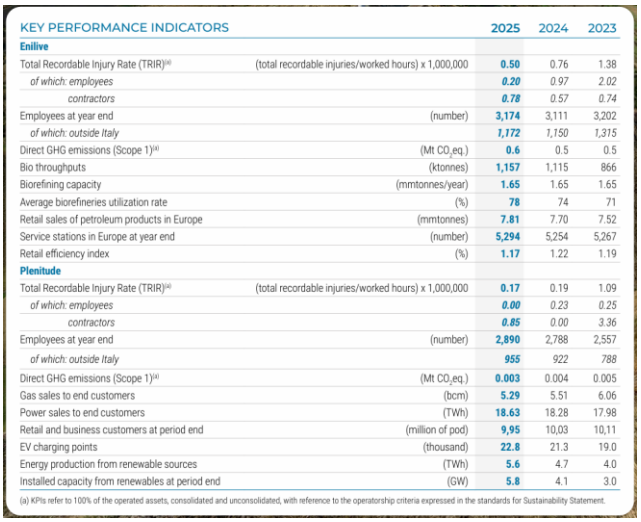
- Identified, when the available information clearly satisfied the category requirements;
- Not identified, when no sufficiently strong evidence was found in the documents examined.

A category classified as *Not identified* should not be interpreted as proof that the company does not have that characteristic. The pilot relied primarily on the companies' latest annual and sustainability report available within the research period.

Pilot company 1: Eni

Eni is an Italian energy company operating across the entire energy value chain. Its activities include oil and gas exploration and production, electricity generation, energy supply, renewable energy, biofuels and chemical products. The Group performs these activities through different business units and controlled companies, including Plenitude, Enilive and Versalis [26].

C1 Resource-efficiency. C1 Resource-efficiency. This category was identified through the activities of Plenitude and Enilive. Plenitude is the Eni company that operates in energy the sale of electricity and gas energy services and electric mobility. In 2025 it produced 5.6 TWh of electricity from sources and reached 5.8 GW of installed renewable capacity mainly from solar and wind plants. Enilive instead operates in biorefining and sustainable mobility. A biorefinery is an industrial plant that produces fuels from biological or renewable raw materials instead of relying only on crude oil. For example, the Enilive plants produce HVO biofuel and Sustainable Fuel using vegetable oils, waste and biological residues. Eni is also converting some traditional refineries into biorefineries, including the sites in Livorno, Sannazzaro and Priolo [26, pp. 73-77].



KEY PERFORMANCE INDICATORS		2025	2024	2023
Enilive				
Total Recordable Injury Rate (TRIR)[a]	(total recordable injuries/worked hours) x 1,000,000	**0.50**	0.76	1.38
of which: employees		***0.20***	*0.97*	*2.02*
contractors		***0.78***	*0.57*	*0.74*
Employees at year end	(number)	**3,174**	3,111	3,202
of which: outside Italy		***1,172***	*1,150*	*1,315*
Direct GHG emissions (Scope 1)[a]	(Mt CO_2eq.)	**0.6**	0.5	0.5
Bio throughputs	(ktonnes)	**1,157**	1,115	866
Biorefining capacity	(mmtonnes/year)	**1.65**	1.65	1.65
Average biorefineries utilization rate	(%)	**78**	74	71
Retail sales of petroleum products in Europe	(mmtonnes)	**7.81**	7.70	7.52
Service stations in Europe at year end	(number)	**5,294**	5,254	5,267
Retail efficiency index	(%)	**1.17**	1.22	1.19
Plenitude				
Total Recordable Injury Rate (TRIR)[a]	(total recordable injuries/worked hours) x 1,000,000	**0.17**	0.19	1.09
of which: employees		***0.00***	*0.23*	*0.25*
contractors		***0.85***	*0.00*	*3.36*
Employees at year end	(number)	**2,890**	2,788	2,557
of which: outside Italy		***955***	*922*	*788*
Direct GHG emissions (Scope 1)[a]	(Mt CO_2eq.)	**0.003**	0.004	0.005
Gas sales to end customers	(bcm)	**5.29**	5.51	6.06
Power sales to end customers	(TWh)	**18.63**	18.28	17.98
Retail and business customers at period end	(million of pod)	**9,95**	10,03	10,11
EV charging points	(thousand)	**22.8**	21.3	19.0
Energy production from renewable sources	(TWh)	**5.6**	4.7	4.0
Installed capacity from renewables at period end	(GW)	**5.8**	4.1	3.0

(a) KPIs refer to 100% of the operated assets, consolidated and unconsolidated, with reference to the operatorship criteria expressed in the standards for Sustainability Statement.

Figure 1 - Emilive & Plenitude: key performance indicators

		2025	2024	2023	Change	% Ch.
Bio throughputs	(ktonnes)	1,157	1,115	866	42	3.8
Sold production of certified biofuels		925	982	635	(57)	(5.8)
Average biorefineries utilization rate	(%)	78	74	71	4	

Figure 2 - Biorefinery: volumes of biofuels processed from vegetable oil

	(TWh)	2025	2024	2023	Change	% Ch.
Energy production from renewable sources		**5.63**	**4.67**	**3.98**	**0.96**	**20.6**
of which: photovoltaic		*3.29*	*2.55*	*1.74*	*0.74*	*29.0*
wind		*2.34*	*2.12*	*2.24*	*0.22*	*10.4*
of which: Italy		*1.45*	*1.45*	*1.53*	*0.00*	*0.0*
outside Italy		*4.18*	*3.22*	*2.45*	*0.96*	*29.8*

Figure 3 - Energy production from renewable sources

These activities satisfy C1 because they replace part of the conventional fossil inputs with renewable or lower-impact alternatives. The relevant mechanism is therefore a change in the resources and technologies used to produce and supply energy.

C2 Circularity. This category was identified mainly through Versalis. Versalis is a company that belongs to Eni. Versalis produces chemicals and polymers, which are material used in plastics, packaging, automotive components and many other industrial products. The link to circularity comes from the way Versalis is changing part of its production process. In Porto Marghera Versalis started a plant that produces the Versalis Revive range of plastics. These products contain between 35% and 100% -consumer recycled plastic. So plastic that has already been used by consumers becomes an input for the production of plastic materials. Versalis also started a demonstration plant, in Mantua that applies the Hoop technology. This technology uses chemical recycling to transform mixed plastic waste into a new raw material that can be used again, including in food and pharmaceutical packaging.

The company has also developed agreements with Acea Ambiente, Veritas and Prysmian to collect and recover different types of post-consumer and industrial plastic waste [26, pp. 79-82].

This mechanism satisfies C2 because waste is brought back into the production system as a secondary raw material.



Figure 4 - Versalis commitment to circular practices

C3 Access-and-service-oriented models. Two Eni initiatives are relevant to C3: Enilive's Enjoy car-sharing service and Plenitude's Adopt a Panel service. Enjoy is a car-sharing and vehicle-rental service. Customers obtain temporary access to a vehicle according to their mobility needs instead of purchasing and owning it. Eni describes Enjoy as a rental service and reports that its fleet includes internal-combustion, hybrid and electric vehicles [26, p. 249]. The basic C3 mechanism is therefore present because the relationship between the customer and the physical asset changes: the customer purchases the use and mobility function of the vehicle rather than the vehicle itself. However, Enjoy alone provides only limited evidence of the sustainability contribution of this access model. The analyzed passage does not demonstrate that car sharing reduces the total number of vehicles, increases their utilization sufficiently or produces a measurable reduction in emissions. Moreover, the fleet is not entirely electric. Stronger evidence for C3 is provided by Plenitude's Adopt a Panel service. Through this initiative, residential customers can virtually consume solar electricity produced in real time by photovoltaic panels located at plants owned by Plenitude, without purchasing or installing a photovoltaic system at home [26, p 228]. Customers therefore use the function and energy that the panel produces while the panel itself stays owned by Plenitude. Adopt a Panel meets both parts of the C3 recognition test. First being able to use the panel replaces owning it. Second the goal of being good for the environment is clear because the service gives customers power from an renewable source.

C4 Stakeholder oriented. Eni uses a Stakeholder Management System to find out which people and groups are impacted by its actions. This system maps more than 7.400 stakeholders. It covers employees, suppliers, customers, local communities, institutions, investors and civil-society organizations. The company talks with these groups through consultations, workshops, meetings, training sessions and special reporting channels. For suppliers this interaction uses the Open-es platform. By 2025 the Open-es platform will involve than 40.000 companies, in a shared sustainability assessment process. For customers, Eni held 17 periodic meetings with Consumer Associations on gas and electricity, involving around 500 representatives in Italy. The information collected is used to manage specific requests and problems and is also considered when defining Eni's strategy, sustainability objectives and business model. For local communities, Eni also uses grievance mechanisms through which individuals can report possible negative effects connected with company projects [26, pp. 143-145].

C4 was therefore identified because the relationship with stakeholders is organized through repeatable processes and can influence company decisions.

C5 Purpose-oriented. Eni's mission clearly links the company's activities to an energy transition to reliable access to energy and, to the United Nations Sustainable Development Goals (SDGs). These goals are backed by governance structures: the Board of Directors approves the Strategic Plan, which includes decarbonization and other sustainability goals and keeps track of its progress. A special "Sustainability and Scenarios Committee" helps the Board. Sustainability is also included in executive remuneration: environmental and energy-transition objectives represent 35% of the Long-Term Incentive Plan (long term bonus), while the Short-Term Incentive Plan (short term bonus) includes a target connected with the reduction of Upstream emissions. In both cases, environmental performance directly affects how much a manager is paid. [26, pp. 2, 36-37, 152-153].

Therefore, the sustainability purpose is connected with decisions, targets and management incentives. This is what distinguishes C5 from general corporate communication or isolated sustainability projects.

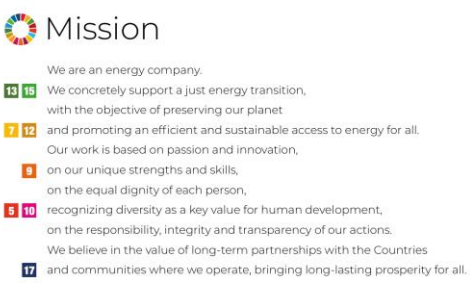


Figure 5 - Eni's mission statement mapped to the relevant SDGs

C6 Sufficiency was not identified because the reviewed evidence does not show a business mechanism explicitly designed to reduce the absolute level of customer consumption or discourage additional purchases.

C7 Revenue-configuration. The clearest evidence of C7 is provided by Plenitude's Adopt a Panel service. The Annual Report explains that customers receive a 100% discount on electricity charges for the energy produced by the selected photovoltaic panel and consumed at the same time [26, p. 228]. The important element is not simply the existence of a commercial discount. The amount charged to the customer is directly connected to the renewable electricity produced by the panel. The pricing system is therefore a part of the value promise that focuses on sustainability: when the panel makes electricity and the customer uses it at the same time the cost for that electricity is cut by 100 percent. Adopt a Panel can then be placed in both C3 and C7. For different reasons. It is, in C3 because the customer uses the function of a panel without buying or putting it in place. It belongs to C7 because the way the customer pays is directly linked to the renewable energy produced and consumed. This also explains why Enjoy is not classified under C7. Customers pay to use a vehicle for a particular period, but this is the ordinary revenue mechanism of a rental service. The available evidence does not show that the Enjoy tariff rewards the use of lower-emission vehicles, supports a disadvantaged customer group or is otherwise directly linked to an environmental or social result. If Enjoy were classified under C7 merely because customers pay according to their use, almost every rental or access service would automatically fall under both C3 and C7. This would make the distinction between the two categories unclear. C7 is therefore identified for Eni specifically on the basis of Adopt a Panel, not on the basis of Enjoy.

C8 Financing-configuration. Eni uses sustainability-linked bonds to finance its activities. At the end of 2025, the company had € 3.75 billion of sustainability-linked bonds in place, in addition to a € 1 billion sustainability-linked convertible bond. These instruments are connected with two specific indicators: Eni's Net Carbon Footprint in its Upstream activities and its installed renewable-energy capacity. If the company does not achieve the agreed targets, a step-up mechanism increases the interest rate paid by Eni [26, pp. 339-340].

C8 was therefore identified because the cost of financing is directly influenced by sustainability performance.

C9 Inclusion. This category was identified through the Eni for Clean Cooking programme launched in 2018. The programme provides cooking systems to households that depend on traditional fuels such as wood and charcoal because households have limited access to safer and more modern energy solutions. These systems reduce the consumption of biomass with benefits for health, forest

conservation and greenhouse-gas emissions. In 2025 the programme reached than 2.2 million people in Sub-Saharan Africa bringing the total number of beneficiaries to approximately 3.7 million. Eni aims to provide access, to cooking to 20 million people by 2030. It supports local production and distribution activities and is included among the technological projects that generate carbon credits used in Eni's climate strategy. C9 is therefore identified because Eni operates a stable mechanism that gives underserved communities access to a safer energy service while also connecting the resulting environmental benefits with the Group's decarbonisation activities [26, pp. 71, 163].

Overall classification of Eni. C1, C2, C3, C4, C5, C7, C8 and C9 are identified in the classification while C6 is not identified because no sufficient evidence is found. The eight categories describe different mechanisms found across the Group and its specialized businesses, including Plenitude, Enilive and Versalis. Some mechanisms apply at company level, while others concern only a specific product, service or programme. The classification therefore shows the variety of sustainability mechanisms documented by Eni.

Pilot company 2: Intesa Sanpaolo

Intesa Sanpaolo is an Italian banking group whose activities include retail and corporate banking, wealth management, insurance and financial advisory services. The Group operates through a broad network in Italy and through international subsidiaries. Unlike an industrial company, the Bank does not mainly create environmental or social value by transforming physical materials. Its most relevant business-model mechanisms are the way it allocates capital, designs credit products, advises clients and defines access conditions for finance [27, pp. 8–9, 47–51].

C1 Resource-efficiency. This category was not identified at the level of Intesa Sanpaolo's own business model. The report describes measures that improve the efficiency of the Bank's offices and operations, and it also describes loans used by clients to invest in energy efficiency, renewable energy and other green projects. These activities are relevant, but they do not have the same meaning. Lower energy or paper use in offices is an operational improvement and does not, by itself, redesign the Bank's core product. Similarly, when a client uses a loan to reduce the resources used in its factory, the resource-efficiency mechanism belongs to the client's activity. For the Bank, the mechanism is the provision of dedicated finance and is therefore classified under C8 [27, pp. 220, 295].

C2 Circularity. This category was not identified. Intesa Sanpaolo supports the circular economy through dedicated credit lines, advisory services and the Circular Economy Lab. These instruments help client companies develop circular solutions, but the Bank does not itself recover products, components or materials and return them to a production cycle. The evidence therefore shows that Intesa enables circular projects through finance, which is C8, rather than operating a circular-loop business model of its own, which would be required for C2. One small exception exists: in 2025, the

Group reconditioned and resold more than 6.500 of its own decommissioned IT assets (desktops, laptops, tablets and monitors), generating around €120.000 in proceeds, but this scale is too small, relative to the Group's overall size, to count as a material business model category. It was therefore recorded as a limited operational initiative and was not considered sufficient to classify Intesa Sanpaolo under C2 [27, pp. 220–223].

C3 Access instead of ownership. This category was not identified as a sufficiently evidenced sustainability-oriented business model. Intesa Sanpaolo does, however, provide a concrete access-based mechanism through operational leasing. In 2025, the Bank developed a partnership with Grenke for the operational leasing of capital goods. This solution allows client companies to use and renew operating equipment without purchasing it and without placing the full investment on their financial structure. From June 2025, Intesa Sanpaolo contributed its entire shareholding in Intesa Sanpaolo Rent Foryou S.p.A. to Grenke Italia and acquired a 17% interest in the resulting company. Grenke Italia is expected to make approximately €2 billion available to SMEs over three years for operational leasing projects. Therefore, the initiative clearly reflects the basic mechanism of access instead of ownership. However, the report presents its benefits mainly in terms of financial flexibility, equipment renewal and tax deductibility. It does not explicitly demonstrate that the leasing offer is designed to increase asset utilisation, extend product life, reduce the number of physical assets required or enable access to specific environmental or social solutions. For this reason, the leasing activity was recognised as a relevant access mechanism, but it was not considered sufficient to classify Intesa Sanpaolo under C3. Digital and omnichannel banking services were also excluded, since digital access to a bank account does not replace the ownership of a physical asset [27, pp. 39, 116].

C4 Relational and organisational redesign. This category was identified. The Bank does more than provide a standard loan. It brings together credit with ESG consulting, specific structures and ongoing collaborations, with companies, non profit groups and other stakeholders. Two examples show this clearly. First the Circular Economy Lab: a team that helps customer companies move towards being more circular offering guidance and education instead of giving money. Second the Impact Department: a team that works with non profit organizations and people who usually have trouble getting a loan. This team manages the "Fund for Impact," a €300 million fund that allows the Bank to lend up to €1.5 billion to people usually excluded from. Since April, these people can apply for this help directly online, without going to a physical branch. This kind of attention also reaches the top of the Bank. A dedicated committee, the ESG Control Room, meets at least every six months to check that stakeholders' needs and ESG risks are genuinely considered in the Bank's strategy, lending decisions and controls. This satisfies C4 because the Bank changes how it works with clients and partners and how responsibilities are organized internally. [27, pp. 117, 178, 220–223].

C5 Purpose and governance integration. This category was identified. Intesa Sanpaolo states that it acts not only on the basis of profit, but also to create long-term value for the Bank and the community and to address issues such as climate change and social inequality. This purpose is supported by formal governance mechanisms. The Board and dedicated ESG structures supervise sustainability priorities, while ESG indicators are included in the variable remuneration of the Managing Director and CEO and in the objectives assigned to about 3,000 Group managers. C5 is therefore present because sustainability is linked to decision-making, control and incentives, rather than remaining only a general statement of intent [27, pp. 50, 178–180].

C6 Sufficiency and demand reduction. This category was not identified. The report describes digitalization, dematerialization and efficiency initiatives, but these mainly reduce operating costs or the use of specific inputs. No sufficiently clear mechanism was found whose purpose is to reduce the total volume of consumption, production or replacement generated by the Bank's business model. Efficiency and digitalization were therefore not treated as evidence of sufficiency [27, pp. 47–49].

C7 Sustainability-linked pricing and revenue logic. This category was identified through the Fund for Impact and related credit products. These products are designed for people who may have difficulty obtaining traditional credit even when they have the potential to repay. The mechanism is practical: the Bank offers subsidized interest rates, repayment periods of up to 30 years and, in the case of per Merito for university students, an unsecured loan. These conditions reduce the financial barrier that would otherwise prevent access. The same initiative is therefore sustainable not simply because the price is low, but because the pricing and repayment logic are intentionally designed to make a socially useful service affordable for a defined group [27, p. 292].

C8 Impact-oriented finance. This category was identified and represents one of the clearest mechanisms in the Bank's business model. Intesa Sanpaolo allocates credit to environmental, circular and transition activities and offers instruments such as S-Loans, which offer companies better loan conditions when they meet sustainability targets, Green Mortgages, which provide better conditions for energy-efficient homes and green, social and sustainability bonds, whose funds are used respectively for environmental projects, social projects, or both. The Bank also offers sustainability-linked bonds. Their interest rates change based on whether the company meets sustainability goals. In 2025 the Group reported about €24.8 billion in lending. This includes €13.6 billion in sustainability and €5.2 billion, in social sustainability. C8 is identified because the financial product and how capital is used help the Bank support social goals[27, pp. 220, 295].

Type of loan	Loans disbursed in 2025 €/bln	Loans disbursed in 2024 €/bln
Loans in the environmental sustainability field	13.6	7.6
Loans in the social sustainability field[280]	5.2	4.5
Loans falling under “other sustainability”	6.0	7.0

Figure 6 - Sustainable financing (amount disbursed during the year)

C9 Inclusive market access. This category was identified. The Fund for Impact and the wider Impact range of products are aimed specifically at groups who are normally left out by conventional banks: students, working mothers, unemployed people, low-income families, people with disabilities and their caregivers, young people starting their first job, and small entrepreneurs who cannot get a normal loan. Each of these groups faces an obstacle. Sometimes the obstacle is the Bank's credit checks sometimes the obstacle is the lack of collateral, sometimes the obstacle is repayment terms that do not fit the borrower's situation. Specific products answer each obstacle. The product "per Merito" removes the requirement for university students. The product "mamma@work" adjusts repayment terms for mothers. The product "per Crescere" supports low income families with children. The product "per avere Cura" supports people with disabilities and those who care for them. C9 is identified because the Bank changes its normal lending offer, on purpose, to include people it would otherwise exclude. The same products can be coded under both C7 and C9 for different reasons: C7 concerns the favourable economic conditions, while C9 concerns the target group, the barrier faced and the mechanism used to remove it [27, pp 292-294].



Figure 7 - Examples of Intesa Sanpaolo's inclusive credit products for vulnerable groups

Overall classification of Intesa Sanpaolo. The analysis identifies C4, C5, C7, C8 and C9. C1, C2, C3 and C6 are not identified on the basis of the evidence reviewed. The case is particularly useful for testing the taxonomy because it shows the need to distinguish the impact created by a financed company from the financial mechanism provided by the bank.

Pilot company 3: Moncler Group

Moncler Group is a luxury fashion group that runs through Moncler brand, which is known for luxury down jackets and outerwear, and Stone Island brand, which makes clothes that focus on research of fabrics, treatments and dyeing techniques. Moncler Group sells its products in, than 70 countries through physical stores, digital channels and selected third-party retailers [28, pp. 13-15]. Moncler represents a useful case for testing the taxonomy because the environmental and social impacts of the fashion industry are connected to several parts of the business model. These include the materials used to produce garments, the management of textile waste, product durability, working conditions in the supply chain and animal welfare.

C1 Resource-efficiency-oriented models. This category was identified. Moncler uses the term "preferred materials" for materials that are intended to have a lower environmental impact than the conventional alternatives used by the Group. These include recycled materials, organic fibres, materials obtained from regenerative agricultural practices and materials certified according to specific environmental or social standards. In the 2025 collections, more than 55% of the yarns and fabrics used by the Group were classified as preferred materials. More specifically, the collections included over 60% recycled nylon, over 50% recycled polyester, over 55% organic or recycled cotton and over 70% certified wool [28, p. 179]. This is a concrete C1 mechanism because Moncler is changing what enters the production of a new garment. For example, replacing virgin nylon with recycled nylon changes the material used to manufacture a jacket before it is sold. The Group estimated that the use of recycled and organic alternatives for selected materials avoided more than 11.000 tonnes of CO_2 equivalent in 2025 compared with the use of conventional materials [28, p. 134]. The same category is also supported by energy-related measures. Since 2023, Moncler has purchased electricity from renewable sources for all its owned and directly managed sites. The Group also produces part of this electricity through photovoltaic systems installed at its logistics and production facilities (Piacenza, Trevis, Modena) [28, pp. 132, 134]. C1 was therefore assigned because the evidence shows measurable changes in both product materials and energy sources.

C2 Circularity-oriented models. This category was identified. C2 asks whether products or materials that could become waste are collected, repaired, recycled or returned to a useful production cycle. The Nylon Scrap Management Process is an example. During garment production pieces of nylon which remain after fabrics have been cut. Workers separate them into different categories, weigh and record them store them and send them to specialized recyclers. The Nylon Scrap Management Process then allows the material to be shredded or melted and transformed into chips that can be used as a secondary raw material. In 2025, all nylon scraps generated at the Group's directly managed production sites were sent for recycling. The recycling system also covered more than 55% of nylon scraps generated within Moncler's external outerwear production network [28, p. 180].

Moncler has developed a similar process for down. The Group worked with a specialized supplier to develop a machine that separates and cleans recovered down so that it can be used again. By the end of 2025, more than 10 tonnes of down had been recycled and certified under the R•DIST module of the DIST Protocol [28, p. 181]. Circularity is also supported by the Extra-Life service. Through this service, customers can send damaged Moncler garments for specialized repairs, including repairs to damaged fabrics. In 2025, Extra-Life and the other after-sales services handled more than 43.000 repair requests, corresponding to approximately 40 tonnes of garments. Around 95% of these requests were successfully completed. Garments that could not be repaired or returned to the customer were

sent for recycling [28, p. 181]. These initiatives satisfy C2 because they create identifiable loops. Nylon scraps become secondary raw materials, down is recovered for further use and damaged garments are repaired instead of being immediately discarded.

C3 Access-and-service-oriented models. This category was not identified. Extra-Life is a service, but the presence of a service is not sufficient to satisfy C3. The customer purchases and owns the Moncler garment before requesting the repair and continues to own it after the repair. The service extends the life of the product, but it does not replace ownership. No rental, leasing, subscription, pay-per-use or shared-access system for Moncler garments was identified in the reviewed evidence. Customers continue to obtain Moncler products mainly through a conventional purchase. [28].

C4 Stakeholder-oriented models. This category was identified. C4 examines whether the company changes its operating practices and relationships in order to protect suppliers, workers, customers, communities or the natural environment. In Moncler's case, the strongest evidence concerns suppliers, supply-chain workers, employees and animal welfare. An important example is the DIST Protocol. DIST means Down Integrity System and Traceability. It is Moncler's system for controlling where the down used in its jackets comes from, how the animals are treated and whether the material can be traced through the different stages of the supply chain. The rules prohibit live-plucking and forced feeding. Suppliers must comply with these requirements if they want to supply certified down to Moncler. Compliance is checked through independent on-site audits. In 2025, 205 audits were carried out across the down supply chain, and the controls did not identify cases of live-plucking or forced feeding [28, pp. 255-257]. The Group also conducts social and environmental audits, which look at issues like child labor, forced labor, working hours, wages, freedom of association, health and safety and environmental management, on its suppliers and subcontractors. In 2025 Moncler and Stone Island carried out a total of 507 audits. If any issue is found during an audit the supplier must follow a corrective plan to fix it. In cases Moncler may end the commercial relationship with that supplier [28, pp. 231-236].

NUMBER	Moncler Group		
	2023	2024	2025
Ethical, social and environmental audits	389	546	507[7]
Animal welfare and traceability audits – down supply chain	156	210	205
Total	**545**	**756**	**712**

Figure 8 - audits performed by Moncler Group

Moncler also conducts a "living wage analysis". A living wage is not simply the legal minimum wage. It is an estimate of the remuneration needed to cover a worker's basic needs and those of their family in a particular country or region. By the end of 2025, all suppliers classified as critical had been involved in this analysis. The assessment covered more than 16.000 supplier workers over three years

and found that more than 85% received remuneration aligned with the estimated local living wage [28, pp. 229, 233]. Employee well-being provides additional evidence. For example, MINDCARE is a psychological support service available to Group employees worldwide, including retail employees. It provides five free, anonymous and confidential online sessions with specialized professionals. These sessions can address stress, career difficulties and parental support. Around 240 sessions were provided in 2025 [28, p. 205]. C4 was therefore assigned because these are concrete operating mechanisms. Moncler audits suppliers, requires corrective actions, controls the origin of down and provides specific support to employees.

C5 Purpose-oriented models. This category was identified. Moncler is classified under C5 because environmental and social objectives have been formally introduced into the way the company is directed and controlled. The Board of Directors approves the Group's Sustainability Plan and receives information on its implementation at least every six months. The Plan establishes objectives concerning climate change, circularity, responsible sourcing, diversity, employees and local communities [28, pp. 71, 85]. More importantly, part of management remuneration depends on the achievement of these objectives. In 2025, 10% of the short-term variable remuneration indicator for senior management was connected to the achievement of at least 34 of the 36 targets included in the 2020-2025 Sustainability Plan. Moncler reported that 35 targets were achieved. Sustainability also represented 15% of the relevant long-term incentive indicator. The targets included maintaining carbon neutrality at directly managed sites, using recycled nylon and obtaining Equal Pay certification [28, p. 72]. This means that sustainability targets can affect the bonuses received by managers. The objectives are therefore connected to decision-making and financial incentives. The C5 classification is backed by the Group's efforts to support social causes. In 2025 the Group invested more than €4 million in community projects, like the most important Warmly Moncler which is a program developed with organizations such as UNICEF and UNHCR to provide clothing, blankets and other essential items to vulnerable people. Between 2020 and 2025, the program reached more than 163.000 people [28, pp. 244-245]. Since it is a recurring initiative, included in the Sustainability Plan and supported by company resources, it can be considered a structured form of giving and redistribution.

TARGETS	2025 RESULTS
GIVE BACK	
Protect people from the cold	
2025 150,000 people in need protected from the cold (2020-2025)	↑ Over 163,000 people in need protected from the cold (2020-2025)

Figure 9 - Result achieved in 2025 relating to the Give Back pillar

C6 Sufficiency-oriented models. This category was identified. Through the Extra-Life service, Moncler repairs garments owned by its customers and allows the same products to remain in use for longer. In 2025, the Group managed more than 43.000 repair requests. The service can therefore delay the purchase of a replacement garment and reduce the environmental impacts connected with producing and disposing of a new one. This mechanism is classified under C6 because it prolongs the use of the same product. Moncler's C2 classification is supported separately by the recovery and recycling of nylon scraps generated during production [28, p. 177,180].

C7 Revenue-configuration models. This category was not identified. Moncler uses a conventional luxury retail model in which customers purchase garments at a stated price. Extra-Life is an after-sales service, but the report does not show that Moncler has changed its broader pricing or revenue model to finance repairs or another sustainability mechanism. [28].

C8 Financing-configuration models. This category was not identified. C8 concerns how Moncler itself obtains the money needed to finance its business and whether that financing is connected to environmental or social targets. The reviewed evidence did not identify a green bond, sustainability-linked loan, mission-aligned investment fund or another financing arrangement whose conditions depend on Moncler's sustainability performance. [28].

C9 Inclusion-oriented models. This category was not identified. Moncler carries out social and philanthropic initiatives but these should not automatically be classified as an inclusion-oriented business model. For example through Warmly Moncler the Group works with organizations such, as UNICEF, UNHCR and the Francesca Rava Foundation to provide clothing, blankets, newborn kits and other essential goods to people living in cold regions. Between 2020 and 2025 the programme supported than 163.000 people [28 p. 249]. This is a socially valuable programme. However, Warmly Moncler is based on donations made through non-profit organizations. It does not change Moncler's normal products, prices, sales channels or customer model to make its commercial offering accessible to an underserved group. Vulnerable beneficiaries do not become a customer segment served through a new inclusive business model. For this reason, the initiative is recorded as philanthropy and community support, but not as C9. C9 would require a business mechanism specifically designed to remove an external barrier to products, services, markets or economic opportunities.

Overall classification of Moncler Group. Moncler case supports five categories: C1, C2, C4, C5 and C6. No sufficient evidence was identified for C3, C7, C8 and C9. The case also shows the importance of examining the function of each initiative. Extra-Life, for example, supports C2 because it keeps garments in use and supports C6 because it reduces or delays replacement. It does not support C3 because customers continue to own the garments. Similarly, Warmly Moncler is socially valuable, but it remains a philanthropic programme rather than an inclusion-oriented market model.

Insights from the pilot test

The pilot test did not indicate a need to change the overall structure of the taxonomy. All nine categories were identified in at least one of the three companies, suggesting that the framework can capture different sustainability mechanisms across the energy, banking and fashion sectors. However the definition of the categories were clarified before applying the taxonomy to the complete sample. C4 requires that stakeholders have a role in business activities decision making or value creation. C5 requires proof that environmental or social goals influence company management. This could include sustainability linked pay. C3 requires access rather than ownership and the activity must clearly contribute to sustainability. C7 requires a pricing, payment or revenue system that directly supports the solution. C9 requires a system that removes access barriers, for underserved groups. Donations and community programs are not automatically included under C9. Finally, a single initiative may belong to more than one category when it contains different mechanisms. For example, Eni's Adopt a Panel combines access to renewable energy (C3) with a specific payment model linked to the energy produced (C7). Similarly, Moncler's Extra-Life programme supports both circularity (C2) and longer product use (C6).

6.3 Application of the taxonomy to the full sample of companies

Enel

Enel is an international energy group. Its main activities include electricity generation, distribution networks, the sale of electricity and gas, renewable energy and services for customers. [29].

C1 Resource-efficiency-oriented models. This category eas identified. Enel has changed the source of the electricity it produces. It has also improved the efficiency of the systems that deliver and use electricity. By the end of 2025 renewable sources represented 71.1 percent of Enel power generation capacity. The report also describes demand-response services, energy-efficiency solutions and offers that help customers manage consumption. In simple terms, Enel is not only using less impactful inputs inside its operations; a significant part of its commercial activity consists of producing renewable electricity and helping customers use energy more efficiently. This is a direct C1 mechanism [29, pp. 10, 103-104].

C2 Circularity-oriented models. This category was identified. Enel applies circular principles to waste, equipment and industrial sites. In 2025, 87% of the waste produced by industrial activities was recovered, while 94.5% (+6.1 p.p vs 2024) of the waste from operation and maintenance activities was reused or recycled. The Group also considers how components and infrastructure can be recovered when a power plant is closed, and it involves local actors in finding new uses for former

industrial sites. C2 is therefore present because materials and assets are not treated only as waste at the end of one use: they are recovered, recycled or prepared for another use [29, pp. 141, 298-303].

C3 Access-and-service-oriented models. This category was identified. Enel operates a public charging network for electric vehicles, which included 31.572 active public charging points at the end of 2025. Customers can locate a public charging station through the Enel On Your Way app, start a charging session and pay according to the electricity consumed or through a specific tariff plan. The customer therefore obtains temporary access to the charging function without purchasing or owning the physical charging station. The same infrastructure can serve many different users and supports the use of electric vehicles. C3 is assigned because Enel provides access to charging as a service instead of requiring each customer to own the necessary infrastructure. [29, p. 34]

C4 Stakeholder-oriented models. This category was identified. Enel uses structured cooperation when it closes or converts power plants and when it develops projects affecting local areas. Communities, public authorities, employees and suppliers are involved through consultation and co-design processes. Their participation can influence the future use of a site, the support offered to workers and suppliers, and the design of local development projects. The report also describes cooperation with suppliers on innovation and circularity. This is stronger than ordinary stakeholder communication because the relationship can change how a project is implemented [29, pp. 140-141, 246].

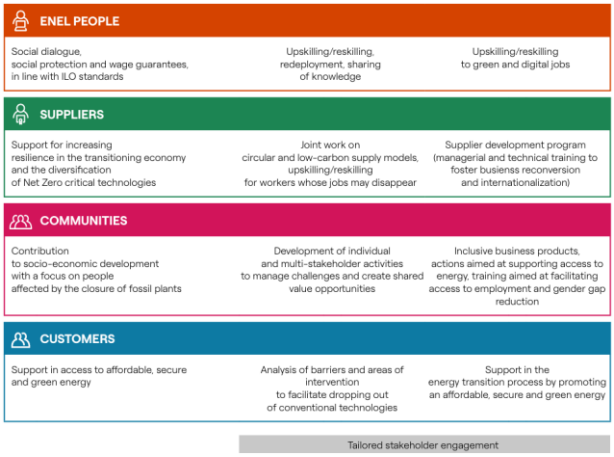


Figure 10 - Enel's engagement with key stakeholder groups

C5 Purpose-oriented models. This category was identified. Sustainability is connected to Enel's governance and management incentives. The Board supervises the strategy and sustainability targets, while environmental and social indicators are included in variable remuneration. In the 2025 short-term incentive system, sustainability-related objectives represented 30% of the CEO/General Manager's performance score. In the Long-Term Incentive Plan, a distinct set of ESG-related

objectives (emissions intensity and gender diversity in management) carried a combined weight of 38% in 2025. This means that progress on sustainability affects the bonus received by management at both the short-term and long-term level, so the purpose is linked to decisions and economic incentives rather than remaining only a statement [29, pp. 65-66].

C6 Sufficiency-oriented models. This category was not identified. Enel promotes energy efficiency and provides information on responsible consumption, but these actions mainly aim to obtain the same energy service with fewer resources. The report did not provide sufficiently clear evidence of a business mechanism intended to reduce the absolute demand for energy or to discourage additional consumption. The case therefore supports C1, but not the stricter requirement for C6 [29, pp. 103, 237].

C7 Revenue-configuration models. The category was identified. Only for specific offers. Enel talks about tariffs and services that are made for customers, families in difficulties and people with disabilities. For example there is the Bonus+Per Te initiative and in Chile there is an offer for air conditioners for elderly customers. The price or payment rule is changed on purpose to make an energy product or service easier to get for a vulnerable group.[29, pp 142, 377-380].

C8 Financing-configuration models. This category was identified. In February 2025 Enel Finance International NV issued a sustainability-linked bond of €2 billion, receiving orders for about €5 billion. At December 31 2025 the Group had €27.055 million of sustainability-linked bonds outstanding in total. The financial conditions of these sustainability-linked bonds depend on whether Enel Finance International NV reaches agreed sustainability indicators, meaning the cost of capital itself is tied to performance. C8 is therefore present because sustainability enters directly into the way the Group raises capital, and does so at a very large scale. [29, pp. 28, 171-173].

C9 Inclusion-oriented models. This category was identified. Enel develops offers and service channels specifically for people who can face economic, physical or informational barriers, including elderly customers, families in financial difficulty and people with disabilities. The Group also supports projects intended to reduce energy poverty and improve energy access and works with consumer organizations to design solutions for vulnerable energy users. C9 is assigned because the mechanism starts from an identifiable barrier and changes the offer, support or access channel for the affected group. [29, pp. 142, 248]

Overall classification of Enel. C1,C2,C3,C4,C5,C7,C8 and C9 identified. No sufficient evidence is found for C6.

STMicroelectronics

STMicroelectronics (ST) designs and manufactures semiconductors, which are the small electronic components that control, measure or process information inside products such as cars, industrial machinery, smartphones and household appliances. The sustainability relevance of the company therefore concerns both the resources used in chip manufacturing and the energy performance and useful life of the products in which its chips are installed [30, pp. 10-20].

C1 Resource-efficiency-oriented models. This category was identified. ST makes semiconductors, used in cars, smartphones and many other industrial machines, which are designed to manage electricity more efficiently, losing for example less energy in the form of heat. The device can therefore perform the same function while using less energy. ST also reduces the environmental impact of its factories by purchasing renewable electricity and developing renewable-energy projects at its production sites. C1 is therefore identified because the company improves energy efficiency both through its products and through the energy used in manufacturing [30, pp. 97, 102,145].

C2 Circularity-oriented models. This category was identified. Producing semiconductors requires large quantities of water and also generates industrial waste. ST treats part of the water used in its factories so that it can be returned to production processes instead of being used only once. The company also separates and processes its waste to allow materials to be reused, recycled or recovered. In 2025, 97% of the Group's waste was prepared for reuse, recycled or recovered, while only 3% was sent to disposal. C2 is therefore identified because ST creates processes through which water and materials can be used again instead of immediately becoming waste [30, pp. 134, 138].

Waste related target

In percentage	December 31, 2024	December 31, 2025
Waste prepared for reuse, recycled and recovered	97%	97 %
Waste disposal rate	3%	3 %

Figure 11 - ST 2025 performance related to waste

C3 Access-and-service-oriented models. This category was not identified. ST mainly sells semiconductors to companies that use them inside cars, machines and electronic products. The customers therefore purchase the physical components. The company also provides technical assistance and software updates, but these services do not replace the sale of the semiconductor. In other words, customers do not rent or temporarily access the function of the chip through a subscription, sharing or pay-per-use model. For this reason, the services connected with the products are not sufficient to classify ST under C3 [30].

C4 Stakeholder-oriented models. This category was identified, although the evidence is currently limited to a small number of sites. The production of semiconductors requires water, and the water used by a factory can also affect local communities, other companies and the surrounding natural environment. ST therefore adopted a roadmap based on the Alliance for Water Stewardship standard. This standard requires a company to study local water problems, speak with the people and organizations that use the same water resources and cooperate with them to improve water management. The roadmap covers fourteen main manufacturing sites and one additional site. At the end of 2025, one site had obtained the certification and the certification process had started at a second site. C4 is identified because the management of water involves cooperation with external stakeholders. However, the result should not be interpreted as if all fifteen sites were already certified [30, p. 194].

C5 Purpose-oriented models. This category was identified. Environmental objectives are included in the company's governance and management systems. The Board and the relevant managers supervise these objectives, while a climate-related indicator is included in the system used to calculate variable remuneration. This means that the achievement of the environmental target can influence the bonus received by management. C5 is therefore identified because sustainability objectives are connected with formal responsibilities, company decisions and financial incentives [30, p. 69, 214].

C6 Sufficiency-oriented models. This category was identified for a specific type of semiconductor. Some ST microcontrollers can receive software updates and additional functions over time. A microcontroller is a small programmable component that controls part of an electronic system, such as a function inside a vehicle. The possibility of updating it allows the manufacturer to improve or adapt the system without immediately replacing the complete electronic unit. This can delay technological obsolescence and extend the useful life of the product. C6 is therefore identified for this specific mechanism [30, p. 8].

C7 Revenue-configuration models. This category was not identified. ST earns revenue mainly by selling semiconductor components and related services. The report does not describe a price or payment mechanism specifically designed to produce an environmental or social benefit. Normal product prices and long-term supply contracts are part of the company's ordinary commercial activity and are not sufficient to identify C7 [30].

C8 Financing-configuration models. This category was not identified. ST uses loans and other forms of financing to support research, production and industrial investments. Some of this financing is provided by public financial institutions. However, receiving money from a public institution does not automatically make the financing sustainable. C8 would require, for example, a loan whose

interest rate changes according to the achievement of environmental or social targets. The reviewed evidence did not show a sufficiently clear mechanism of this kind. [30].

C9 Inclusion-oriented models. This category was not identified. ST carries out educational, diversity and community initiatives that can generate positive social effects. However, C9 requires a business mechanism designed to help an underserved group overcome a specific barrier to a product, service, market or economic opportunity. The report does not show that ST changes the characteristics, price or distribution channel of its commercial products to make them accessible to such a group. The social initiatives are therefore relevant, but they are not sufficient to identify an inclusion-oriented business model [30].

Overall classification of STMicroelectronics. C1,C2, C4, C5 and C6 identified. No sufficient evidence is found for C3, C7, C8 andC9.

Prysmian

Prysmian produces cables and related systems used to transport electricity and data. Its products are used in electricity grids, buildings, telecommunications networks and offshore wind farms. The materials, efficiency, durability and recyclability of these cables can influence the environmental impact of the infrastructure in which they are installed [31, pp. 9, 12, 51].

C1 Resource-efficiency-oriented models. This category was identified. Prysmian makes cables that help expand electricity grids and connect renewable-energy plants. These cables are more efficient and so less electricity is lost during transmission. Prysmian uses the E Path label to assess its products based on criteria such as carbon footprint, circularity, recycled materials and transmission efficiency. In 2025 sustainability-linked products accounted for 44.2 percent of Prysmians revenue. C1 is therefore identified because product design and material choices can reduce energy and resource use[31, pp. 29, 51, 151].

C2 Circularity-oriented models. This category was identified. In 2025 recycled materials represented 21.3 percent of the inputs included in this indicator. The company also reuses cable reels, which are the large supports used to transport cables. In 2025, 53% of these reels were reused. The Alesea digital system helps Prysmian track the reels and organize their return. C2 is therefore supported by both recycled materials and a practical return-and-reuse process [31, pp.137-139] .

C3 Access-and-service-oriented models. This category was not identified. Alesea is a digital service, but customers still purchase Prysmian's cables. They do not rent or temporarily access the function of the cable. Alesea supports the return and reuse of reels, but it does not replace product ownership [31, p. 138].

C4 Stakeholder-oriented models. This category was identified. Prysmian works with suppliers to find, test and qualify recycled copper and polyethylene suitable for cable production. The company also includes recycled-content requirements in its purchasing specifications and agrees improvement plans with suppliers. C4 is therefore identified because cooperation with suppliers directly influences the materials purchased and used in Prysmian's products [31, pp. 135-136].

C5 Purpose-oriented models. This category was identified. The Board and its committees regularly receive information about sustainability targets and results. Sustainability indicators are also included in the short-term bonus and the long-term incentive plan. In 2025, ESG objectives represented 20% of the indicators used in both systems. Part of management remuneration therefore depends on environmental and social performance, showing that sustainability is connected with governance and financial incentives [31, pp. 40-42].

C6 Sufficiency-oriented models. This category was not identified. Prysmian's Alesea system supports the return and reuse of cable reels, while its broader circularity strategy includes recycled materials and design for durability and recyclability. These practices reduce waste and the use of virgin resources and are therefore classified under C2. Although reel reuse may also reduce the need to purchase new reels, this is a consequence of the circular loop rather than evidence of a deliberate change in Prysmian's demand, production or growth logic. The report does not identify a distinct business mechanism intentionally designed to reduce cable consumption, replacement, overproduction or overall physical throughput [31].

C7 Revenue-configuration models. This category was not identified. The expression "sustainability-linked revenue" refers to revenue generated by products that Prysmian classifies as having a lower environmental impact. It does not mean that the customer price or payment conditions change according to a sustainability result. The indicator therefore describes the product portfolio, but not a new sustainability-oriented revenue mechanism [31, pp. 17, 19, 139-141].

C8 Financing-configuration models. This category was identified. Prysmian has a five-year Sustainability-Linked Term Loan of €1.2 billion. The interest-rate spread can increase or decrease according to greenhouse-gas emissions, the percentage of women among selected new employees and the number of sustainability audits in the supply chain. C8 is therefore identified because environmental and social performance can directly affect the cost of the company's financing [31, p. 435].

C9 Inclusion-oriented models. This category was not identified. Prysmian's cables help connect households to electricity and digital networks, but this represents a general infrastructure benefit. The

report does not show a product, price or distribution channel specifically designed for an underserved group, such as low-income households or remote communities. No sufficiently clear inclusion-oriented business mechanism was therefore identified [31, pp. 17, 19].

Overall classification of Prysmian. C1, C2, C4, C5 and C8 identified. No sufficient evidence was found for C3, C6, C7 and C9.

Ferrari

Ferrari produces luxury cars. The company places particular importance on performance, exclusivity and the preservation of its vehicles over time. Sustainability mechanisms must therefore be separated from normal technological improvements and activities mainly intended to protect the value of the brand [32].



Figure 12 - Ferrari's iconic logo

C1 Resource-efficiency-oriented models. This category was identified. Ferrari has put steps in place to cut down energy use and to replace part of the energy used in production with renewable sources. The e-Building, which is used for assembling cars and for making motors, batteries and electric axles has heat-pump systems and a solar power installation that can produce about 1.3 MW. In 2025 48 % of the energy used by the Group came from sources and the amount of renewable energy that Ferrari makes itself grew by 26 % compared with 2024 [32, pp. 57, 80, 238-240].

C2 Circularity-oriented models. This category was identified. In 2025 Ferrari used 1.623 tonnes of reused or recycled components, intermediate products and materials. These made up 5% of the materials and components considered by the company. Ferrari also diverted 6.144 tonnes of waste from disposal through recycling operations. The company completed the testing of aluminium alloys for its engines in 2025 but the use of these materials in production is planned for 2026. This future initiative is therefore not used as the evidence, for the classification. C2 is identified because Ferrari already recovers waste and uses materials in its production system. [32 pp 253, 254-256] .

C3 Access-and-service-oriented models. This category was not identified. Ferrari offers financing and leasing services through Ferrari Financial Services and external partners. However, the report presents these services as instruments supporting vehicle purchases and customer relationships. It does not

explain how leasing increases vehicle utilization, reduces the number of cars required or produces another environmental or social benefit. No sustainability-oriented rental, sharing or pay-per-use mechanism was identified. [32, pp. 68, 70-71].

C4 Stakeholder-oriented models. This category was identified through Ferrari's structured employee-well-being programmes. Formula Benessere provides employees with free annual medical examinations during working hours and also offers medical assistance to their children. In 2025, more than 3.100 employees, corresponding to approximately 63% of the eligible population, and over 1.000 children benefited from the programme. Ferrari also supports employees' families through initiatives such as Formula Estate Junior. C4 is identified because these are recurring and measured operating practices designed to protect the health and well-being of employees and their families [32, pp. 271-272].

C5 Purpose-oriented models. This category was identified. Environmental and social objectives are included in Ferrari's long-term management incentive plan. In the 2025-2027 plan, 20% of the performance-share component depends on ESG results. Half of this ESG component concerns reductions in carbon emissions, while the other half concerns the presence of women in selected management positions. The number of shares received by management can therefore change according to sustainability performance. C5 is identified because environmental and social objectives influence formal financial incentives [32, pp. 182, 192].

C6 Sufficiency-oriented models. This category was identified. Ferrari offers a seven-year maintenance programme, extended warranties and special services for vehicles. Ferrari Premium is made for cars that are aged between sixteen and twenty. Ferrari Classiche, instead, manage the certification, repair and restoration of vehicles that are aged more than twenty. These services also offer support and spare parts that might no longer be available, in regular markets. C6 is identified because Ferrari has an operating system that helps customers keep the vehicle for many years instead of replacing it [32, pp. 46, 60, 63-64].

C7 Revenue-configuration models. This category was not identified. Ferrari's prices reflect the performance, exclusivity and scarcity of its vehicles. The company also earns revenue, from maintenance and warranty services. However the report does not show a price or payment condition directly linked to an social result. [32].

C8 Financing-configuration models. This category was not identified. Ferrari mainly finances its investments through cash generated by its business and ordinary debt instruments. The report does

not identify a material green bond, sustainability-linked loan or financing arrangement whose cost or use depends on environmental or social targets. [32].

C9 Inclusion-oriented models. This category was not identified. Ferrari supports social and community initiatives, but its commercial offer remains focused on luxury sports cars. The report does not show a product, price or distribution channel designed to remove a specific barrier for an underserved external group. These initiatives were therefore not sufficient to identify C9 [32].

Overall classification of Ferrari. C1, C2, C4,C5 and C6 identified. No sufficient evidence was found for C3, C7,C8 and C9.

Recordati

Recordati is a pharmaceutical group operating through two main business areas. *Specialty and Primary Care* provides medicines for common therapeutic needs, while *Rare Diseases* focuses on treatments for small groups of patients affected by serious conditions. For Recordati, sustainability therefore concerns not only production and packaging, but also patients' ability to obtain diagnosis and treatment [33, pp. 22, 26-37].

C1 Resource-efficiency-oriented models. This category was identified. Recordati purchases renewable electricity wherever it is available. Including the Tunisian plant, approximately 91% of the electricity purchased by the Group's production plants in 2025 came from renewable sources. The Group also reached approximately 6.200 kWp of installed solar capacity and expanded the use of FSC-certified paper for medicine boxes and package leaflets. C1 is identified because these actions reduce the environmental impact of the energy and materials used to manufacture medicines [33, pp. 112–113].

C2 Circularity-oriented models. This category was identified, although its current scale is limited. At the Campoverde di Aprilia plant, approximately 28% of the benzaldehyde used in 2025 came from recovered material. Recordati also recovered 10.2 kilograms of palladium for reuse and 28 tonnes of dimethyl carbonate. These are chemical materials used during production. Their recovery allows them to remain in use instead of becoming waste. This is the circular mechanism required for C2. However, the report states that these quantities remain small compared with the total materials used by the Group [33, pp. 113, 169-170].

C3 Access-and-service-oriented models. This category was not identified. Recordati provides patient-support programmes, but these help patients obtain medicines or cover their cost. They do not replace product ownership with rental, sharing, subscription or pay-per-use. Medicines are consumed during treatment and are not durable assets that can be shared or returned after use. [33].

C4 Stakeholder-oriented models. This category was identified. Researchers identified this category. The Q-bag, a backpack that holds the pump for children with high-risk neuroblastoma serves as a clear example. During development children and their families tested the Q-bag. Suggested changes to make the Q-bag safer and easier to use. Their feedback led to several design revisions before the Q-bag was introduced in more than fifteen countries. C4 is identified because patients and families actively influenced the design of the solution rather than simply being informed about it [33, pp. 37, 199-200].

C5 Purpose-oriented models. This category was identified. Recordati's Board and dedicated committees supervise the Sustainability Plan. Environmental and social objectives are also included in the incentive system for the Chief Executive Officer and other managers. In 2025, 5% of the CEO's short-term variable remuneration depended on the completion of ESG initiatives. One of these concerned the roadmap for installing solar panels at Group production plants. C5 is identified because sustainability objectives can influence management decisions and remuneration [33, pp. 90-92].

C6 Sufficiency-oriented models. This category was not identified. Medicines can prevent illness and reduce the need for future treatment, but this general benefit is not sufficient to establish C6. Repair, refurbishment and reuse are generally not applicable to pharmaceutical products because of safety and regulatory requirements [33, p 168].

C7 Revenue-configuration models. This category was identified through the Patient Assistance Program (PAP) and the Co-Pay Assistance Program (CAP). PAP provides medicines to eligible patients who do not have adequate insurance and can demonstrate financial need. CAP helps insured patients pay the part of the medicine cost that is not covered by their insurance. Around 1.450 rare-disease patients received support through these and similar programmes in 2025. C7 is identified because Recordati changes the economic conditions under which eligible patients can obtain its medicines [33, pp. 107, 202].

C8 Financing-configuration models. This category was identified. Recordati has a €400 million credit facility linked to two ESG indicators. The first concerns the Group's installed renewable-energy capacity, while the second concerns sustainability audits of suppliers. Achievement of the related targets can affect the interest rate applied to the credit facility. C8 is therefore present because Recordati's environmental and responsible-sourcing performance is directly connected to the cost of an important financing instrument [33, p. 106].

C9 Inclusion-oriented models. This category was identified. PAP and CAP are directed at patients who face a financial barrier, such as insufficient insurance coverage or an inability to pay the

remaining cost of treatment. Recordati also continued the Health Caravans project in Tunisia. This project gave than 1,000 medical visits and improved access to healthcare, for underserved rural communities. C9 is identified because these initiatives help defined groups overcome financial or geographical barriers to healthcare. PAP and CAP are classified under both C7 and C9: C7 describes how the payment conditions are changed, while C9 describes the patients and access barriers addressed [33, pp. 105,202,204].

Overall classification of Recordati. C1,C2,C4,C5,C7 and C8 and C9 identified. No sufficient evidence was found for C3 and C6.

Buzzi

Buzzi sells cement, made of clinker, ready-mix concrete and aggregates. Clinker is made in kilns that heat materials to 1.450 degrees Celsius. This heating process uses a lot of energy and also releases a lot of carbon dioxide. Because of this Buzzi focuses on sustainability. Their main sustainability mechanisms focus on energy use. They also focus on reducing clinker. Another focus is using alternative fuels. They look at materials as well. Product durability is another area they work on[34].

C1 Resource-efficiency-oriented models. This category was identified. In 2025, clinker-to-cement ratio went down to 74.8% from 76.6% in 2024. At the same time the energy required to produce one tonne of clinker dropped from 4.157 megajoules to 3.952 megajoules. Buzzi also generates electricity using panels and captures heat, from industrial processes. C1 is identified because Buzzi produces cement using energy and fewer high-impact materials [34, pp. 74, 78, 80, 112].

C2 Circularity-oriented models. This category was identified. Buzzi uses selected industrial waste as alternative fuel in Buzzi's cement kilns. Buzzi also replaces some raw materials with industrial by-products, recycled aggregates and materials recovered from demolition waste. In 2025 alternative fuels supplied 32.7 % of the energy used in Buzzi's clinker production compared with 30.3 %, in 2024. C2 is identified because Buzzi returns materials that could become waste to use as fuel or production inputs [34, pp. 78, 109-113].

C3 Access-and-service-oriented models. This category was not identified. Buzzi mainly sells cement, concrete and aggregates to customers. The report does not describe a rental, sharing, subscription or pay-per-use model in which Buzzi retains ownership of a product and customers pay only to use its function. Technical assistance does not change the ownership of the construction materials and was therefore not classified under C3 [34, pp. 45].

C4 Stakeholder-oriented models. This category was identified through Buzzi's research partnerships. The Group works with universities, cement producers, industrial companies and start-ups to develop

lower-impact materials and production technologies. For example, Buzzi works with Queens Carbon to test a new cementitious material produced at a lower temperature. The partnership includes a pilot facility and a joint technical committee for exchanging knowledge. C4 is identified because external partners directly participate in developing and testing new solutions [34, pp. 28-30].

C5 Purpose-oriented models. This category was identified. Environmental and social objectives are included in the variable remuneration of key managers. In the 2025 short-term incentive system, sustainability objectives could represent up to 15% of variable remuneration. The long-term incentive plan also includes a carbon-emission reduction target representing 30% of its variable component. C5 is identified because the achievement of sustainability results can directly affect management remuneration [34, p. 43].

C6 Sufficiency-oriented models. This category was identified, but only for a specific product mechanism. Buzzi already offers some Ultra High Performance Concrete products. This type of concrete has very high strength and durability and can provide the required structural performance using a smaller volume of material. More durable structures may also require fewer repairs or replacements over time. C6 is identified because the mechanism can reduce future material demand. However, the report states that these products still represent a niche market and are undergoing further testing and improvement [34, p. 29].

C7 Revenue-configuration models. This category was not identified. Buzzi generates revenue mainly by selling cement, concrete and aggregates through conventional commercial arrangements. The report does not describe a price or payment condition that changes according to an environmental or social result. [34, pp. 45, 187,188].

C8 Financing-configuration models. This category was not identified. The report describes ordinary bank debt, term loans and credit facilities. However, it does not identify a green bond, a sustainability-linked loan or another financing instrument whose use or interest rate depends on environmental or social targets. [34, p. 217].

C9 Inclusion-oriented models. This category was not identified. Buzzi supports schools, sports initiatives and communities located near its production plants. Some projects provide free activities to children and young people. These initiatives have social value, but they do not change the company's products, prices or distribution channels to help a defined underserved group obtain cement, concrete or another commercial service. They were therefore treated as community support rather than an inclusion-oriented business model [34, pp. 135-136].

Overall classification of Buzzi. C1,C2,C4, C5 and C6 identified. No sufficient evidence was found for C3, C7,C8 and C9.

Telecom Italia (TIM)

TIM provides fixed and mobile connectivity and digital services to individuals, companies and public administrations in Italy and Brazil. Its activities depend on telecommunications networks, data centres and customer devices such as modems and smartphones. Sustainability is therefore relevant both to the environmental impact of this infrastructure and to the possibility of providing reliable connectivity to communities that are more difficult to reach [35].

C1 Resource-efficiency-oriented models. This category was identified. In 2025, the electricity used by TIM's operations in Italy and Brazil was covered by renewable sources or certificates. The company also improved the efficiency of its infrastructure. For example, the removal of obsolete network equipment generated energy savings of 6.28 GWh, while eleven data centres complied with the European Code of Conduct for Data Centre Energy Efficiency. C1 is identified because TIM changes both the source of its electricity and the efficiency of the infrastructure used to provide connectivity [35, pp. 181, 183, 191].

C2 Circularity-oriented models. This category was identified. TIM collects modems, routers and smartphones that are returned due to a fault, the end of a contract or a trade-in. These devices are checked carefully. If they are in condition they get repaired, updated and put back into use. In 2025, TIM collected 21.787 smartphones through TIM Rivaluta Smartphone and approximately 80% were regenerated, avoiding an estimated 45 tonnes of electronic waste. In Brazil, 128 tonnes of returned modems were collected and 79% were regenerated and reused. C2 is identified because devices return to the company through an organized process and are used again instead of immediately becoming waste [35, pp. 161, 197,198].

C3 Access-and-service-oriented models. This category was identified. TIM provides mobile devices to Small Business customers through operating rental as an alternative to selling the product. Customers can therefore use the device without purchasing it. At the end of the contract the device is returned to TIM, where the device is technically assessed and if possible regenerated or reused. In 2025 the programme covered 7.434 devices. The report expressly describes the initiative as a product-service model intended to extend the operating life of devices, improve resource efficiency and reduce electronic waste. C3 is therefore identified because access replaces ownership and is directly connected with a documented circularity benefit [35, p. 197].

C4 Stakeholder-oriented models. This category was identified. In Brazil, TIM and Telefónica share mobile-network infrastructure in smaller towns. Instead of operating two overlapping networks, the companies use common infrastructure and switch off redundant sites. By the end of 2025, networks had been switched off in 478 towns and cities under the 3G and 4G agreement, while 4.818 sites were shared under the 2G agreement. C4 is identified because cooperation between the two operators directly changes how the telecommunications service is produced and reduces the energy and resources required [35, p. 72].

C5 Purpose-oriented models. This category was identified. TIM includes environmental and social targets in its long-term management incentive plan. In the 2025-2027 plan, 15% of the performance score depends on network eco-efficiency and another 15% depends on the presence of women in positions of responsibility. The number of shares awarded to management can therefore change according to these results. [35, p. 125].

C6 Sufficiency-oriented models. This category was identified. TIM prioritizes the use of regenerated devices in its after-sales replacement processes, rather than sourcing new units. In 2025, approximately 12.000 regenerated smartphones were used to replace failed, lost or stolen devices for Business customers, accounting for 75% of total replacements in this segment. For Consumer customers, over 13.000 modem replacements were carried out using regenerated devices, equal to 19% of total replacements. In Brazil, TIM S.A. explicitly states that its regeneration programme for Customer Premise Equipment contributes to *the reduction of the demand for new devices*. C6 is identified because this mechanism is distinct from the recovery loop described in C2: rather than simply describing how a device is returned and reintroduced into circulation, it concerns the deliberate use of existing regenerated stock to avoid producing or purchasing new units [35, pp. 197-198]

C7 Revenue-configuration models. The category was found by TIM Rivaluta Smartphone. Customers who return an used Smartphone in eligible condition receive a discount when they purchase a Smartphone. In 2025 the programme delivered about €4 million of value to customers. The discount is only awarded if the return of the Smartphone is completed so that the old Smartphone can enter TIM's regeneration process. C7 is identified because the commercial condition offered to the customer directly supports the circular mechanism [35, pp. 30, 197].

C8 Financing-configuration models. This category was identified. TIM reported a Sustainability Bond with a remaining nominal value of €499 million, whose proceeds had been fully allocated to eligible environmental initiatives. TIM Brasil also issued a sustainability-linked bond of 1.6 billion, connected to specific sustainability targets. C8 is identified because environmental objectives affect either the allocation of the funds raised or the conditions of the financing instrument [35, p. 185].

C9 Inclusion-oriented models. This category was identified. In Italy TIM uses 5G fixed-wireless access in order to provide broadband services in areas that are not covered by fibre. It also extends fibre coverage to towns located in what are called White Areas. In Brazil the Favela Marte project uses 5G and fixed-wireless technology to improve connectivity, for a community that has been affected by the divide. C9 is identified because these initiatives address a geographical barrier that can prevent underserved communities from accessing reliable digital services[35, pp. 31, 72].

Overall classification of Telecom Italia (TIM). The analysis identifies all nine categories.

Tenaris

Tenaris produces steel pipes and provides technical and logistical services connected with their use. Its products are mainly used by the energy industry, especially in oil and gas activities. However, the company also develops pipes for geothermal energy, hydrogen transportation and carbon capture and storage. Its main sustainability mechanisms therefore concern steel production, energy use, material recovery and product durability [36, pp. 22–25].

C1 Resource-efficiency-oriented models. This category was identified. Tenaris produces a portion of its steel using electric arc furnaces. These arc furnaces mainly use steel scrap than making steel directly from iron ore and coal. This method generally requires fewer materials and results in lower direct carbon emissions. At the Campana industrial site in Argentina, two wind farms with a total capacity of approximately 200 MW provide electricity for the steelmaking operations. Tenaris also develops pipes for geothermal energy, hydrogen and carbon capture and storage. C1 is therefore identified because the company changes its energy sources, production materials and products to reduce resource use and emissions [36, pp. 22, 30, 33].

C2 Circularity-oriented models. This category was identified. Steel production generates residues such as slag, scale and iron fines. Tenaris recovers part of these materials and uses them again in steelmaking or supplies them to the cement and construction industries. The company also collects the plastic protectors placed at the ends of pipes during transportation. These protectors can be reused or recycled to produce new plastic products. In 2025, only 8.5% of the residues and co-products measured by the company were sent to disposal, compared with 9.7% in 2024. C2 is identified because materials that leave one process are recovered and returned to productive use [36, pp. 136-137].

C3 Access-and-service-oriented models. This category was not identified. Tenaris provides several services related to the delivery, management and use of its pipes. However, customers still purchase and use the physical products. The report does not describe a rental, sharing, subscription or pay-per-

use model in which customers receive access to the function of a pipe without owning the product. [36].

C4 Stakeholder-oriented models. This category was identified through Rig Direct. This service allows Tenaris to work directly with customers to understand when and where pipes are needed. Deliveries can then be coordinated with the customer's drilling activities. This reduces unnecessary inventory, transportation and handling. The relationship is not limited to selling pipes because Tenaris and the customer jointly organize part of the supply process. C4 is identified because cooperation with customers changes how the service is provided and can reduce its environmental impact [36, p. 25].

C5 Purpose-oriented models. This category was identified. The remuneration of the Chief Executive Officer is connected with both financial and non-financial objectives. The non-financial objectives include safety and decarbonization. Sustainability targets are also included among the objectives used to determine bonuses and long-term incentives for senior managers. This means that environmental and social results can influence the remuneration received by management. C5 is identified because sustainability objectives are included in the company's governance and incentive system [36, p. 96].

C6 Sufficiency-oriented models. This category was identified for a specific mechanism. Tenaris works with customers to improve the use and useful life of its materials and products. The report explains that this approach can reduce the amount of material that must be purchased, transported and handled. This category is different from C2. C2 concerns recovering materials after use, while C6 concerns using the same product for longer and reducing the need for additional materials. C6 is therefore identified only for this product-life mechanism and not for all Tenaris activities [36, p. 137].

C7 Revenue-configuration models. This category was not identified. The report does not describe a price, discount or payment condition directly connected with an environmental or social result. [36].

C8 Financing-configuration models. This category was not identified. The report does not show a material green bond, sustainability-linked loan or other financing instrument whose use or financial conditions depend on sustainability targets[36].

C9 Inclusion-oriented models. This category was identified through Tenaris's education programmes. The Roberto Rocca Technical Gene programme works with 27 schools in six countries. It provides technical training, industrial internships and improved school laboratories and reaches more than 6.700 students and teachers. Tenaris also supports schools located in vulnerable communities and awards scholarships using both academic and socioeconomic criteria. In 2025, it awarded 1.683 scholarships to high-school students and 256 to university engineering students. C9 is identified

because these programmes reduce educational and employment barriers for specific groups and provide access to skills and economic opportunities [36, pp. 161-163].

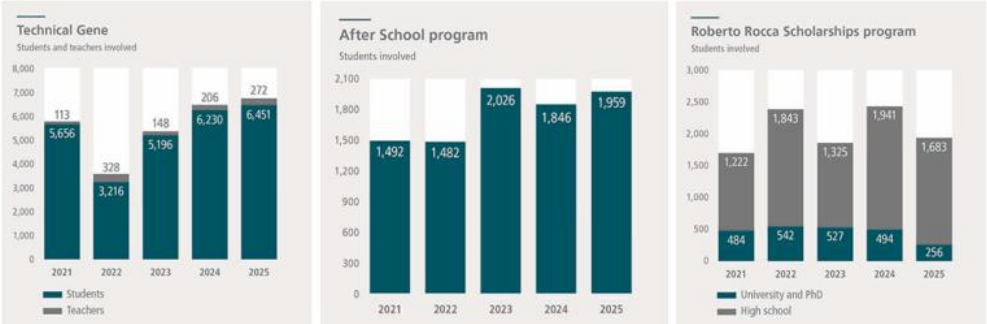


Figure 13 - Tenaris' commitment to inclusivity

Overall classification of Tenaris. C1, C2,C4, C5 and C6 and C9 identified. No sufficient evidence found for C3, C7 and C8.

Terna

Terna manages Italy high-voltage electricity transmission grid. Its main activity is to transport electricity from production areas to local distribution networks. It must also maintain a constant balance between the electricity produced and the electricity consumed. Terna does not normally produce electricity or sell it directly to final customers. Its main sustainability role is therefore to develop a reliable grid that can connect renewable-energy plants and transport the electricity they produce [37].

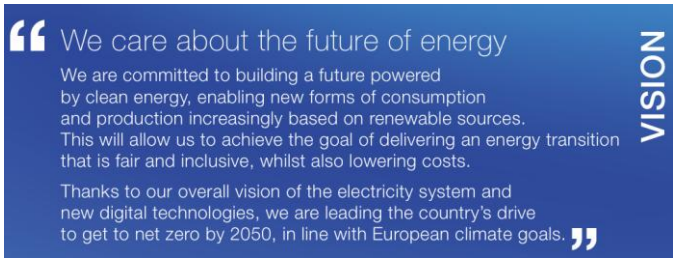


Figure 14 - Terna's declared vision

C1 Resource-efficiency-oriented models. This category was identified. Renewable electricity is often produced in areas which are far from the places where it is consumed. If the grid does not have enough capacity, part of this electricity cannot be transported and may be lost. Terna invests in new lines, interconnections and digital technologies that increase the amount of renewable electricity that the system can manage. Its planning approach also aims to avoid unnecessary or duplicated connection

infrastructure. C1 is identified because these investments allow the electricity system to use renewable energy and infrastructure more efficiently [37, pp. 67-68].

C2 Circularity-oriented models. This category was identified. In 2025, approximately 92% of the waste reported by the Group was recovered. Terna has also adopted a Circular Economy Strategy covering the purchase of materials, the management of infrastructure, grid operations and the disposal of old equipment. The strategy promotes the use of secondary materials and the recovery and reuse of equipment removed from the electricity network. C2 is identified because the company has a structured process for keeping materials and assets in use instead of immediately treating them as waste [37, pp. 12, 265-267].

C3 Access-and-service-oriented models. This category was not identified. Terna provides an electricity transmission service, but customers would not normally purchase or own a national electricity grid. The service therefore does not replace the sale of a physical product with rental, sharing or pay-per-use. [37].

C4 Stakeholder-oriented models. This category was identified. Through initiatives such as Terna Incontra and public consultations, the company involves municipalities, institutions, citizens and local organizations in the planning of important infrastructure projects. These discussions can lead to changes in the route of a power line, the technical design of a project or the environmental measures adopted. In 2025, all projects considered significant by Terna included stakeholder-engagement activities. C4 is identified because local stakeholders can influence how the infrastructure is designed and constructed [37, pp. 341-344].

C5 Purpose-oriented models. This category was identified. Environmental and social objectives are included in Terna's short- and long-term management incentive plans. These objectives concern areas such as the integration of renewable electricity, the connection of new renewable-energy plants and the safety of employees and contractors. If the results are different from the targets, the variable remuneration received by managers can change. [37, pp. 210-212].

C6 Sufficiency-oriented models. This category was not identified under the strict rule used in the analysis. Terna maintains and modernizes its infrastructure, and its Circular Economy Strategy also refers to extending the life of assets. However, grid maintenance is mainly necessary to guarantee the safety and continuity of electricity transmission. The report does not clearly show a separate mechanism specifically designed to reduce the number of assets replaced or the total demand for physical infrastructure. These activities support C1 and C2, but the evidence is not sufficient to identify C6 [37, pp. 96, 265-267].

C7 Revenue-configuration models. This category was identified. Part of Terna's regulated revenue depends on incentives established by the regulatory authority. The company can receive bonuses or penalties depending on results such as transmission capacity, electricity-system efficiency, renewable-energy curtailment and energy not supplied following network failures. In simple terms, part of Terna's revenue changes according to the quality and efficiency of the service provided. C7 is therefore identified because the revenue mechanism is connected with measurable environmental and system results [37, pp. 64-66, 114-115].

C8 Financing-configuration models. This category was identified. In 2025 Terna released two bonds, each 750 million euros. The money collected from bonds is used to fund or update projects that create positive effects. Projects include investments in the electricity network that help bring energy into use[37, p. 125].

C9 Inclusion-oriented models. This category was not identified. Terna's electricity network serves the whole country and can also benefit remote areas. However, this general public benefit is not sufficient to identify C9. The report does not describe a specific product, price or distribution system designed to remove a barrier faced by a clearly defined underserved group. Community consultation supports C4, but it does not create an inclusion-oriented market model [37].

Overall classification of Terna. C1,C2,C4, C5, C7 and C8 identified. No sufficient evidence found for C3, C6 and C9.

UniCredit

UniCredit is a European commercial bank. It provides current accounts, payment services, mortgages, loans, investment products and financial services for companies. Unlike an industrial company, UniCredit does not produce a large quantity of physical goods. Its most important sustainability mechanisms therefore concern how the Bank advises its customers, provides access to financial services and directs money towards environmental and social projects [38].

C1 Resource-efficiency-oriented models. This category was not identified. UniCredit reduces energy use in its offices and purchases electricity from renewable sources. However, these actions mainly concern the environmental management of buildings and internal activities, and not the core business. The Bank also finances companies that invest in renewable energy or efficient technologies. In this case, however, the physical changes are carried out by the financed companies and not by UniCredit. These financing activities are therefore classified under C8 rather than C1 [38, pp. 72-74].

C2 Circularity-oriented models. This category was not identified. UniCredit provides loans and advisory services to companies developing circular-economy projects. However, the report does not

show that the Bank itself operates a material recovery, reuse, repair or recycling system that is relevant to its business model. Financing circular projects supports C8 because it concerns the allocation of capital. [38, pp. 138–140].

C3 Access-and-service-oriented models. This category was not identified. UniCredit provides leasing through specialized companies, UniCredit Leasing S.p.A., but leasing is not automatically a sustainable access model. The report does not clearly show that the leasing offer increases the use of existing assets, extends their useful life or reduces the total number of products required. [38].

C4 Stakeholder-oriented models. This category was identified through UniCredit's ESG Advisory service. A dedicated team works with clients to understand how climate change, regulations and stakeholder expectations may affect clients activities. The team then helps clients incorporate sustainability into clients strategies and choose financial solutions. C4 is identified because UniCredit develops a relationship with its clients and can influence clients business decisions. The service therefore goes beyond the simple sale of a standard financial product [38, p. 131].

C5 Purpose-oriented models. This category was identified. UniCredit includes environmental and social objectives in its management incentive system. ESG performance is considered in the short- and long-term evaluation of senior managers and other relevant employees. Sustainability results can therefore influence the variable remuneration they receive. C5 is identified because environmental and social objectives are included in the Bank's governance, performance measurement and incentive systems [38, pp. 132-134].

C6 Sufficiency-oriented models. This category was not identified. Digital banking can reduce paper use and the need for customers to travel to a branch. However, it mainly changes the channel through which banking services are provided. Digitalization alone is therefore not sufficient to identify C6 [38].

C7 Revenue-configuration models. This category was identified. UniCredit offers discounted basic accounts and debit cards to people with limited financial-management capacity or simple banking needs. It also provides a current account with economic benefits for Ukrainian refugees and asylum seekers. These initiatives change the fees and economic conditions applied to specific customers. C7 is identified because the price or payment conditions are deliberately adapted to make the banking service easier to access [38, p. 299].

C8 Financing-configuration models. This category was identified. Sustainable finance represents an important part of UniCredit's business. In 2025, the Bank reported €11.3 billion of environmental lending and €5.5 billion of social lending. UniCredit offers green and social financing, in which

money is directed towards eligible projects, and sustainability-linked financing, in which the financial conditions can depend on environmental or social targets. C8 is identified because sustainability changes how capital is allocated and, in some cases, the conditions under which it is provided [38, pp. 72-74, 138-140].

C9 Inclusion-oriented models. This category was identified. UniCredit provides financial products designed for groups that may have difficulty accessing normal banking services. These include basic accounts for people with limited financial capacity, accessible services for people with disabilities, products for refugees and social microcredit for women who have experienced gender-based violence. C9 is identified because these products address specific economic, physical or social barriers. [38, pp. 299].

Overall classification of UniCredit. C4,C5,C7, C8 and C9 identified. No evidence sufficient found for C1, C2,C3 and C6.

Technoprobe

Technoprobe designs and produces probe cards used to test semiconductor chips before they are placed inside electronic products. A probe card contains many small probes that make contact with a chip and verify whether it works correctly. Each card is designed for the technical characteristics of a specific chip. For this reason, the same card cannot normally be used to test a completely different product. The main sustainability mechanisms concern energy use, product maintenance, management incentives and access to employment [39].

C1 Resource-efficiency-oriented models. This category was identified, although its current scale is limited. Technoprobe operates photovoltaic systems at production sites in Italy and the United States. The amount of electricity produced by these systems increased in 2025. The Group also established objectives to reduce energy consumption relative to revenue and increase the use of renewable energy. C1 is identified because the company is making concrete changes to the energy used in its operations. However, renewable energy still represents a small part of total energy consumption, so this category should not be interpreted as evidence that the entire production system uses renewable energy [39, pp. 83-85].

Type of energy consumption (MWh)	2024	2025
Total energy consumotion from fossil sources	44.844	46.461

Type of energy consumption (MWh)	2024	2025
Total energy consumption from renewables sources	751	883

Figure 15 - Technoprobe energy consumption by type

C2 Circularity-oriented models. This category was not identified. Technoprobe uses a small quantity of reused or recycled materials and is studying the durability, repairability and recyclability of its products. However, the report explains that circular-economy actions have not yet been formalized into an established Group system. The maintenance service can replace worn probes and needles, but the report does not show that these removed components are recovered and used again in production. [39, pp. 92-94].

Resoruce inflows (T)	2024	2025
Total weight of products and materials used	933	399
Biological materials (%)	-	-
TOTAL WEIGHT OF REUSED OR RECYCLED MATERIALS OR COMPONENTS	0,23	0,42
REUSED OR RECYCLED MATERIALS OR COMPONENTS (%)	-	-

Figure 16 - Technoprobe resource reused or recycled

C3 Access-and-service-oriented models. This category was not identified. Technoprobe sells probe cards and provides maintenance and technical support. Customers continue to obtain and use the physical product. [39].

C4 Stakeholder-oriented models. This category was identified through Technoprobe's employment-inclusion partnerships. The company works with social cooperatives and the Targeted Placement Service of the Province of Lecco to create training and work pathways for people with disabilities or other vulnerabilities. These organizations provide specialist knowledge, tutors, facilities and contact with the participants. C4 is identified because the initiatives depend on structured cooperation between Technoprobe, public bodies and social organizations. These partners actively contribute to how the training and employment programmes are organized [39, pp. 101-102].

C5 Purpose-oriented models. This category was identified. In 2025, sustainability objectives represented 10% of both the annual variable-remuneration plan and the 2025-2027 long-term

incentive plan. The annual objectives included reducing waste and energy consumption relative to revenue and increasing renewable-energy use. The remuneration received by management can therefore change according to the environmental results achieved. [39, p. 30].

C6 Sufficiency-oriented models. This category was identified. The probes and needles contained in a probe card can become worn during use. At the customer's request, Technoprobe can replace these individual components instead of replacing the entire card. The report directly connects this maintenance service with extending the useful life of the product. C6 is identified because repairing the existing probe card can delay the production and purchase of a complete replacement. The classification is limited to this specific maintenance mechanism [39, p. 93].

C7 Revenue-configuration models. This category was not identified. The report does not describe a price, discount or customer-payment condition directly linked to an environmental or social result. Technoprobe earns revenue from maintenance services, but customers are paying for a technical activity rather than for the achievement of a sustainability outcome. Maintenance revenue alone is therefore not sufficient to identify C7 [39].

C8 Financing-configuration models. This category was not identified. The report does not provide sufficient evidence of a material green bond, sustainability-linked loan or other financing arrangement whose use or financial cost depends on Technoprobe's environmental or social performance.[39].

C9 Inclusion-oriented models. This category was identified through Technoprobe's employment programmes. The *ForMe* programme provides people with disabilities with training, tutoring and practical experience for jobs such as warehouse operator and quality-control operator. Ten people participated in the programme in 2025. The *Ciclofficina* programme also helps vulnerable people develop technical and customer-service skills through bicycle repair and refurbishment. C9 is identified because these programmes address a specific employment barrier and create a structured pathway towards economic participation. [39, pp. 101-102].

Overall classification of Technoprobe. C1, C4, C5, C6 and C9 considered identified. No sufficient evidence for C2, C3, C7 and C8.

Leonardo

Leonardo makes helicopters, aircraft, electronic systems and technologies that support cybersecurity and space missions. It also offers maintenance, training and digital services. The main environmental concerns for Leonardo are the energy and materials used to build products, the long life of this equipment and the chance to replace some physical tasks with digital simulations[40].

C1 Resource-efficiency-oriented models. This category was identified. In 2025, renewable sources covered approximately 86% of the electricity purchased by Leonardo. The company also uses digital twins and simulators to reduce the physical resources required for product design, testing and training. For example, training carried out through a simulator can reduce the number of hours flown by a real aircraft and therefore reduce fuel consumption and emissions. C1 is identified because Leonardo changes both its energy sources and the technologies used to carry out resource-intensive activities [40, pp. 25, 88-89].

C2 Circularity-oriented models. This category was identified. Through the *OnLife* programme, Leonardo collects computers and monitors that are no longer needed for their original use. Suitable devices are refurbished and returned to the secondary market or donated, while the remaining equipment is recycled to recover useful materials. In 2025, 275 computers and monitors were donated or returned to use, while 2.072 kilograms of electronic waste were recycled. C2 is identified because the products pass through an organized recovery process instead of immediately becoming waste [40, pp. 109-111].

C3 Access-and-service-oriented models. This category was identified. Leonardo applies Product-as-a-Service solutions to simulation, software and computing activities. For example, software can be provided through licences that operate on centrally managed infrastructure. High-performance computers can also be used by several customers instead of each customer purchasing and operating a separate system. C3 is identified because customers receive access to a digital function or computing capacity without needing to own all the physical infrastructure. This can increase equipment utilization and reduce the number of separate systems required [40, pp. 109-110].

C4 Stakeholder-oriented models. This category was identified. Leonardo evaluates the environmental and social performance of its strategic suppliers and can establish improvement plans with them. More than 1.800 suppliers, representing over 70% of the value of new orders, were assessed during the two-year period reported by the company. The relationship therefore includes evaluation, cooperation and improvement activities rather than only the purchase of components. C4 is identified because suppliers participate in a structured process that can change Leonardo's procurement and supply-chain practices [40, pp. 133-136].

C5 Purpose-oriented models. This category was identified. Sustainability objectives are included in both short- and long-term management remuneration. Sustainability indicators represent 10% of the short-term incentive component and 10% of the long-term component. Environmental and social performance can therefore influence the variable remuneration received by managers. C5 is identified

because sustainability objectives are formally connected with governance, management responsibility and financial incentives [40, pp. 67-68].

C6 Sufficiency-oriented models. This category was not identified. Through the OnLife programme, Leonardo refurbishes, donates or recycles computers and monitors that are no longer required for their original use. This activity supports C2 because it creates an organized recovery and reuse process. The use of simulators can reduce fuel consumption and the physical resources required for training and testing, but this supports C1. The report does not provide sufficient evidence of a business mechanism specifically designed to extend the useful life of Leonardo's main products or delay their replacement. The available evidence is therefore not sufficient to identify C6[40, pp. 88,89, 109-111].

C7 Revenue-configuration models. This category was not identified. Leonardo earns revenue from maintenance, training, software and other services. However, receiving revenue from a service does not automatically create a sustainability-oriented revenue model. The report does not show a price, discount or payment condition directly linked to an environmental or social result. [40].

C8 Financing-configuration models. This category was identified. At the end of 2025, approximately 66% of Leonardo's available financing sources were linked to ESG indicators. The relevant loans include conditions that can change the financing margin according to results such as reductions in carbon emissions and increases in the percentage of suppliers with science-based climate targets. In simple terms. [40, pp. 23, 24].

C9 Inclusion-oriented models. This category was not identified. Through OnLife-Hope Leonardo gives refurbished computers and monitors to non-profit organizations that work in places where the digital divide is a problem. The initiative reaches about 19.800 people. Helps provide 99.000 hours of digital training each year. The programme is real and socially important. However the programme depends on donations. Does not change Leonardo's regular products, prices or customer channels that serve an underserved market.[40, p. 146]

Overall classification of Leonardo. C1,C2,C3, C4,C5 and C8 identified. No sufficient informations found for C6, C7 and C9.

Stellantis

Stellantis designs, manufactures and sells cars and commercial vehicles through many brands. The Group also provides parts, financial services, used vehicles and mobility services. Its sustainability mechanisms mainly concern vehicle electrification, material recovery and the extension of the life of vehicles and components [41].

C1 Resource-efficiency-oriented models. This category was identified. Stellantis has started selling battery- vehicle models. The company also applies eco-design principles to reduce material use and increase the use of bio-based and other lower-impact materials in new vehicles. C1 is identified because Stellantis changes both vehicle technology and material inputs to reduce resource use and environmental impact [41, pp. 231, 257].

C2 Circularity-oriented models. This category was identified. Through SUSTAINera, Stellantis organizes its activities around four actions: remanufacturing, repair, reuse and recycling. At the Mirafiori Circular Economy Hub, used engines, gearboxes, batteries and other components are processed. In 2025 the company also introduced a closed loop in which aluminium and iron recovered from engines are used to manufacture new engines. C2 is identified because components and materials return to a cycle [41, pp. 257-260].

C3 Access-and-service-oriented models. This category was identified through Free2move Charge. The service provides customers with access to a network covering 26 European countries and more than one million charging points, including over 200,000 fast-charging points. Customers can therefore use the charging function without owning the public charging infrastructure. This access mechanism has a clear sustainability contribution because it makes charging more widely available and supports the use of electric vehicles. [41, p. 231].

C4 Stakeholder-oriented models. This category was identified. Stellantis checks suppliers by doing evaluations and audits. If a supplier does not meet the required labor or human-rights standards the supplier must make an action plan and then check if the problem is fixed. Serious non-compliance may lead Stellantis to end the relationship. C4 is identified because a supplier's performance can change purchasing decisions and contractual relationships[41, pp. 291, 294].

C5 Purpose-oriented models. This category was identified. Sustainability is connected with formal management incentives. In the 2023-2025 and 2024-2026 long-term incentive plans, 30% of the performance assessment was linked to the number of electric and hybrid vehicle models made available in the European and US markets. Management remuneration could therefore change according to the achievement of an electrification target. C5 is identified because an environmental objective entered a formal decision-making and remuneration system [41, pp. 184-185].

C6 Sufficiency-oriented models. This category was identified. Through SUSTAINera, Stellantis provides repair activities that help keep existing vehicles and components in use for longer. Repair allows a damaged component to remain operational instead of requiring the immediate purchase and production of a complete replacement. C6 is therefore identified because this service can extend

product life and delay replacement. The classification is limited to the repair and life-extension mechanism. The collection, remanufacturing, reuse and recycling of components remain classified under C2 because they concern organized circular flows [41, pp. 257-260].

C7 Revenue-configuration models. This category was not identified. The report does not show a customer price, discount or payment condition that changes according to an environmental or social result. [41].

C8 Financing-configuration models. This category was identified. At the end of 2025 Stellantis had two bonds that are clearly green bonds. One bond was €1.25 billion. Was issued in 2023. The other bond was €500 million. Was issued in 2024. Thus C8 is identified because Stellantis uses a dedicated sustainable-finance instrument[41, p. 425].

C9 Inclusion-oriented models. This category was identified in a limited but concrete form. Since 2021 Citroën UK has worked with SignLive, a Sign Language service to make its ways of talking more open, for deaf people. The project solves a problem because deaf customers can have trouble getting information or speaking through normal ways. SignLive offers a way for this group to connect with Citroën. C9 is therefore recognized because the company changes some of its customer-contact methods to meet the needs of a specific group. [46 P. 147].

Overall classification of Stellantis. All categories, except C7, were identified.

DiaSorin

DiaSorin develops diagnostic tests and the instruments used to perform them. Its business combines analyzers, which are machines installed in laboratories, and reagents, which are chemical materials consumed each time a test is carried out. This combination creates relevant mechanisms concerning equipment access, recovery and life extension [42, pp. 13-18].

C1 Resource-efficiency-oriented models. This category was identified. DiaSorin replaced lighting, ventilation systems, windows, freezers and other equipment with more energy-efficient alternatives at selected sites. The company also continued a packaging project designed to reduce the volume of boxes used for spare parts. Smaller packaging uses less material and requires less space during transportation. C1 is identified because these actions reduce the energy and materials required to operate facilities and distribute products [42, pp. 180, 202].

C2 Circularity-oriented models. This category was identified. DiaSorin collects instruments that are no longer needed by customers and looks at whether they can be restored. Machines that are suitable are reconditioned by a specialized supplier before being sold again. In 2025 72 instruments went

through this process. C2 is recognized because equipment returns, from customers and enters a cycle instead of becoming waste[42 pp. 202-203].

C3 Access-and-service-oriented models. This category was identified through the reagent-rental model, considered together with equipment recovery. Under this arrangement, a laboratory can use a DiaSorin analyser while purchasing the reagents needed to perform tests, instead of purchasing the machine in the conventional way. DiaSorin records equipment located at customer sites among its own assets and can collect it when it is no longer required. Because the access model is connected with an operating reconditioning process, the evidence is sufficient for C3. Reagent rental considered alone would not have been sufficient [42, pp. 198, 269].

C4 Stakeholder-oriented models. This category was identified. DiaSorin develops some diagnostic solutions with specialist partners. For example, it worked with QIAGEN on tests for latent tuberculosis and with the engineering company TTP on LIAISON NES, a compact platform that performs molecular tests close to the patient. The partners contribute different scientific and technical skills to the development of the final solution. [42, pp. 14, 16, 28].

C5 Purpose-oriented models. This category was identified. DiaSorin's ESG Plan was approved by the Board of Directors. In 2025, 10% of the annual variable remuneration of the Chief Executive Officer and General Manager depended on the combined achievement of sustainability objectives. These included insulating the Saluggia offices to reduce energy use and financing science education for students and teachers. [42, pp. 31, 151].

C6 Sufficiency-oriented models. This category was identified. Reconditioning allows an existing diagnostic instrument to be repaired, updated and used by another customer. It therefore delays the manufacture and purchase of a replacement machine. C2 describes the collection and return loop, whereas C6 describes the extension of the machine's useful life and the reduction in the need for new equipment [42, pp. 202-203].

C7 Revenue-configuration models This category was not identified. The reagent-rental model changes the way DiaSorin generates revenue because the diagnostic instrument is provided together with the continuing supply of reagents and technical support. However, the customer pays for the reagents required to perform diagnostic tests, and this payment is not conditional on returning the analyser, extending its useful life or achieving an environmental or social result. [42].

C8 Financing-configuration models. This category was not identified. The report states that DiaSorin had not issued green bonds. It also does not describe a material loan or bond whose interest rate changes according to sustainability performance. [42, p. 180].

C9 Inclusion-oriented models. This category was not identified. The report states that some reconditioned instruments are sent to developing countries. This may improve the availability of diagnostic equipment, but it does not identify a specific underserved population, the barrier faced by that population or a price or distribution mechanism designed to remove it. [42].

Overall classification. C1,C2,C3,C4, and C5 and C6 identified. C7, C8 and C9 not.

De' Longhi

De' Longhi designs and sells household appliances, particularly coffee machines, food-preparation products, air conditioners and heating appliances. It also produces professional coffee equipment through brands such as La Marzocco and Eversys. The most relevant mechanisms concern appliance efficiency, product recovery, repair and durability [43].

C1 Resource-efficiency-oriented models. This category was identified. De' Longhi redesigns appliances to reduce electricity, water and material use. For example, selected Pinguino GentleJet air conditioners introduced in 2025 improved energy efficiency by 10% and 19% compared with previous models. The PrimaDonna Aromatic coffee machine uses less energy and water and includes recycled plastic in selected parts. C1 is identified because the products are redesigned to provide the same cooling or coffee-making function with fewer resources [43, p. 87].

C2Circularity-oriented models. This category was identified. Through the Renova programme, returned coffee machines are inspected, repaired with original parts, tested and placed back on the market through De' Longhi's online store. In 2025, Eversys also repaired 242 faulty electronic boards and returned them to production or the market. These are concrete circular loops because products and components are recovered and used again rather than discarded [43, pp. 98-99].

C3 Access-and-service-oriented models. This category was not identified. De' Longhi mainly sells appliances that become the property of the customer. Maintenance, spare parts and after-sales assistance help customers use the product, but they do not replace ownership. [43].

C4 Stakeholder-oriented models. This category was identified. De' Longhi uses customer information to improve products and services. Wonderflow is a software system that collects and groups reviews from more than seventy online sales channels. In 2025, the company also involved more than 39.000 consumers in twelve countries in product research. The results were incorporated into product-improvement decisions. C4 is identified because customer feedback becomes a practical input into product design and service management [43, p. 126].

C5-Purpose-oriented models. This category was identified. The Sustainability Plan is integrated into the business plan and monitored by the Board and its committees. For annual variable remuneration paid in 2025, 15% concerned sustainability objectives set for 2024. These included increasing polystyrene-free packaging and digital instruction manuals and completing social audits of suppliers.[43, pp. 49-50].

C6 Sufficiency-oriented models. This category was identified. De' Longhi designs selected products to remain repairable and useful for a long period. The LONGTIME label is an independent certification indicating that a product has been designed for durability and repairability. Some Kenwood kitchen machines manufactured as early as 1976 can still use newer accessories. Together with spare-parts availability and repair programmes, this reduces premature replacement and supports C6 [43, pp. 98-99].

C7 Revenue-configuration models. This category was not identified. De' Longhi earns revenue from appliances, spare parts and assistance, but the report does not describe a price, discount or payment condition linked to a verified environmental or social result. [43].

C8 Financing-configuration models. This category was not identified. The report does not describe a material green bond, sustainability-linked loan or other financing instrument whose permitted use or cost depends on environmental or social indicators.[43].

C9 Inclusion-oriented models. This category was not identified. De' Longhi reports that it is developing inclusive-product guidelines addressing accessibility, age, language and economic conditions. However, the report does not yet identify a specific product or commercial channel implemented for a defined underserved group. The initiative represents a possible future development, but it was not sufficiently operational in 2025 to identify C9 [43, p. 127].

Overall classification of De' Longhi. C1,C2,C4,C5 and C6 identified. No evidence for C3, C7, C8 and C9.

MAIRE

MAIRE is an engineering and technology group serving the energy and chemical industries. Through Nextchem, it develops and licenses technologies, while Tecnimont and KT design and manage the construction of industrial plants. Its activities include technologies for low-carbon hydrogen and ammonia, sustainable fuels, carbon capture and plastics recycling [44].

C1 Resource-efficiency-oriented models. This category was identified. Nextchem does not mainly make the fuels or chemicals. Instead it offers the technologies and engineering designs that decide

how its customers industrial plants work. One clear example is the 2025 contract to update a urea plant in China. The new design should raise production capacity by 26 percent. Cut high-pressure steam use, by 15 percent. MAIRE also said that its technologies helped customers stop about 1.2 million tonnes of emissions in 2025. The calculation method was created by MAIRE. Verified by another company. C1 is therefore identified because energy efficiency and emission reduction form part of the technology sold to customers [44, pp. 9,64,188].

C2 Circularity-oriented models. This category was identified. MyReplast Industries operates a plastics-recycling plant in Bedizzole. The plant receives plastic waste mainly from industrial and commercial activities, together with a smaller quantity of municipal waste. The plastic is selected, shredded, washed and dried before being transformed into recycled polymer. This material can then be used by customers instead of plastic produced entirely from virgin fossil resources. The plant can produce more than 40.000 tonnes of recycled polymers per year and reports a recycling efficiency of 95%. C2 is identified because plastic waste is recovered, processed and returned to productive use as a secondary material [44, pp. 41, 153].

C3 Access-and-service-oriented models. C3 Access-and-service-oriented models. This category was not identified. MAIRE grants customers licenses to use its industrial technologies without transferring ownership of the related patents and technical knowledge. Licensing is therefore a form of access. This element alone is not enough to identify C3. The sustainability benefit must come from the access arrangement itself for example because shared use cuts down the number of assets needed or because the provider keeps and takes care of an asset for the whole life of that asset. In MAIRE's case customers still run their industrial plants. The environmental benefit comes from what the licensed technology does, such, as cutting energy use or grabbing back materials. These mechanisms therefore support C1 or C2. C3 would apply if MAIRE retained ownership or operational control of an industrial asset and customers paid for the service or environmental performance produced by that asset instead of purchasing and operating it themselves. No sufficiently clear evidence of this mechanism was found in the reviewed report [44, pp. 11.15].

C4 Stakeholder-oriented models. This category was identified. In 2025 Nextchem and Siemens Energy agreed to develop and bring to market a high-temperature fuel-cell system that uses methanol as fuel. Nextchem will supply the fuel-cell module whereas Siemens Energy will bring its expertise in onboard integration, electrification and energy-management systems. The planned solution aims to replace amounts of diesel and cut emissions of nitrogen oxides and sulphur oxides. C4 was identified because Nextchem and Siemens Energy bring skills and share responsibility for designing the final sustainability-oriented solution [44, pp. 67, 102].

C5 Purpose-oriented models. This category was identified. MAIRE includes environmental and social objectives in both annual and long-term management incentive systems. In the Management by Objectives plan for 2025–2027, the corporate ESG objective has a weight of 15%. In the Long-Term Incentive Plan for the same period, ESG indicators represent 20% of the total assessment. These indicators concern the reduction of direct and purchased-energy emissions, workplace safety, the development of new transition technologies and the percentage of expenditure with suppliers assessed according to ESG criteria. [44, pp. 145-148].

C6 Sufficiency-oriented models. This category was not identified. MAIRE's technologies can reduce energy use, emissions and demand for virgin materials. However, the report does not show a business mechanism intended to reduce the absolute consumption of the final product or delay the replacement of an existing product. These benefits support C1 and C2, but they do not satisfy the requirement of C6 [44].

C7 Revenue-configuration models. This category was not identified. MAIRE receives revenue from engineering, construction, equipment, technology licences and technical services. However, the amount paid by the customer does not appear to change according to the energy saved, the emissions avoided or another environmental or social result. A customer may pay for a low-carbon or circular technology, but this makes the technology sustainable rather than changing the payment mechanism itself. The evidence therefore supports C1 or C2, but not C7 [44, pp. 11,12, 154].

C8 Financing-configuration models. This category was identified. In November 2025, MAIRE issued a €275 million sustainability-linked bond. The bond initially pays a fixed annual interest rate, but this rate can increase by 0.25 percentage points for each sustainability target not achieved, up to a maximum increase of 0.50 points. The targets include reducing MAIRE's direct emissions and emissions from purchased energy by 28% compared with 2024. They also require at least 20% of relevant suppliers to establish science-based climate targets, meaning emission-reduction objectives consistent with climate science. C8 is identified because MAIRE's sustainability performance can directly change the cost of its financing [44, pp. 33–34, 155].

C9 Inclusion-oriented models. This category was not identified. This category was not identified. MAIRE supports projects that produce clear social and inclusion benefits. Its community-investment activities include scholarships for students experiencing financial difficulties, school materials for students without adequate resources and educational initiatives intended to reduce educational poverty. These programmes address a real economic barrier, but they are delivered as community support or through Fondazione MAIRE, a legally independent non-profit organisation. They are not integrated into MAIRE's commercial or operating model. The In-Country Value programme is more

closely connected to the company's activities because it promotes local employment, training and supplier development. However, it is directed broadly towards the countries in which MAIRE operates and does not identify a specific underserved group and the barrier preventing that group from accessing employment or business opportunities. Neither mechanism therefore combines a clearly defined excluded group with a documented change in MAIRE's business model. [44, pp. 153, 310,311, 315, 317].

Overall classification for MAIRE. C1,C2,C4,C5 and C8. No evidence for C3, C6, C7 and C9.

INWIT

INWIT owns and manages telecommunications towers and other mobile-network infrastructure in Italy. It operates as a neutral host, meaning that different telecommunications operators can place their equipment on the same infrastructure. At the end of 2025, INWIT managed more than 25.000 towers and over 60.000 hosting contracts, which represent the individual spaces provided to operators on those sites [45].

C1 Resource-efficiency-oriented models. This category was identified. Sharing a tower allows several operators to provide mobile services without constructing separate parallel towers. This reduces land, steel, energy and construction work per operator. INWIT estimates that its sharing model has stopped more than 2.5 million tonnes of carbon-dioxide emissions during the time studied. The company also uses electricity from sources and energy-saving systems. C1 is identified because the same connectivity service is provided with fewer physical and energy resources [45, pp. 20, 22].

C2 Circularity-oriented models. This category was identified. Equipment taken out from telecommunications sites is moved to a warehouse, where it is inspected for reuse within the company. Any materials that are not suitable, for reuse are sent to specialized recovery centers. In 2025 INWIT handled 581 tonnes of waste. Reported a recovery rate of 98%[45 Pp. 126-128].

C3 Access-and-service-oriented models. This category was identified and represents a central part of INWIT's business model. Mobile operators pay to use space and supporting infrastructure on towers owned and managed by INWIT. They therefore obtain access to the infrastructure without constructing and owning a separate tower. Unlike ordinary rental, the sustainability contribution is explicit: several operators share one asset, reducing duplicated infrastructure, land use and materials.[45, pp. 20, 126].

C4 Stakeholder-oriented models. This category was identified. The Roma 5G project is developed through a private partnership, with the City of Rome. They share responsibilities and resources to deliver infrastructure or a public service. Through this cooperation INWIT is extending Wi-Fi

coverage to underground stations and public squares. C4 is identified because cooperation with the municipality directly affects where and how the infrastructure is developed [45, p. 90].

C5 Purpose-oriented models. This category was identified. In 2025, sustainability targets represented 15% of the annual management incentive: 10% concerned energy efficiency and renewable energy, while 5% concerned safety on construction sites. Sustainability also represented 20% of the long-term incentive, divided between renewable energy and women in management positions. C5 is identified because environmental and social performance can directly influence management remuneration [45, p. 38].

C6 Sufficiency-oriented models. This category was identified. When several operators use the same tower, fewer separate towers need to be constructed. INWIT also designs infrastructure to be durable, repairable and easier to disassemble, and checks removed equipment for reuse. C3 concerns the operators' access to a shared asset, whereas C6 concerns the lower need for additional towers and replacement components. The same business model therefore supports the two categories for different reasons [45, pp. 20, 126].

C7 Revenue-configuration models. This category was not identified. INWIT receives recurring hosting fees, and some contracts are adjusted for inflation. However, these are ordinary commercial conditions: the fee does not change according to the amount of materials, land or emissions saved. [45, p. 42].

C8 Financing-configuration models. This category was identified. In October 2025 INWIT issued a sustainability linked bond of €850 million, which is connected with targets concerning carbon-emission reductions. INWIT also has two €500 million credit facilities linked to sustainability indicators. [45, pp. 59, 64, 122].

C9 Inclusion-oriented models. This category was identified. Under the state-supported Italia 5G programme, INWIT built more than 300 sites in 2025 in areas where adequate mobile connectivity was unavailable and ordinary market investment was insufficient. It also activated more than 1.450 hosting units in areas with above-average social and material vulnerability. This vulnerability measure considers factors such as education, employment, housing and income. C9 is identified because the infrastructure is directed towards communities facing a specific geographic and digital-access barrier [45, p. 88].

Overall classification for INWIT. All categories identified, except C7.

Snam

Snam is an energy-infrastructure group. Its activities include the transportation, storage and regasification of natural gas. Through specialized companies, the Group also operates in biomethane, energy efficiency, sustainable mobility and carbon capture and storage. Snam is therefore relevant to the taxonomy because it both manages large energy infrastructures and provides solutions intended to support the energy transition [56].

C1 Resource-efficiency-oriented models. This category was identified. Through Renovit Snam makes better the energy use of buildings and industrial plants. The activities include upgrading heating systems and energy supply making building walls and roofs better and controlling street lights and water services. The practical result is that customers can get the service but use less energy. C1 is identified because energy efficiency is part of the service offered to customers and is not limited to the reduction of energy use in Snam's own offices [56, p. 135].

C2 Circularity-oriented models. This category was identified through the biomethane business. Bioenerys uses waste and biomass from farm and food business to make biogas. Then the biogas is turned into biomethane. The leftover stuff can be used as digestate or compost and then put back into the soil. At the end of 2025, Bioenerys operated 35 plants with a total biomethane and biogas capacity of 47 MW. C2 is identified because waste materials are reused to produce energy and agricultural inputs [56 pp 31,135].

C3 Access-and-service-oriented models. This category came through Renovit's Energy Service Company model and Energy Performance Contracts. Renovit does not simply sell equipment and do one time installation, it can put money directly into an energy efficiency project. Then it takes care of managing, operating and maintaining the systems. The customer gets an energy service. therefore there is no need to buy each part of the solution separately or handle the maintenance on their own. C3 is identified because the service-based arrangement is directly connected with a reduction in energy consumption [56, pp. 31, 135, 156].

C4 Stakeholder-oriented models. This category was identified. A clear example is the Ravenna carbon-capture and storage project developed with Eni. Eni captures carbon dioxide from its Casalborsetti facility, while the joint project transports and permanently stores it in an offshore geological field. The experimental phase, completed in 2025, was designed to manage approximately 25.000 tonnes of carbon dioxide per year and achieved a reduction of more than 90% in emissions from the relevant facility. C4 is identified because the two companies combine different assets and capabilities to create a solution that neither could provide alone [56, p. 330].

C5 Purpose-oriented models. This category was identified. In 2025, 20% of the short- and long-term variable remuneration of Snam's Chief Executive Officer depended on sustainability objectives. These included sustainable finance, the use of ESG criteria in purchasing, the reduction of natural-gas emissions and gender balance in management. [56, pp. 183-184].

C6 Sufficiency-oriented models. This category was identified. Snam keeps parts of its gas transportation network in operation even after the assets have completed their regulatory useful life and have been fully depreciated. The regulatory system provides a specific incentive for maintaining these assets in service. In 2025, Snam's recognized revenues included €50 million connected with the continued operation of fully depreciated assets. This is more than ordinary maintenance because the mechanism specifically rewards the continued use of existing infrastructure. C6 is therefore identified because extending the operating life of the network can delay the replacement of pipelines and reduce the need for new infrastructure [56, pp. 108-109].

C7Revenue-configuration models. This category was identified through Energy Performance Contracts. Under these contracts, the energy improvement is monitored for the duration of the agreement and the services or investments are provided according to an agreed level of energy efficiency or financial savings. The economic relationship is therefore connected with the result achieved, rather than only with the sale of equipment. C7 is identified for this performance-based payment logic[56, p. 156].

C8Financing-configuration models. This category was identified. In 2025 Snam issued a sustainability linked bond of USD 2 billion. The financial conditions of this bond are linked to greenhouse-gas reduction targets. Snam also issued a €1 billion European Green Bond. The proceeds from this bond are used for projects that match the EU Taxonomy. By the end of the year sustainable instruments made up 85% of Snam's funding[56 Pp. 16,17, 63].

C9Inclusion-oriented models. This category was not identified. Through Snam Foundation and the Municipality of Milan, the Energy Poverty Zero project helps people understand their energy consumption and address energy-poverty problems. The initiative has a clear social value and is directed towards a vulnerable group. However, the report presents it mainly as a community and training project. It does not show that Snam changes a commercial product, tariff or access channel for the beneficiaries. The evidence was therefore not sufficient to identify C9 [56, p. 265].

Overall classification of Snam. All categories identified, except C9.

Italgas

Italgas manages gas-distribution networks in Italy and Greece. The Group also operates in water services, information technology and energy efficiency. Through Geoside, its Energy Service Company, Italgas provides energy-saving solutions to residential customers, companies and public administrations [47].

C1 Resource-efficiency-oriented models. This category was identified. Geoside improves buildings and industrial systems using energy-efficient technologies, data analysis and artificial intelligence. These interventions are intended to reduce the energy required by customers. Italgas estimated that Geoside's Energy Performance Contract activities avoided approximately 13.000 tonnes of carbon-dioxide emissions in 2025. C1 is identified because energy reduction is part of a service sold to customers and produces a measurable environmental result [47, pp. 98, 129].

C2 Circularity-oriented models. This category was identified. The new Nimbus gas meter is made with 60% recycled plastic. Italgas also reuses excavated soil and rocks from construction activities and has developed a system for tracing, recovering and reusing decommissioned personal protective equipment. C2 is identified because secondary materials are used in a new product and other materials are returned to productive use rather than being sent directly to disposal [47, pp. 140-141].

C3 Access-and-service-oriented models. This category was identified through Geoside's Energy Performance Contracts. Customers receive an energy-efficiency service covering the improvement and management of their buildings or systems, rather than purchasing only a single item of equipment. The environmental benefit is explicit: the contracts reported by Italgas reduced customers' energy consumption and avoided emissions. C3 is therefore identified because an ongoing service provides the energy-saving function [47, pp. 19, 129].

C4 Stakeholder-oriented models. This category was identified. Italgas worked with companies, universities and specialized suppliers during the development and testing of the Nimbus meter. It also cooperated with strategic suppliers on the Green Site and Single Material projects, which improve the management of construction materials and reduce unnecessary transportation. These relationships influence product development and operating processes.[47, pp. 140,163].

C5 Purpose-oriented models. This category was identified. Sustainability indicators made up 25% of the 2025 short term incentive plan for management. These indicators included accidents, network inspections, energy use and diversity and inclusion. The 2023-2025 long term plan also gave a weight of 20% to carbon-emission reduction and energy efficiency[47 Pp. 94-95].

C6 Sufficiency-oriented models. This category was identified through the design of the Nimbus meter. Its modular structure makes individual components easier to repair, avoiding the replacement of the

entire device when only one part has a problem. Italgas estimates that the meter's useful life will be more than 50% longer than that of meters currently installed and has set a target operating life of 19 years. C6 is identified because repairability and durability can delay the need to manufacture and install a replacement meter [47, pp.141,142].

C7 Revenue-configuration models. This category was identified through Geoside's Energy Performance Contracts. These are not ordinary consultancy contracts: the economic relationship is structured around an agreed energy-performance improvement. In practical terms, the contract concerns the energy saving produced over time and not only the equipment installed at the beginning. C7 is identified because the revenue mechanism supports the achievement and maintenance of an environmental result [47, p. 129].

C8 Financing-configuration models. The reviewed report does not identify a material green bond, sustainability-linked loan or other instrument whose use or cost is explicitly connected with environmental or social targets [47].

C9 Inclusion-oriented models. This category was not identified. The report refers to compensation mechanisms for economically disadvantaged energy customers in Greece. However, these conditions form part of the regulatory tariff system and are established by the competent authority. The evidence does not show that Italgas independently designed a product, price or distribution channel for a defined underserved group. Regulatory protection was therefore not considered sufficient for C9 [47].

Overall classification of Italgas. All categories identified, except C8 and C9.

Bank Monte dei Paschi di Siena

Provides banking, investment, insurance and financial services to individuals, families and companies. [48].

C1 Resource-efficiency-oriented models. This category was not identified. The Bank implements measures to improve the efficiency of its buildings and reduce its operational emissions. However, these internal actions do not materially change the financial service offered to customers. Loans supporting renewable energy or energy-efficiency projects are classified under C8 because the Bank provides capital to the company carrying out the environmental activity. The financed activity should not be treated as if it were performed directly by the Bank [48, pp. 213–225].

C2 Circularity-oriented models. This category was not identified. MPS manages the waste produced in its offices and finances companies involved in recovery, reuse and circular-economy projects.

However, the Bank does not itself collect products or materials and return them to a productive cycle as a material part of its business model. [48, pp. 242-244].

C3 Access-and-service-oriented models. This category was not identified. Following the acquisition of Mediobanca, the Group includes leasing and rental activities. These arrangements allow customers to use an asset without purchasing it immediately. However, the report does not demonstrate that the access model itself increases asset utilization, extends product life or produces another clear environmental or social benefit. For consistency with Intesa Sanpaolo and the other leasing cases, ordinary leasing was therefore not sufficient for C3 [48, pp. 167-168].

C4 Stakeholder-oriented models. This category was identified. MPS played a decisive role in establishing Microcredito di Solidarietà together with the Municipality and Province of Siena, the Diocese and other local organizations. The Bank also signed agreements with associations representing families of people with severe disabilities to define useful banking, insurance and trust services. C4 is identified because these external organizations help shape financial solutions for groups facing specific difficulties [48, p. 281].

C5 Purpose-oriented models. This category was identified. The 2025 performance scorecard of the Chief Executive Officer and General Manager assigns 10% to ESG objectives. The indicators include new ESG lending to individuals and companies, gender representation in positions of responsibility and new ESG bond issues. Sustainability results can therefore influence annual variable remuneration. [48, p. 159].

C6 Sufficiency-oriented models. This category was not identified. The Bank may finance projects that reduce material consumption or extend the life of buildings and equipment. However, MPS provides the capital and does not directly operate the relevant repair, reuse or life-extension mechanisms. No material financial product was identified whose specific purpose is to reduce the customer's absolute consumption of a physical product. [48].

C7 Revenue-configuration models. This category was identified through social microcredit and the preferential offer for families affected by severe disabilities. Microcredito di Solidarietà give loans of up to €10.000 at an annual nominal interest rate of 3%, without application fees, commissions or early-repayment charges. In 2025 159 loans were granted for a total of €626.500. The Bank also offers preferential conditions for products used by families of people with disabilities. C7 is identified because financial conditions are deliberately adapted to reduce an economic-access barrier [48, p. 281].

C8 Financing-configuration models. This category was identified. In 2025, excluding the newly acquired Mediobanca activities, MPS provided approximately €1.82 billion in green financing. This included €843 million of sustainability-linked loans and €545 million of Green Loans. A sustainability-linked loan can reduce the interest rate when the borrower achieves agreed ESG targets, while a Green Loan finances a defined environmental project. MPS also issued a €500 million Green Senior Preferred Bond. C8 is identified because environmental objectives influence both the allocation of capital and the conditions of financing [48, pp. 225-227].

C9 Inclusion-oriented models. This category was identified. Microcredito di Solidarietà is specifically intended for individuals and families who cannot obtain ordinary bank credit and are experiencing economic or social hardship. MPS Fiduciaria's agreements also provide adapted services to families with members affected by severe disabilities, including loans for electro-medical equipment and mortgages for suitable housing. C9 is identified because the beneficiaries and the barriers they face are clearly defined and the Bank provides stable financial mechanisms intended to remove those barriers [48, p. 281].

Overall classification: identified C4,C5,C7,C8 and C9. No evidence found for C1,C2,C3 and C6.

Reply

Reply is a technology and consulting group specializing in artificial intelligence, cloud computing, the Internet of Things and digital media. The Group designs technological solutions, integrates different systems and provides digital services to companies and public-sector organizations [49].

C1 Resource-efficiency-oriented models. This category was identified. Reply's GreenOps service helps customers measure and reduce the carbon footprint of cloud services by optimizing computing cycles and energy consumption. Reply also reported that 99.8% of the electricity used by the Group in 2025 came from renewable sources. C1 is identified because the company both reduces the impact of its operations and sells a service designed to reduce customers' energy use [49, pp. 33, 136].

C2 Circularity-oriented models. This category was not identified. Reply develops digital solutions for tracing materials, products and physical assets and provides life-cycle assessment software. These tools can help customers collect information and manage circular-economy projects. However, the report does not demonstrate a sufficiently specific process in which Reply's solution organizes the recovery of a product or material and returns it to another use or production cycle. Traceability is an important enabling activity, but it does not by itself prove that a circular loop has been completed. The available evidence was therefore not sufficient to identify C2 [49, p. 118].

C3 Access-and-service-oriented models. This category was not identified. Reply provides cloud, software and managed digital services and discusses how connected products can become remotely managed services. However, the report does not demonstrate a specific Reply access model that replaces ownership of a durable asset and produces a clear sustainability benefit. GreenOps reduces the energy used by cloud systems and therefore supports C1, but it does not by itself establish C3 [49, pp. 33, 38].

C4 Stakeholder-oriented models. This category was identified for a specific solution. Ticuro Reply is a telemedicine platform that connects patients, caregivers and healthcare professionals. It collects information from medical devices and wearable sensors and makes it available remotely throughout the patient's care pathway. In 2025, the platform was tested across six Italian regions. C4 is identified because the solution changes how different participants share information and cooperate in providing healthcare. [49, p. 46].

C5 Purpose-oriented models. This category was identified. Reply's medium- and long-term incentive plan assigns 8% of the performance assessment to an ESG objective concerning carbon neutrality. The other indicators concern financial and shareholder performance. [49, pp. 91,92]

C6 Sufficiency-oriented models. This category was identified for a specific part of Reply's commercial offering: it develops predictive maintenance solutions for industrial plants and energy infrastructure. These systems use operational data to identify faults and abnormal conditions before serious damage occurs. The report explicitly states that predictive analytics can extend the life of infrastructure systems. C6 is therefore identified because the service helps customers maintain existing physical assets for longer and can delay their replacement. The classification is limited to these life-extension solutions and does not apply to Reply's ordinary cloud and consulting services [49, pp. 18, 23].

C7 Revenue-configuration models. This category was not identified. Reply earns revenue from consulting, system integration, software and managed services. However, the report does not show a price, fee or payment condition that changes according to an environmental or social result. [49].

C8 Financing-configuration models. This category was not identified. The reviewed report does not describe a material green bond, sustainability-linked loan or other financing instrument whose proceeds or financial conditions are connected with environmental or social targets. [49].

C9 Inclusion-oriented models. This category was not identified. Reply develops healthcare and accessibility-related technologies and has received recognition for social-impact and inclusion projects. Nevertheless, the report does not identify a stable product, price or distribution channel

designed for a clearly defined underserved group. Ticuro can improve remote healthcare, but the evidence does not specify that the service is directed towards people excluded because of income, disability or geographical location. It therefore supports C4 but is not sufficient for C9 [49, pp. 46, 95, 106].

Overall classification of Reply: C1,C4,C5 and C6 identified. C2,C3,C7,C8 and C9 not identified.

Fincantieri

Designs and builds cruise ships, naval vessels and also specialized offshore ships. The Group also provides repair, refitting, conversion, maintenance and fleet-support services. Its sustainability mechanisms therefore concern both the environmental performance of new ships and the management of existing ships throughout their useful life [50].

C1 Resource-efficiency-oriented models. This category was identified. In 2025, the average Energy Efficiency Design Index of the cruise ships delivered by Fincantieri was 41% lower than the reference baseline. This indicator measures the carbon emissions expected in relation to the ship's transport capacity: a lower value therefore indicates a more efficient design. Renewable sources also covered 90% of the electricity used by the Group. C1 is identified because Fincantieri changes both ship technology and the energy used in its shipyards [50, p 179].

C2 Circularity-oriented models. This category was identified. Fincantieri separates metal waste produced in its shipyards and prepares ferrous scrap in a form that can be sent directly to steel mills and reintroduced into steel-production cycles. In 2025, 87% of Group waste was sent for recovery. The company also established CircularYard with Hera to improve waste sorting, recovery and recycling in Italian shipyards. C2 is identified because production residues are recovered as secondary materials rather than being treated only as waste [50, p. 202].

C3 Access-and-service-oriented models. This category was not identified. Fincantieri offers maintenance, repair, fleet assistance and other after-sales services, but customers continue to own the ships. These services improve or maintain an existing asset without replacing ship ownership with rental, sharing or pay-per-use. They therefore support C6 by extending the ship's useful life, but they do not satisfy the different ownership requirement of C3 [50, pp. 19].

C4 Stakeholder-oriented models. This category was identified through CircularYard. The company was created by Fincantieri and Hera, which contributes its specialized knowledge of waste collection, treatment and recycling. At the end of 2025, the joint system was already operating in six Fincantieri shipyards. C4 is identified because the partnership changes the practical organization of waste

management and combines the industrial knowledge of Fincantieri with the environmental expertise of Hera [50, pp. 10,11, 90-91].

C5 Purpose-oriented models. This category was identified. Sustainability objectives represented 20% of the 2025 short-term variable remuneration of the Chief Executive Officer and General Manager. The 2025-2027 Long-Term Incentive Plan also assigned a weight of 25% to sustainability targets included in the Group's Sustainability Plan. [50, pp. 126,127].

C6 Sufficiency-oriented models. This category was identified. Fincantieri provides ship repairs, upgrades, refitting, refurbishment and conversion services. The report defines refitting and refurbishment as activities that bring obsolete vessels, or vessels that no longer comply with new rules, back into use. These services allow a shipowner to adapt and continue using a complex existing vessel instead of replacing it with a newly built ship. C6 is identified because life extension is an explicit part of Fincantieri's commercial offer [50, pp. 24-25, 94].

C7 Revenue-configuration models. This category was not identified. Fincantieri receives revenue from the construction, repair and upgrading of ships. Although some of these services have environmental benefits, the report does not show that the amount paid by the customer changes according to energy savings, emissions avoided or another verified sustainability result. Revenue from a more efficient ship or a life-extension service is therefore not sufficient, by itself, to establish C7 [50].

C8 Financing-configuration models. This category was identified. At the end of 2025, sustainable instruments represented 56% of the Group's medium- and long-term financing. In July 2025, Fincantieri signed a €200 million sustainability-linked loan with Intesa Sanpaolo whose cost can change according to the achievement of indicators contained in the Sustainability Plan. Other sustainability-linked facilities were also in place. [50, pp. 68,69].

C9 Inclusion-oriented models. This category was identified. Through projects developed with schools and the ELIS consortium, Fincantieri seeks to reach young people affected by school dropout, educational poverty or exclusion from both education and employment. The *Masters of the Sea* programme provides free and paid technical training followed by opportunities for immediate employment in shipbuilding. Eight courses organized between the end of 2024 and 2025 resulted in 108 hires during 2025 and 250 hires since the programme began. C9 is identified because the initiative creates a structured route from exclusion to training and paid employment. [50 pp 220,221].

Overall classification of Fincantieri: all except C3 and C7.

Pirelli

Produces tyres for cars, motorcycles and bicycles, mainly for the premium market. Its main environmental impacts are linked to the materials used to produce tyres, the energy consumed in factories and the effect of tyres on vehicle energy consumption [51].

C1 Resource-efficiency-oriented models. his category was identified. In 2025 all the electricity purchased by Pirelli was certified as renewable. The company is also replacing traditional tyre-curing presses with electric presses, which can improve energy efficiency by about 80%. In 2025, electric presses represented 14% of those installed worldwide and 30% of those installed in Europe. Pirelli also develops tyres with lower rolling resistance, which can reduce fuel or electricity consumption during vehicle use. C1 is identified because Pirelli reduces energy consumption both in production and during the use of its products [51, pp. 106,107, 125-126]

C2 Circularity-oriented models. This category was identified. In 2025 26.9% of the raw materials used by Pirelli were natural or recycled. These included recycled steel, recycled carbon black and silica from rice husks. Recycled carbon black is obtained from end of life tyres. Pirelli also launched a tyre containing more than 70% natural and recycled materials [51, pp. 31–32, 126–131].

C3 Access-and-service-oriented models. This category was not identified. Pirelli offers digital services such as Cyber Tyre, which uses sensors which give information on tyre and road conditions. However, customers still buy and own the tyres. Since Pirelli does not offer rental, sharing or pay-per-use models, the evidence is not sufficient to identify C3 [51 pp 29-31].

C4 Stakeholder-oriented models. This category was identified. Pirelli works with car manufacturers and technology companies to develop products. For example Pirelli developed a tyre containing than 70% natural and recycled materials for Jaguar Land Rover. Pirelli also works with Bosch to combine tyre sensors, software and vehicle systems[51, pp. 31, 127].

C5 Purpose-oriented models. This category was identified. Sustainability indicators are included in the remuneration of Pirelli's management. They represent 15% of the short-term incentive and 25% of the long-term incentive. The indicators include climate objectives, the environmental characteristics of tyres, workplace safety and other social targets. [51, pp. 87,88].

C6 Sufficiency-oriented models. his category was identified through product durability. The last developed Cinturato tyre offers about 20% more mileage than the previous version, meaning that it can be used for longer before replacement. This can reduce the number of tyres needed over the life of a vehicle. C6 is identified only for this specific product life-extension mechanism [51, pp 31,32,125-126].

C7 Revenue-configuration models. This category was not identified. Pirelli earns revenue from tyres and related services, including products with improved environmental characteristics. However, the report does not show a price, discount or payment condition directly linked to an environmental or social result. Selling a lower-impact tyre supports C1 or C2, but it does not automatically change the revenue mechanism required for C7 [51].

C8 Financing-configuration models. This category was identified. Pirelli has issued sustainability-linked bonds, including a €600 million bond with an annual interest rate of 4.25%. These instruments contain sustainability targets concerning greenhouse-gas emissions and the use of renewable electricity. Failure to achieve the targets can increase the amount paid by the company to investors.[51, pp. 103,104].

C9 Inclusion-oriented models. This category was not identified. Pirelli supports community, education and cultural initiatives, but the report does not show a commercial product, price or distribution channel specifically designed to remove a barrier faced by a defined underserved group. These activities were therefore treated as community support rather than an inclusion-oriented business model [51].

Overall classification of Pirelli. C1,C2,C4,C5,C6 and C8 identified and no sufficient evidence for C3, C7 and C9.

Amplifon

Amplifon provides hearing-care services and sells hearing aids through a worldwide network of specialist stores. Its offer includes hearing tests, selection and fitting of hearing devices, periodic checks and continued assistance. Sustainability is therefore connected both with the environmental management of devices and with access to hearing care [52].

C1 Resource efficiency oriented models. This category was identified. Amplifon buys electricity using certificates and long-term supply agreements. In 2025 renewable sources made up 83% of the electricity the Group purchased. The company also replaces lighting and other store equipment with efficient options. Rechargeable hearing aids offer proof because they cut down on the repeated use and disposal of single-use batteries. C1 is identified because these actions reduce energy and material inputs in both operations and product use [52, pp. 169-174].

C2 Circularity-oriented models. This category was identified, although the evidence is limited to specific activities. Amplifon uses reusable packaging containing more than 70% recycled material in fourteen countries. It also collects used batteries and electronic equipment through appropriate waste channels. These mechanisms allow packaging or materials to remain in use or enter a recovery

process. However, the report does not provide sufficient evidence that hearing aids are systematically collected, refurbished and supplied to new commercial customers [52, pp. 116, 120].

C3 Access-and-service-oriented models. This category was not identified. Amplifon offers extensive assistance and may help customers obtain insurance or reimbursement, but the hearing aid is still supplied for the individual customer's use and is not shared or repeatedly transferred between users. The report does not show a rental or pay-per-use model that keeps ownership of the device with Amplifon and creates a clear sustainability benefit. [52, pp. 118-120].

C4 Stakeholder-oriented models. This category was identified. Amplifon gathers feedback from customers and information about how hearing aids are used. Amplifon uses this information to help specialists adjust hearing aids and improve the service. The company also works with manufacturers and technical partners to integrate devices, software and customer assistance. C4 is identified because information from customers and partners is used to modify the solution, rather than being collected only for communication purposes [52, pp. 116, 120].

C5 Purpose-oriented models. This category was identified. Amplifon's Sustainable Value Sharing Plan connects part of management remuneration with four sustainability objectives. These include reducing emissions, increasing renewable electricity, improving gender balance and reducing the use of disposable hearing-aid batteries. ESG indicators represented approximately 11% of the Chief Executive Officer's total incentive opportunity.[52, p. 111].

C6 Sufficiency-oriented models. This category was not identified. Amplifon provides periodic checks, cleaning and adjustments as part of the assistance offered to people using hearing aids. These services help maintain the correct performance of the device. However, the reviewed evidence does not demonstrate that Amplifon repairs or refurbishes hearing aids in order to extend their useful life or that these services measurably delay replacement. Ordinary assistance was therefore not sufficient to identify C6. The collection of batteries, electronic equipment and packaging remains relevant to C2 because it concerns organized recovery and recycling flows [52].

C7 Revenue-configuration models. This category was identified through Amplifon's free hearing tests. A hearing test normally represents the first economic step in obtaining hearing care. By providing it free of charge, Amplifon removes this initial cost and allows more people to understand whether they have hearing loss. C7 is identified because the price of an important part of the service is deliberately set at zero to improve access. The classification concerns the pricing mechanism[52, p. 117].

C8 Financing-configuration models. This category was identified. Amplifon had nine sustainability linked financing arrangements. These include a €75 million financing tranche and a €175 million loan

signed with Intesa Sanpaolo in 2025. Their financial conditions are connected with progress towards objectives included in Amplifon's Sustainability Plan. [52 pp 127-128].

C9 Inclusion-oriented models. This category was identified. Through Miracle Ear Foundation, Amplifon provides hearing aids and support to people taht cannot afford them. In 2025 more than 300 hearing aids were provided to over 150 people in underserved communities in the United States; beneficiaries also receive continued maintenance support. C9 is identified because a defined group faces a clear economic barrier and the programme directly provides Amplifon's core hearing-care solution to overcome that barrier [52 pp 217-218].

Overall classification of Amplifon: all categories, except C3 and C6.

Brunello Cucinelli

Designs and sells luxury clothing and accessories, with high quality materials and developed by a network of specialized italian artisan workshops. For this company, the most relevant sustainability mechanisms concern product durability, repair services, relationships with artisans, energy use and material management [53].

C1 Resource-efficiency-oriented models. This category was identified. This category was identified. In 2025 energy which is renewable covered about 40% of the Group's total energy use, compared with 32% in 2024. The company uses renewable electricity and photovoltaic systems in sites such as Solomeo, Penne and Gubbio. These actions reduce the dependence on fossil energy in offices and production facilities[53 pp 129-131,161].

C2 Circularity-oriented models. This category was identified. At the Solomeo site, water used in some production activities is treated and partly reused instead of being discharged. The company also uses reusable packaging and packaging made from recycled materials. These practices help reduce waste and keep water and materials in use for longer [53 pp 142, 151-154].

C3 Access-and-service-oriented models. This category was not identified. Customers purchase and own Brunello Cucinelli garments. The company offers repair services, but this does not replace ownership with rental, sharing or payment for temporary use. Repairs help customers use the same garment for longer and therefore support C6. They also involve a particular pricing decision relevant to C7, but they do not establish C3 [53, pp. 152-155].

C4 Stakeholder-oriented models. This category was identified. The company works with approximately 400 specialized artisan workshops involving around 8.000 artisans. These workshops provide specialized skills that form part of the company's production model, while Brunello Cucinelli supports stable relationships, training and continuity of craftsmanship. C4 is identified because external artisans are closely integrated into the creation and production of the final garments [53, pp. 32-33].

C5 Purpose-oriented models. This category was identified. Sustainability and the principles of *Humanistic Capitalism* are included in the company's governance and remuneration system. In 2025, 40% of the Chief Executive Officer's short-term variable remuneration was connected with objectives concerning human sustainability, climate, biodiversity and inclusion [53, pp. 99, 122].

C6 Sufficiency-oriented models. This category was identified. Brunello Cucinelli offers a repair service that helps customers use their garments for longer; instead of replacing a damaged or worn product, customers can repair it and continue using it. This help to reduce the need to buy and produce a new garment [53].

C7 Revenue-configuration models. This category was identified through the repair service, which is normally provided free of charge. The absence of a repair fee reduces the customer's economic incentive to discard an older garment and purchase a replacement. The mechanism supports C6 because it extends product life and C7 because the pricing decision helps make that extension possible. C7 is therefore limited to this specific free-service mechanism [53, pp. 152-153].

C8 Financing-configuration models. This category was not identified. The report describes the Group's ordinary loans and financial position, but it does not provide sufficient evidence of a material green bond, sustainability-linked loan or other financing instrument dedicated to environmental or social objectives[53] .

C9 Inclusion-oriented models. This category was not identified. The company supports schools, cultural projects and training for young people, including the School of Contemporary High Craftsmanship and Arts. These initiatives preserve professional skills and create employment opportunities. However, the report does not clearly define a disadvantaged group, the barrier faced by that group and a mechanism specifically designed to remove it. The activities were therefore not considered sufficient for C9 [53, pp. 35, 209-210].

Overall classification: all excpet C3 and C8 and C9.

Cementir Holding

Makes cement, ready mixed concrete and aggregates. Cement production causes a lot of carbon emissions because it needs high temperatures. The main ways to be more sustainable therefore focus on carbon cement, different raw materials, other fuels and methods to capture carbon[54]

C1 Resource-efficiency-oriented models. This category was identified. Cementir developed FUTURECEM which is a cement that uses less clinker. Since clinker is the main source of emissions in cement production, this reduces the carbon footprint by about 30%. Cementir also sells DCarb white cement which has around 15% lower emissions than the standard product. C1 is identified because these products reduce emissions while maintaining the same construction function [54 pp 15,38-39].

C2 Circularity oriented models. This category was identified. In 2025 alternative materials made up 11.2 percent of the materials used in cement production. These materials include sources from other industrial activities or demolition processes. Alternative fuels, such as selected waste and biomass provided 25 percent of the thermal energy used by the Group. Cementir also reuses demolition waste as aggregate, in concrete[54, pp 171, 202-204].

C3 Access-and-service-oriented models. This category was not identified. Cementir mainly sells cement, concrete and aggregates. The report does not show an offer in which customers obtain temporary access to the function of these products while Cementir retains ownership. Technical support and product advice do not change the ownership structure and therefore do not meet the requirements of C3 [54].

C4 Stakeholder-oriented models. This category was identified. Cementir works with customers and other partners to test lower-carbon cement and recycled materials in real construction projects. Customers provide information about practical needs and product performance, while Cementir uses this feedback to improve its products and technical solutions. C4 is identified because cooperation with external actors contributes directly to the development and use of the sustainability-oriented product [54, p. 38].

C5 Purpose-oriented models. This category was identified. In 2025, Cementir introduced ESG indicators into the Chief Executive Officer's variable remuneration and into the annual incentive system for other managers. The objectives include reducing emissions, improving workplace safety and increasing the contribution of lower-carbon products.[54, pp. 75-82].

C6 Sufficiency-oriented models. This category was not identified under the strict rule used in the analysis. Cementir produces durable and high-performance concrete, which can potentially extend the life of buildings or allow less material to be used. However, the report does not provide sufficiently clear evidence that these characteristics reduce total material demand or delay replacement in practice. Product efficiency supports C1, but a general statement about durability is not enough to establish C6 [54, pp. 10, 38-39].

C7 Revenue-configuration models. This category was not identified. Cementir earns revenue from lower-carbon cement and concrete, but customers continue to purchase these products through conventional commercial contracts. The report does not describe a price or payment condition linked to emissions avoided, materials recovered or another sustainability result. The environmental characteristics of the product support C1 or C2, but not C7 [54].

C8 Financing-configuration models. This category was identified. Cementir and Air Liquide received a €220 million grant from the European Innovation Fund for the ACCSION carbon-capture project in Aalborg. The funds are dedicated to constructing a system designed to capture approximately 1.5

million tonnes of carbon dioxide per year once fully operational. C8 is identified because capital is allocated specifically to a defined environmental project and is conditional on its development [54, p. 37].

C9 Inclusion-oriented models. This category was not identified. Cementir supports local communities and educational initiatives, but the report does not identify a commercial product, price, employment channel or distribution system specifically redesigned to remove a barrier faced by a defined underserved group. These activities were therefore considered community support rather than an inclusion-oriented business model [54].

Overall classification: C1,C2,C4,C5 and C8; No sufficient evidence found for C3,C6,C7 and also C9.

Rai Way

Rai Way owns and manages infrastructure used to transmit and distribute television, radio and telecommunications signals. It operates towers, broadcasting sites, data centres and transmission networks. In addition to serving Rai, the company hosts equipment belonging to other broadcasters, public administrations and telecommunications operators [55].

C1 Resource-efficiency-oriented models. This category was identified. Rai Way purchases electricity generated entirely from renewable sources and introduces more energy-efficient broadcasting and network technologies. These measures are important because broadcasting sites and data centres operate continuously and consume electricity throughout the year. C1 is identified because the company changes both the source and the amount of energy required to provide its infrastructure services [55, pp. 28, 126–131, 241].

C2 Circularity-oriented models. This category was not identified under the strict test. Rai Way states that 100% of its waste is sent to recovery. However, the detailed table shows that both "preparation for reuse" and "recycling" are reported at 0.00 tonnes, for both hazardous and non-hazardous waste, in 2025 and 2024. All 141.70 tonnes of recovered waste fall under the broader category "other recovery operations", which may include processes such as energy recovery that do not return the material to a productive cycle. This reading is confirmed explicitly by the report itself, which separately discloses a "non-recycled waste percentage" of 100% for both 2025 and 2024. The available evidence therefore does not demonstrate the material loop required for C2 [55, pp. 136-137].

Rifiuti non riciclati	u.m.	2025	2024
Rifiuti non riciclati	t	141,95	215,11
Rifiuti totali		141,95	215,11
Percentuale rifiuti non riciclati	**%**	**100%**	**100%**

Figure 17 - Rai Way's non-recycled waste percentage (2025-2024)

C3 Access-and-service-oriented models. This category was identified through the Tower Rental service. Rai Way allows broadcasters and telecommunications operators to install their equipment on its existing towers instead of constructing and owning a separate tower. Maintenance and other supporting services may also be included. The mechanism increases the use of existing infrastructure and can reduce the number of duplicated sites. C3 is identified because customers obtain access to an infrastructure function without having to own the entire physical asset [55, pp. 8, 160, 168-169].

C4 Stakeholder oriented models. This category was identified. Rai Way works with customers and local institutions to transfer telecommunications equipment from problematic locations to existing company sites. In 2025, this rationalization activity involved eleven installations. The partners jointly evaluate technical, service and local-impact requirements before the equipment is moved. C4 is identified because cooperation leads to a concrete change in the organization and location of infrastructure [55, pp. 160, 168-169].

C5 Purpose-oriented models. This category was identified. Sustainability indicators represent 15% of Rai Way's short-term incentive system. Of this amount, 10% concerns workplace and property rationalization and 5% concerns the reduction of vehicle-fleet emissions. ESG indicators also represent 20% of the long-term incentive plan. C5 is identified because environmental and social performance can directly influence management remuneration [55, pp. 48-50].

C6 Sufficiency-oriented models. This category was identified. Through its Tower Rental services, Rai Way hosts the transmission equipment of different broadcasters and telecommunications operators at its existing sites. This lets the existing infrastructure serve customers instead of needing separate towers for each operator. The report clearly says Rai Way's plan is to cut down on towers and to use current spaces better by putting antennas on existing masts whenever possible. The report does not give a number for how many new tower are avoided, but the system is designed to stop building additional physical infrastructure[55, pp 160, 168-169].

C7 Revenue-configuration models. This category was not identified. Tower Rental generates recurring revenue, but a recurring payment is not automatically a sustainability-oriented revenue mechanism. The fee paid by the customer is not shown to change according to the number of towers avoided, energy saved or another environmental or social result. Tower Rental therefore supports C3, but the evidence is not sufficient for C7 [55, p. 209].

C8 Financing-configuration models. This category was not identified. The report describes ordinary credit facilities and corporate financing, but it does not provide sufficient evidence of a green bond, a sustainability-linked loan or another material financing instrument whose use or cost is directly connected with sustainability objectives [55].

C9 Inclusion-oriented models. This category was identified. In 2025, Rai Way supported the installation of 43 new 5G and Fixed Wireless Access systems on its infrastructure, especially in rural and suburban areas. Fixed Wireless Access provides internet connectivity through wireless signals when fixed fibre connections are not available or are difficult to install. C9 is identified because the initiative addresses a defined geographic barrier and improves connectivity in areas affected by the digital divide [55, p. 168].
Overall classification: all except C2,C7 and C8.

6.4 Coding procedure

This section describes the coding framework used to assess the applicability of the taxonomy to the selected company sample. For each category, a list of keywords and related expressions was prepared. These terms were used to locate potentially relevant passages within the annual report covering the financial year ended 31 December 2025 for each company. The main search terms are presented in Table 6.1.

Table 13 - keywords used by category

Category	Keywords used	Evidence required
C1 Resource efficiency	energy efficiency; resource efficiency; energy saving, renewable energy, emission reduction	The activity reduces the use of energy, water or materials, or lowers emissions.
C2 Circularity	circular, recycling; reuse; recovery; recycled materials; waste; take-back	A product, material or resource is recovered and used again
C3 Access and service	rental, leasing, sharing; subscription; pay per use; product as a service; access	The customer uses a product or receives its function without owning it and this produces a sustainability benefit
C4 Stakeholder orientation	partnership; collaboration; co development; joint, engagement	External stakeholders help design or carry out a sustainability oriented solution.
C5 Purpose orientation	purpose, mission; governance, targets; remuneration, incentive	environmental or social objectives influence governance, decisions or managers remuneration
C6 Sufficiency	durability; repair; product life; longer use; reduced consumption, overproduction	The activity is designed to reduce consumption, replacement or overproduction
C7 Revenue configuration	outcome-based payment; pay for performance; shared savings, sustainability linked price	the amount or method of payment changes according to an environmental or social result
C8 Financing configuration	green bond, green loan, social bond; sustainability linked bond; sustainability linked loan; interest rate	the use or cost of financing is connected to environmental or social objectives
C9 Inclusion	inclusion, low income, vulnerable, affordable; poverty; disability; inclusive	a specific mechanism removes a barrier faced by a disadvantaged or underserved group

The keywords were used only as a screening device. A keyword occurrence was not treated as sufficient evidence of a category. For every relevant result, the related paragraphs, tables and report

sections were read. A category was identified only when the evidence described a concrete activity or mechanism consistent with its recognition question. This approach follows the general dictionary-assisted logic used by Ritala et al. (2018) [57]. Their study used 428 keywords to conduct an automated content analysis of 93.770 press releases issued by 101 S&P 500 companies between 2005 and 2014. The present study instead examines a smaller sample of 30 companies and does not classify firms on the basis of keyword frequency. The smaller sample made it possible to read every candidate passage and assess the meaning of the evidence in its specific context.

6.5 Company-level results

The application of the taxonomy produced 183 positive classifications across the 30 companies. The total is higher than 30 because the taxonomy is multi-label: a company may be assigned to several categories when different sustainability mechanisms are identified. On average, each company was assigned to 6.1 categories. The number ranged from four to nine, and 23 companies were assigned to between five and seven categories.

Table 14 - Frequency of the categories in the company sample

Code	Category	Companies	Share of sample
C1	Resource efficiency	27	90,0%
C2	Circularity	24	80,0%
C3	Access and service	10	33,3%
C4	Stakeholder orientation	30	100,0%
C5	Purpose orientation	30	100,0%
C6	Sufficiency	18	60,0%
C7	Revenue configuration	12	40,0%
C8	Financing configuration	18	60,0%
C9	Inclusion	14	46,7%

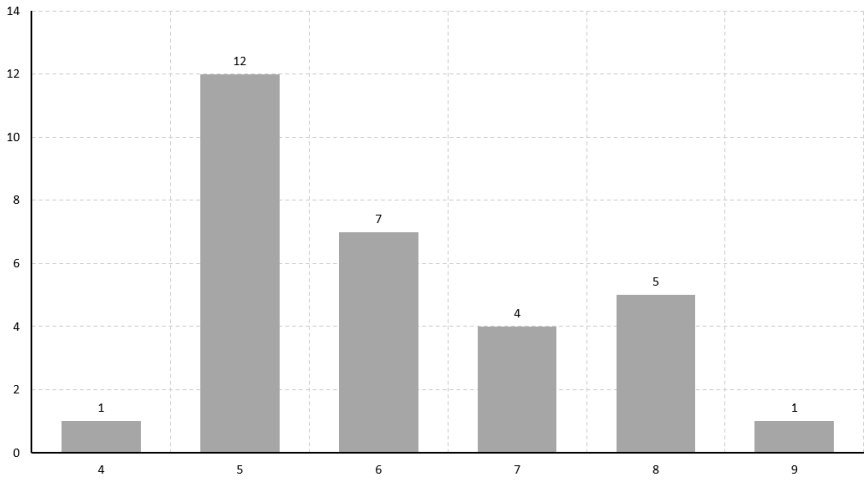


Figure 18 - Distribution of the number of categories identified for a single company

C4 Stakeholder orientation and C5 Purpose orientation were identified in all 30 companies. C4 was applied when external stakeholders contributed directly to the development or implementation of a sustainability solution. For example, MAIRE and Siemens Energy contribute different technologies to the joint development of a lower-emission fuel-cell system [44]. C5 was applied when sustainability influenced corporate purpose, governance, objectives or management incentives. MAIRE, for example, includes environmental and social indicators in senior-management remuneration [44]. These results show that collaboration and sustainability governance are common across the sample, although their presence does not prove that all companies achieve the same impact. Environmental and operational mechanisms were also frequent. C1 Resource efficiency was identified in 27 companies, or 90% of the sample, while C2 Circularity was identified in 24 companies, or 80%. C1 concerns reducing the energy, materials or emissions required to provide a product or service. MAIRE's technology for a urea plant, for example, is expected to increase production capacity while reducing the use of high-pressure steam [44]. C2 instead requires a resource to be recovered, reused or returned to a production cycle. MAIRE's MyReplast plant transforms plastic waste into recycled polymers that can replace virgin materials [44]. C1 therefore concerns using fewer resources, whereas C2 concerns keeping resources in circulation. C3 Access and service was the least frequent category and was identified in ten companies, representing 33.3% of the sample. It was applied only when customers could access the function of an asset without purchasing it and when this arrangement produced a clear sustainability benefit. A generic service, digital platform or technology licence was not sufficient. Eni's Adopt a Panel service provides an example because customers benefit from renewable energy generated by photovoltaic panels without purchasing, installing or owning the panels [26]. C6 Sufficiency and C8 Financing configuration were each identified in 18 companies, or 60% of the sample. C6 required a deliberate mechanism that reduced replacement, consumption or physical production. Repair, maintenance and durability were included when they kept the same product or asset in use for longer. Moncler's Extra-Life service, for example, repairs garments and delays their replacement [28]. This differs from C2 because recycling recovers materials, while sufficiency extends the period during which the same product remains in use. C7 Revenue configuration was identified in 12 companies, or 40% of the sample. It was applied when the payment or revenue mechanism supported a sustainability result, rather than simply when a sustainable product was sold. TIM, for example, offers an economic benefit when customers return used smartphones, connecting the price mechanism with product recovery [35]. C8 required sustainability objectives to influence financing conditions or the use of financial resources. Enel's sustainability linked bonds, for example, connect financial conditions with the achievement of environmental targets [29]. C9 Inclusion was identified in 14 companies, or 46.7% of the sample.

This category required a clearly defined underserved group and a mechanism designed to remove a specific barrier. General donations or community programmes were not sufficient. INWIT, for example, develops telecommunications infrastructure in areas where inadequate coverage and limited commercial investment restrict access to mobile connectivity [45]. TIM was the only company for which all nine categories were identified [35]. Eni, Enel, Stellantis, INWIT and Snam each presented eight categories, although their specific combinations were different [26], [29], [41], [45], [56]. Reply had the count with four categories [49]. These differences should not be taken as a sustainability ranking. The count of categories measures how many different business model mechanisms are documented, not how effective or how much they affect the environment or society.

In total all nine categories appeared, but how often they appeared varied a lot. The taxonomy therefore captured different mechanisms without giving every company the same profile. The results provide preliminary support for its practical applicability, but they describe the evidence available in company disclosures and do not directly measure sustainability performance.

6.6 Cross-sector comparison

The comparison across the ten ICB Supersectors shows that sustainability mechanisms are not distributed equally across sectors. Each Supersector contains three companies, so the results can be compared on the same basis.

Several indicators were used. The total number of positive classifications shows how many company-category combinations were identified in each sector. The average number of categories per company shows how many different mechanisms were found, on average, in one company. The breadth rate shows how much of the maximum possible sector coverage was reached. A high breadth rate means that the sector presents a wide variety of mechanisms, but it does not mean that it is more sustainable. The categories were also grouped into three structural blocks. Resource and product transformation includes C1, C2 and C6. Market access and revenue includes C3, C7 and C9. Organizational and financial integration includes C4, C5 and C8. The block coverage shows how strongly each of these three areas is represented. The balance gap compares the strongest and weakest blocks. A small gap means that the sector has a balanced profile, while a large gap means that its mechanisms are concentrated in only one or two areas. Two additional indicators were used. The within sector consistency rate shows how often all three companies in a sector received the result for a category, whether positive or negative. A high value means that the companies have similar profiles. The relative specialization ratio shows whether a category is more common in a sector than in the complete sample. A value above one indicates that the category is relatively concentrated in that sector. Telecommunications recorded the highest number of positive classifications with 23 and an average

of 7.67 categories per company. It was followed by Energy with 22 classifications and an average of 7.33 and Utilities with 21 and an average of seven. Health Care recorded 20 classifications, Automobiles and Parts 19 Industrial Goods and Services 18 and Consumer Products and Services 16. Banks and Construction and Materials each recorded 15 while Technology had the total with 14 classifications and an average of 4.67 categories, per company. Across the complete sample, the breadth rate was 67.8%. Organizational and financial integration was the most strongly represented block, with coverage of 86.7%. Resource and product transformation reached 76.7%, while market access and revenue reached only 40%. Therefore, companies more frequently changed their operations, products, stakeholder relationships, governance and financing than their customer-access or revenue mechanisms. Telecommunications had the breadth rate, at 85.2 percent and the smallest balance gap at 11.1 percent points. All three blocks were strongly represented. Shared infrastructure supported C3, maintenance and technological upgrading supported C6 and the expansion of connectivity, in areas supported C9. This was the sector where C3 and C9 were found in all three companies. Energy and Utilities also showed fairly balanced profiles. Their breadth rates were 81.5% and 77.8%, while both had a balance gap of 22.2 percentage points. In these sectors, sustainability involved production, infrastructure, financing and customer contracts. In particular, C7 was identified in all three Utilities companies.

Health Care reached a breadth rate of 74.1% and had a balance gap of 33.3 percentage points. The sector combined environmental mechanisms related to production and materials with pricing, financing and patient-access mechanisms. Automobiles and Parts reached a breadth rate of 70.4%. Its resource and product transformation block achieved complete coverage because C1, C2 and C6 were identified in all three companies. However, market access and revenue reached only 22.2%, and C7 was not identified in any company. Consumer Products and Services showed a similar concentration. Its breadth rate was 59.3%. Resource and product transformation reached 100%, while market access and revenue reached only 11.1%. The sector therefore focused mainly on repair, durability and material recovery. Industrial Goods and Services reached a breadth rate of 66.7%. Organizational and financial integration achieved complete coverage, while market access and revenue reached only 22.2%. Construction and Materials had a breadth rate of 55.6% and recorded no C3, C7 or C9 classifications. Its sustainability mechanisms were mainly connected with materials, production processes, governance and financing. Banks also had a breadth rate of 55.6%, but their profile was very different. Resource and product transformation was absent, market access and revenue reached 66.7%, and organizational and financial integration reached 100%. All three banks were assigned to C4, C5, C7, C8 and C9. This does not mean that banks have no environmental influence. It means that the environmental impact of financed companies was not treated as a direct operational

mechanism of the bank. Technology had the lowest breadth rate at 51.9%. All three companies were assigned to C1, C4, C5 and C6 while C3, C7 and C8 were missing. The result therefore shows a range of documented mechanisms, not a lower level of sustainability. The within-sector consistency rate was highest for Banks, at 100%, because all three banks received exactly the same classification. Consumer Products and Services followed at 88.9%. Technology and Construction and Materials reached 77.8%; Industrial Goods and Services, Automobiles and Parts, and Telecommunications reached 66.7%; Utilities reached 55.6%. Energy and Health Care had the lowest consistency, at 44.4%, showing greater differences among companies in the same sector. The relative specialization results also revealed clear patterns. C3 was three times more frequent in Telecommunications than in the complete sample and twice as frequent in Energy. C7 was 2.5 times more frequent in Banks and Utilities and 1.67 times more frequent in Health Care. C6 was 1.67 times more frequent in Technology, Automobiles and Parts, and Consumer Products and Services. C8 had the same relative concentration in Industrial Goods and Services, while C2 was the most distinctive category in Construction and Materials.

The comparison between Banks and Construction and Materials shows why these indicators are useful. Both sectors averaged five categories per company, but their profiles were almost opposite. Banks were concentrated in pricing, financing and inclusion, while Construction and Materials was concentrated in resource efficiency, circularity, governance and sustainable finance. The indicators used in this section helped test different aspects of the taxonomy. The total classifications, average number of categories and breadth rate showed that the taxonomy could be applied across all ten sectors and could identify several mechanisms within the same company. Block coverage and the balance gap showed where sustainability was focused and whether a sector had an specialized profile. Within-sector consistency showed whether companies in the sector received similar classifications. Relative specialization showed the categories that were especially common in sectors. The clear and understandable differences, between sectors suggest that the classifications were not random. They show that the taxonomy can distinguish between different ways of integrating sustainability into a business model, even when sectors have the same average number of categories. At the same time the general presence of C4 and C5 revealed a limitation because these categories provided little sector level differentiation. Overall the results support the usefulness of the taxonomy as a diagnostic and comparative tool, but not as a ranking of sustainability performance.

6.7 Cross-sector analysis by primary sustainability orientation

Section 6.6 grouped the categories according to the part of the business model that they change. This section provides a different and simpler view by grouping them according to their primary sustainability orientation.

The environmental and resource orientation includes C1 Resource efficiency, C2 Circularity and C6 Sufficiency. These mechanisms reduce energy or material use, recover resources, extend product life or delay replacement. The social and stakeholder orientation includes C4 Stakeholder orientation, C5 Purpose orientation and C9 Inclusion. These categories concern stakeholder involvement, sustainability governance and the removal of barriers affecting underserved groups. The economic and market orientation includes C3 Access and service, C7 Revenue configuration and C8 Financing configuration. These mechanisms change how customers access an offer, how the company earns revenue or how sustainability influences financing.

This grouping shows the orientation of each category not every possible effect. For example C8 was assigned to the market orientation because it changes financing conditions even when the target is environmental or social. Likewise C9 was assigned to the stakeholder orientation because its main feature is the removal of a barrier for a specific group even when prices or revenues also change. Some indicators were used. Company presence shows how many companies have least one mechanism belonging to an orientation. Positive classifications show the number of mechanisms identified within that orientation. The average number of mechanisms per company shows how many of the three categories were found, on average in each company. Mechanism density shows how fully the three categories are represented across the sample.

At sector level orientation coverage shows how strongly each orientation is represented among the three companies. The dominant orientation is the one with the highest coverage. The balance gap compares the strongest and the weakest orientations. A small gap indicates a balanced profile while a large gap indicates that the sector is strongly concentrated in one orientation. The social and stakeholder orientation was the most diffused. It was present in all 30 companies and prooduced 74 positive classifications. Each company presented an average of 2.47 social and stakeholder mechanisms, and the overall mechanism density was 82.2%. This result was mainly influenced by C4 and C5, which were identified in every company. The environmental and resource orientation was present in 27 companies, or 90% of the sample. It produced 69 positive classifications, with an average of 2.30 mechanisms per company and a density of 76.7%. Resource efficiency, circularity and sufficiency were therefore important parts of most company profiles. The economic and market orientation was present in 22 companies, or 73.3% of the sample. However, it produced only 40

classifications, with an average of 1.33 mechanisms per company and a density of 44.4%. This means that economic and market mechanisms appeared in many companies, but most companies used only one of the three possible mechanisms rather than combining changes in access, revenue and financing. Across the complete sample, the dominant orientation was therefore social and stakeholder. The difference between the strongest and weakest orientations was 37.8 p.p. Utilities presented the most balanced sector profile. All three orientations reached 77.8%, producing a balance gap of zero. Energy was also relatively balanced: environmental and resource mechanisms and social and stakeholder mechanisms both reached 88.9%, while economic and market mechanisms reached 66.7%. Its balance gap was 22.2 percentage points. Telecommunications reached 100% in the social and stakeholder orientation, 88.9% in environmental and resource, and 66.7% in economic and market. The balance gap was tehrefore 33.3 p.p. This profile reflects the combination of shared infrastructure, equipment maintenance, access models, sustainable finance and digital inclusion. Health Care also had a relatively balanced profile. Social and stakeholder mechanisms reached 88.9%, environmental and resource mechanisms 77.8%, and economic and market mechanisms 55.6%. Industrial Goods and Services reached 77.8% in both environmental and resource and social and stakeholder mechanisms, while economic and market mechanisms reached 44.4%. Both sectors had a balance gap of 33.3 percentage points. Automobiles and Parts reached 100% in environmental and resource mechanisms, 77.8% in social and stakeholder mechanisms and 33.3% in economic and market mechanisms. Consumer Products and Services also reached 100% in environmental and resource mechanisms, but only 66.7% in social and stakeholder mechanisms and 11.1% in economic and market mechanisms. Their balance gaps were 66.7 and 88.9 percentage points, respectively. Sustainability in these sectors was therefore mainly connected with products, materials, repair and longer product life. Construction and Materials showed a similar pattern. Environmental and resource mechanisms reached 77.8%, social and stakeholder mechanisms 66.7%, and economic and market mechanisms 22.2%. Its balance gap was 55.6 percentage points, showing that sustainability was mainly incorporated into materials, production processes and resource use. Banks presented the opposite profile. Environmental and resource coverage was zero, while social and stakeholder coverage reached 100% and economic and market coverage reached 66.7%. The balance gap was therefore 100 percentage points. Banks were classified according to the mechanisms they directly control, such as governance, financing conditions, adapted prices and access for underserved customers. Technology reached 77.8% in both environmental and resource and social and stakeholder mechanisms but recorded no economic and market mechanisms. Its balance gap was 77.8 percentage points. This result does not indicate an absence of economic value. It reflects the strict recognition

rules: a generic technological or digital service was not sufficient for C3, and no clear C7 or C8 mechanism was identified.

The indicators used in this section provided a simpler way to test and interpret the taxonomy. Company presence showed whether an orientation appeared across many companies, while positive classifications, average mechanisms and mechanism density showed how strongly it was represented. Sector coverage, dominant orientation and balance gap showed whether a sector focused mainly on one orientation or combined environmental, social and economic mechanisms more evenly. The results produced clear profiles that were consistent with the main activities of the sectors. Manufacturing sectors were more focused on environmental and resource mechanisms, Banks on social and market mechanisms, while Utilities, Energy and Telecommunications presented more balanced configurations. This supports the ability of the taxonomy to organize the nine categories into meaningful patterns and to make cross-sector differences easier to understand. These indicators do not measure the impact achieved, but they show that the taxonomy can identify where sustainability is concentrated, which mechanisms are combined and which areas are less developed.

6.8 Discussion of the empirical test

The empirical test examined whether the taxonomy could be applied to real companies using publicly available reports. All nine categories were identified at least once in the sample, producing 183 positive classifications across 30 companies. The companies also presented different combinations of categories. The taxonomy could therefore be applied to both manufacturing and service companies without creating separate categories for each sector. This provides preliminary support for its practical usefulness. The sector results were also reasonably consistent with the characteristics of the different businesses. Manufacturing sectors were more strongly associated with resource efficiency, circularity and sufficiency. Banks were mainly associated with governance, inclusion, revenue and financing mechanisms. Utilities, Energy and Telecommunications presented more balanced profiles. These differences suggest that the results were not random and that the taxonomy captured meaningful differences in how sustainability enters a business model. The analysis of the three primary sustainability orientations provided a simpler interpretation of the results. At sample level, the social and stakeholder orientation was the strongest, with a density of 82.2%. It was followed by the environmental and resource orientation at 76.7%, while the economic and market orientation reached 44.4%. Sustainability was therefore more frequently integrated through operations, products, stakeholder relationships and governance than through changes in access, revenue and financing. The dominant orientation also differed across sectors. Social and stakeholder mechanisms were dominant in Banks, Health Care and Telecommunications. Environmental and resource mechanisms were

dominant in Automobiles and Parts, Consumer Products and Services, and Construction and Materials. Energy, Technology, and Industrial Goods and Services showed the same level of environmental and social orientation. Most importantly, the economic and market orientation was not the sole dominant orientation in any sector. This suggests that companies more frequently modify products, resources, governance and stakeholder relationships than the economic structure of their business models. However, a dominant orientation only indicates the highest frequency of mechanisms within a sector. These percentages measure the presence of the categories associated with each orientation. The fixed grouping also represents the primary orientation of each category and may not capture all its possible effects. For example, a financing mechanism classified under the economic and market orientation may support an environmental target. The three orientations should therefore be used as a summary of the identified mechanisms, not as a measurement of impact.

The application also confirmed that keywords alone were not sufficient. Each passage had to be read to understand the mechanism, its sustainability purpose and its connection with the business model. A generic service did not automatically support C3 and a community programme did not automatically support C9. The keyword search helped locate relevant information, but the final classification depended on the meaning of the evidence. The distinction between C2 and C6 required focus. Recovery, recycling and reuse generally support C2 because they bring products or materials back to use. Repair, durability and upgrading generally support C6 when they keep the product or asset in use and delay its replacement. An initiative could support both C2 and C6. Moreover, finding C6 does not prove that the company reduced its production or sales. Finding C6 only shows a mechanism aimed at reducing replacement or unnecessary consumption. Another key issue was the scope of the evidence. A category could apply to the company, a business line or a single product or service. These situations are not the same. The number of identified categories measures the variety of documented mechanisms, not their economic importance or their contribution to impact. A future application could therefore add information such as the share of revenue, investment, assets or customers associated with each mechanism. C4 and C5 were identified in all 30 companies. These categories captured mechanisms related to stakeholder collaboration and sustainability governance but they offered limited differentiation between companies. Their universal presence may reflect both the spread of these practices, among listed companies and the breadth of the recognition rules. Future testing could use thresholds or evaluate the depth of these mechanisms. The results also depend on the selected sample and on the quality of public information. Only three large listed companies were analyzed in each Supersector. The findings cannot therefore be extended automatically to smaller companies or to the full population of each sector. Company reports may also provide detailed information about some activities while giving limited attention to others. A category that was not

identified should consequently be interpreted as a lack of sufficient public evidence, rather than proof that the mechanism does not exist. Finally the coding required some judgment. The use of rules for recognizing and excluding certain items helped with this problem but it did not get rid of it completely. An independent classification done by another researcher would be helpful, for checking if different coders get results. Overall the empirical test shows that the taxonomy can work as a screening and classification tool. It helps identify how sustainability changes the business model, compare company and sector profiles and highlight the areas needing more study. For an impact investor, it can support the first stage of company analysis. However, it cannot replace impact assessment. The taxonomy identifies the mechanism and its expected sustainability orientation; indicators and evidence are still required to determine its scale, additionality and actual results.

7 Conclusions

7.1 Summary of contributions

This thesis addressed the lack of a common structure for comparing sustainable business model classifications. The reviewed studies examine related topics but differ in terminology, level of detail, analytical focus and methodology. Some classify complete business model mechanisms, while others focus on activities, organizational characteristics, enabling factors or sustainability outcomes. Using only one of these approaches may therefore provide an incomplete view of how a company integrates sustainability into its business model. *The first contribution* of the thesis is the structured comparison of these studies. A total of 77 concepts were extracted from the nine papers that provided directly comparable business model elements. Their similarities and differences were organized into 43 comparison points, consisting of nine total overlaps, eighteen partial overlaps and sixteen gaps. This comparison initially produced 23 preliminary items. A second consolidation separated them, resulting in nine final categories: resource efficiency, circularity, access and service, stakeholder orientation, purpose orientation, sufficiency, revenue configuration, financing configuration and inclusion. The taxonomy is multi label because the same company can use different methods at the same time. The second contribution is the application of the taxonomy. The framework was tested on 30 companies listed on Euronext Milan. These companies covered ten ICB Supersectors. Each sector had three companies. The study used company reports that were available publicly. It combined searching for keywords with looking at the evidence found. All nine categories were found at once. This led to 183 classifications. On average each company had 6.1 categories. C4 Stakeholder orientation and C5 Purpose orientation were found in all 30 companies. C1 Resource efficiency was found in 27 companies. C2 Circularity was found in 24 companies. C3 Access and service was the least common category. It was found in ten companies. Most companies, 23 out of 30 had between five and seven categories. This shows that sustainability is usually covered through many mechanism together. The study also showed results between the sectors. Manufacturing sectors were more linked to resource efficiency, circularity and sufficiency. Banks were more linked to governance, financing and revenue. Energy, Utilities and Telecommunications had varied and balanced approaches. In the group, social and stakeholder methods were most common. They made up 82.2%. Environmental and resource methods were next, at 76.7%. Economic and market mechanisms reached 44.4%, suggesting that companies changed their products, operations, stakeholder relationships and governance more frequently than their access, payment and financing structures. Overall, the thesis contributes a common and traceable language for identifying how sustainability modifies a business model. The empirical results provide preliminary support for the practical applicability of the taxonomy across

different sectors. However, the framework classifies documented mechanisms; it does not measure their scale or actual impact.

7.2 Limits and future perspectives

The first limitation concerns the selection of the literature. The twelve studies were chosen through a purposive and expert-guided process rather than a systematic review of the entire sustainable business model literature. The selected papers provide varied and relevant perspectives, but other classifications may contain mechanisms or criteria not included in the final taxonomy. Future research could use a systematic review process, expand the number of studies. The reviewed studies also use different methodologies and evidence bases. Some rely on expert panels, surveys or company cases, while others are mainly conceptual or literature-based. These differences were examined but were not used to weight their contributions. The support count therefore indicates how many papers contribute to a category, not the methodological strength of the evidence. Future research could develop a weighting system based on research design, external validation, sample size and evidence quality. A second limitation concerns the company sample. The empirical analysis covers 30 large listed companies from ten selected ICB Supersectors. It is not statistically representative of all companies within these sectors. Large listed companies also tend to publish more extensive sustainability information than smaller firms. The taxonomy should therefore be tested on larger and more diverse samples, including SMEs, private companies, social enterprises and companies operating in different countries. A third limitation is the dependence on publicly disclosed information. Company reports may describe some activities in detail while giving little attention to others. Therefore a category recorded as "not identified" indicates that sufficient evidence was not found in the reviewed sources; it does not prove that the mechanism is absent. Future studies could combine documentary analysis with interviews, questionnaires, internal company data or direct observations. The classification also required interpretation by a single researcher. Recognition and exclusion rules reduced subjectivity, but they could not remove it completely. Independent coding by additional researchers would make it possible to measure agreement and identify categories that remain difficult to interpret. Finally the number of identified categories shows how many different categories exist, not how important each category is. A mechanism can involve the whole company, a key business line or just a small project but every good classification has currently the same value. C4 and C5 are found in every company so they give limited difference within this sample of categories. Future research could set higher threshold and record the share of revenue, investment, assets, products or customers that each mechanism brings into the company. The taxonomy could also be linked to impact indicators to assess the scale, additionality and duration of the outcomes produced.

7.3 Operational implications for impact investors

The taxonomy can support the first stage of impact-investment analysis by helping investors understand how a company creates sustainability impact. Instead of asking only whether a company is sustainable, investors can look at the specific changes it makes in the business model. The analysis should start with an activity that is properly documented not just with the words the company uses. Mentioning circular economy is not enough for C2 unless there is proof showing how products or materials are recovered and put back into use. Once a category is found the investor should look at how big and important it is. A company wide system is different from a trial project or a small effort in one product line. Important questions are how money, investment or activity relies on the system if it is protected by rules or agreements who pays and who gains and which partners or resources are needed for it to work. The taxonomy can also help choose the evidence and impact measures. Claims about using resources can be checked by looking at energy or material savings. Circularity might need details about how much is recovered and what happens next. Sufficiency can be judged by how long products last, how often they are fixed or how many replacements are avoided. Inclusion needs proof about the group of people it targets, the problem it solves and how people it helps. Financial and money making methods should be checked by seeing if the money conditions or customer payments really connect to social results. At the level of investment portfolio the taxonomy can help compare the different combinations of mechanism across companies, industries or investments. It could show, for example that a share of the portfolio has a lot of exposure towards operational efficnieny and circular but few that focus on inclusion or access. This information can help build the investment portfolio and decide what to focus on. The number of categories should not be used as a score or ranking for companies. The taxonomy must be used with impact and financial analysis. Investors still need to check how big and new the expected impact is, how good the proof is, how well the company is doing financially, how its valued and what risks there are. The framework does not say if a company is a good investment. Its real use is to help start the analysis make comparing companies which can appear similar and find the questions and aspects that need checking.

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