Assessing the Level of Sustainability Planning: Insights from the Automotive Sector

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Abstract

This paper aims to assess the extent to which sustainability goals are being planned within the automotive sector to achieve the Sustainable Development Goals (SDGs). Our research is an exploratory study. The study employed a qualitative methodology with a content analysis approach. We conducted a semi-manual content analysis of 20 leading European automotive companies. Our exploratory research results suggest that companies prioritize environmental aspects in their planning, with a particular focus on SDGs 7, 12, and 13. SDGs 1, 2, 14, and 16 receive limited coverage, possibly because they are not directly connected to the core activities of the automotive sector. However, the results align with findings from earlier studies and the industry's characteristics. This study aims to contribute to the academic literature on strategic planning by examining its extent in the automotive industry and providing insights into the effectiveness of strategic planning tools in achieving sustainability goals. Our study provides a perspective on the current state of sustainability planning within a specific sector, thereby contributing to strategic studies. In practice, it highlights the effectiveness of planning instruments in achieving sustainability objectives and the key themes receiving the most significant attention. Finally, our research is directed at academics, practitioners, and decision-makers.

Keywords: Sustainability plan, SDGs, Automotive sector, Content analysis

1. Introduction

Sustainability and non-financial issues are gaining relevance in Europe (Lombardi, 2021; Mio *et al.*, 2024), prompting companies to divulge their sustainability commitments through both mandatory and voluntary sustainability

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reports (Tarquino *et al.*, 2020). While financial planning has traditionally dominated, companies are increasingly integrating non-financial concerns, aligning their strategies with the Sustainable Development Goals (SDGs) through sustainability plans (Guarini *et al.*, 2021; Guidi *et al.*, 2024). According to PwC (2018), 54% of businesses incorporate SDGs into their corporate strategies, and 72% reference them in their sustainability reports.

Sustainability plans enable organizations to manage their environmental, social, and economic impacts in a sustainable manner (Lombardi, 2022; Mio *et al.*, 2020) and are crucial for operationalizing sustainability objectives in their reports (Di Nauta *et al.*, 2020; Engert *et al.*, 2016; Liao *et al.*, 2020). In the automotive industry, environmental concerns are a primary focus due to the sector's significant environmental footprint, underscoring the pressing need for sustainable innovation (Lukin *et al.*, 2022; Wolff *et al.*, 2020). Despite advancements in green technologies and circular economy models aligned with the SDGs, a significant gap persists between stated sustainability goals and actual practices (Rhoden *et al.*, 2022). This disparity underscores the sector's potential to align Environmental, Social, and Governance (ESG) objectives (Lenort *et al.*, 2023).

Our study aims to assess the extent to which sustainability goals are being planned within the automotive sector to support the achievement of the SDGs. Specifically, we aim to assess the level of sustainability planning information in both qualitative and quantitative aspects, thereby contributing to the achievement of the SDGs. This paper employed an exploratory methodological approach, which is suitable for gaining initial insights and developing future hypotheses, especially with small sample sizes. (Milne and Adler, 1999). We conducted a semi-manual content analysis (Lombardi *et al.*, 2022; Krippendorff, 2018) to develop an indicator of sustainability planning across 20 leading European automotive companies, utilizing data from sustainability plans, reports, and corporate websites.

Our findings suggest that sustainability planning in the automotive sector primarily focuses on environmental goals (SDGs 7, 12, and 13), driven by global challenges and regulatory pressures (Lisowski *et al.*, 2020; Wolff *et al.*, 2020; Lenort *et al.*, 2023). Key efforts include energy efficiency, electrification, and circular economy models. Conversely, limited attention to social SDGs, especially 1 and 2, underscores the need to align sustainability objectives with core business priorities and define measurable, targeted criteria to avoid generic planning (Lukin *et al.*, 2022).

This study aims to fill a research gap. To the best of the authors' knowledge, no focused investigations have addressed sustainability planning and SDG achievement in the automotive sector. Existing studies mainly examine

implementation gaps (Lenort *et al.*, 2023; Wolff *et al.*, 2020). Although the sector has long faced environmental scrutiny and has been a hub of innovation (Domański *et al.*, 2009; Vaz *et al.*, 2017), few studies provide analytical frameworks to assess the structure of sustainability initiatives, particularly in relation to SDG implementation. Even with the adoption of advanced practices such as electrification and life-cycle analysis (Mayyas *et al.*, 2012; Masoumi *et al.*, 2019), the literature rarely evaluates their planning, operationalization, and comparability through standardized goals, such as the SDGs.

This study provides an investigation into sustainability planning in the automotive sector, contributing to the examination of sustainability goals and offering insights into strategic management and planning literature within the European landscape (Hristov *et al.*, 2022; Lombardi, 2022; Mintzberg, 1993). Additionally, this research contributes to the scholarly literature on SDG disclosure by highlighting the role that planning plays in achieving sustainable objectives (Bebbington and Unerman, 2018; Izzo *et al.*, 2020). Furthermore, it underlines the effectiveness of planning instruments in achieving sustainability objectives and emphasizes the potential of the sustainability planning tool in achieving desired results (Liao *et al.*, 2020; Van Zanten and Van Tulder, 2021). Finally, our research is directed at academics, decision-makers, and practitioners.

This paper is organized as follows. Following the introduction, Section 2 reviews the literature on sustainability planning and the role of SDG disclosure in the automotive sector. Section 3 shows the methodology employed in this study and provides a sample description. Section 4 presents and discusses the results of our analysis. Finally, Section 5 concludes our paper by highlighting the theoretical and practical implications, limitations, and suggesting future research directions.

2. Literature review

Historically, sustainability reporting has relied on voluntary disclosures. Companies share socio-environmental information without legal requirements to enhance their image and reputation while building trust with stakeholders who are increasingly demanding transparency on non-financial issues (Lombardi, 2021; Mio *et al.*, 2024). The content of these reports was often difficult to compare, limiting meaningful evaluations of sustainability performance. The European Union (EU) initially implemented a voluntary framework; however, in recent years, it has transitioned to adopting more stringent regulatory interventions. As a result, the EU introduced the 2014/95/EU Non-Financial Reporting Directive (NFRD), which was updated with the 2022/2464/EU Corporate Sustainability

Reporting Directive (CSRD). NFRD requires large Public Interest Entities to provide annual non-financial reporting. The required data includes environmental protection, corporate social responsibility, employee welfare, human rights observance, and anti-corruption efforts, providing stakeholders with a perspective on a company's ESG performance (Galeotti *et al.*, 2023).

In Italy, the adoption of NFRD through Legislative Decree No. 254/2016 has improved both the quantity and quality of sustainability information disclosed by Italian companies, aligning with broader European trends toward enhanced corporate governance (Lombardi *et al.*, 2021; Mion and Adaui, 2019; Tarquinio *et al.*, 2020). However, recent evidence suggests that, despite improvements, climate-related disclosure by large Italian companies still reveals significant gaps and incomplete adherence to EU guidelines (Lombardi *et al.*, 2022). This legislation does not specify requirements for sustainability strategies. On the other hand, Legislative Decree 125/2024, which implements the CSRD in Italy, requires a description of the strategies adopted for sustainability issues and their implementation. Sustainability plans are necessary for implementing valuable sustainability strategies (Hristov *et al.*, 2022). They enable organizations to move beyond mere compliance and truly commit to achieving long-term sustainability goals (Palmer and Flanagan, 2016).

Plans, goals, and initiatives are defined to guide an organization in managing its environmental, social, and economic impacts (Lombardi, 2022). While companies are not obligated to develop sustainability plans, many view them as crucial for implementing the objectives outlined in their sustainability reports (Di Nauta *et al.*, 2020; Engert *et al.*, 2016). This allows organizations that choose these plans to be more flexible in adjusting their strategies based on current conditions while pursuing global objectives, such as the United Nations' SDGs (Bebbington and Unerman, 2018; Mio et al., 2020).

Unlike ESG, which serves as a framework for the internal assessment of corporate performance, the SDGs provide a comprehensive and measurable framework that companies can use to contribute to broader global goals. Research indicates that specific and quantifiable objectives related to the SDGs enable companies to achieve more significant and sustainable results (Erin *et al.*, 2022; Guarini *et al.*, 2021; Van Zanten and Van Tulder, 2021). Therefore, sustainability plans serve as a connection between obligatory sustainability reports and the organization's overarching strategic objectives. They ensure that environmental initiatives go beyond mere symbolism by fostering the connection between financial and non-financial elements (Brinkmann, 2019).

Sustainability reports and plans improve coherence, transparency, and accountability, acting as strategic tools for engaging stakeholders and strengthening market positions (Aureli *et al.*, 2020; Eccles *et al.*, 2010; Rosati and

Faria, 2019). Transparent and standardized reporting aligns corporate practices with societal expectations, thereby preserving legitimacy and reputation. This fosters comparability across sectors and encourages broader organizational engagement to enhance sustainability practices (Adams and Abhayawansa, 2022; Ascani *et al.*, 2021; Barroso-Méndez *et al.*, 2024; Lozano and Huisingh, 2011). Ultimately, transparency boosts corporate reputation and supports effective strategic planning (Busco *et al.*, 2018).

Companies with high ESG ratings tend to exhibit improved financial performance and reduced risk profiles (Buallay, 2019). This alignment is crucial in the automotive sector, where regulatory pressures and stakeholder expectations require transparent and measurable sustainability outcomes (Wolff *et al.*, 2020). While sector-specific, these findings reinforce the broader value of ESG integration in enhancing business performance (Buallay, 2019). Incorporating ESG factors into strategic planning and reporting supports a comprehensive sustainability approach, meeting the needs of stakeholders and regulatory requirements (Lokuwaduge and Heenetigala, 2017).

Beyond financial results, sustainability documents impact the achievement of sustainability goals, with effective planning facilitating the integration of these initiatives into management systems (Lozano *et al.*, 2016). SDG reporting can promote sustainable practices that exceed regulatory compliance (Izzo *et al.*, 2020). Several studies emphasize the integration of socio-environmental indicators into corporate strategies and the positive effects of sustainability reporting on governance and performance (Massa *et al.*, 2015; Riccaboni and Leone, 2010).

Sustainability plans can significantly impact short-term progress (Liao *et al.*, 2020), and the type of sector affects the quality of SDG disclosures (Pizzi *et al.*, 2021). Structured and measurable planning is crucial for aligning sustainability with business operations and monitoring practices (Adams and Abhayawansa, 2022; Busco *et al.*, 2018). In the automotive sector, sustainability is relevant due to its substantial contribution to global GDP and significant greenhouse gas emissions, with road transport accounting for approximately 18% of global direct CO2 emissions (Lisowski *et al.*, 2020).

Recent research has highlighted regional differences in the sector's sensitivity to the SDGs, which are shaped by geographic, economic, and cultural factors (Lenort *et al.*, 2023). In Europe, stringent emissions regulations emphasize SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action), driving practices such as CO2 reduction, energy efficiency, and circular economy models in production and supply chains (Domański *et al.*, 2009; Lenort *et al.*, 2023). Firms focusing on SDG 8, 12, and 13 show greater sustainability awareness (Rizzato *et al.*, 2024). Additionally, SDG 8 is gaining traction in

developing regions, where companies are investing in workforce development and promoting safer working conditions to align economic growth with sustainability (Lenort *et al.*, 2023).

An accurate focus on the relevant and automotive-specific SDGs enables companies to prioritize efforts on measurable objectives (Lisowski *et al.*, 2020). Innovative approaches in this sector include green technologies, such as electrification and advanced materials, alongside frameworks for assessing life-cycle impacts (Mayyas *et al.*, 2012; Masoumi *et al.*, 2019; Vaz *et al.*, 2017; Wolff *et al.*, 2020). The automotive industry is undergoing a significant transformation as leading companies increasingly adapt their business models to align with the principles of the circular economy and the SDGs (Wolff *et al.*, 2020). This shift transcends mere compliance-oriented strategies, evolving into proactive, business-driven approaches that integrate sustainability efforts into competitive strategies.

Such integration fosters innovation while also enhancing business confidence and securing market advantages (Lukin *et al.*, 2022). Despite these advancements, a gap remains between the sustainability strategies communicated by automotive firms and their actual operational practices (Rhoden *et al.*, 2022). The automotive sector can serve as a testing ground to understand how sustainability strategies can be effectively planned and implemented, balancing environmental, social, and economic objectives. Based on these assumptions, we developed the following research question (RQ):

RQ: What is the extent of publicly disclosed sustainability plans by the leading European automotive manufacturers?

3. Research method

The methodological approach used in this paper was exploratory (Milne and Adler, 1999). The primary goal of this approach was to investigate an under-researched topic to gather initial insights. Furthermore, this approach enabled us to identify additional research directions and develop future hypotheses. According to Swedberg (2020), this methodology was helpful for small sample sizes.

We conducted qualitative research (Hair *et al.*, 2003). According to Hair *et al.* (2003, p. 276), "*A qualitative research approach is the most appropriate and indeed the only way to achieve some research objectives. Situations in which qualitative research is likely to be the preferred method include 1) which little known about a research problem or opportunity*…". We performed a semi-manual content analysis (Krippendorff, 2018; Lombardi *et al.*, 2022).

The analysis relied on data extracted from the ORBIS database (Bureau van Dijk) as of December 6, 2024, focusing on the twenty leading companies by

revenue in the European automotive sector. The analysis focused exclusively on companies that produce cars and trucks, excluding those that specialize in supplying components. This choice was driven by the understanding that direct control over production and environmental practices is more effective when focusing on primary manufacturers, as suppliers are often influenced by external factors (Brent and Visser, 2005). Furthermore, manufacturing companies play a central role in driving sustainability initiatives, while suppliers tend to show more limited involvement in such processes (Jiang et al., 2018). Finally, our sample is reported in Table 1.

Table 1 – Description of Sample

Company	Country	Total Production 2023 (billion EUR)	Company	Country	Total Production 2023 (billion EUR)
Company 1	DE	~ 332	Company 11	SE	~ 18
Company 2	NL	~ 190	Company 12	NL	~ 16
Company 3	DE	~ 156	Company 13	ES	~ 15
Company 4	DE	~ 155	Company 14	NL	~ 9
Company 5	DE	~ 70	Company 15	CZ	~ 8
Company 6	FR	~ 54	Company 16	SK	~ 8
Company 7	SE	~ 50	Company 17	DE	~ 8
Company 8	DE	~ 47	Company 18	NL	~ 6
Company 9	GB	~ 30	Company 19	FR	~ 5
Company 10	DE	~ 19	Company 20	PL	~ 3

Source: Authors' elaboration

Data were collected from secondary sources, including sustainability plans, when available, or sustainability reports and company website information on their sustainability strategies, when plans were unavailable. We analyzed the sections related to sustainability strategy and planning, typically covering a three-year period. In cases where no plan was available, the reference year for analysis was 2023, reflecting the most recently disclosed strategies and achieved results.

To make the process of organizing and analyzing the textual material more methodical, a thorough coding system was designed. Specifically, we analyzed the (A) incidence, (B) frequency, and (C) typology of SDG planning information (Lombardi *et al.*, 2022). This classification was structured into three distinct groups, for a total of 51 indicators (see Table 2), each assigned an alphanumerical code:

A. Incidence Indicators: These assess whether relevant information is present or missing in the documents;
B. Frequency Indicators: These gauge how often specific words or phrases appear in the documents;
C. Typology Indicators: These include both qualitative and quantitative dimensions of how sustainability planning information was presented.

Table 2 – Indicator system

Indicators based on the presence-absence of SDG planning (A)		Indicators based on the frequency of SDG planning information (B)		Indicators based on other qualitative-quantitative SDG planning information (C)	
Code	**Indicator**	**Code**	**Word or group of words**	**Code**	**Indicator**
A_1	SDG 1 - NO POVERTY	B_1	SDG 1 - NO POVERTY	C_1	A_1 and B_1
A_2	SDG 2 - ZERO HUNGER	B_2	SDG 2 - ZERO HUNGER	C_2	A_2 and B_2
A_3	SDG 3 - GOOD HEALTH AND WELL-BEING	B_3	SDG 3 - GOOD HEALTH AND WELL-BEING	C_3	A_3 and B_3
A_4	SDG 4 - QUALITY EDUCATION	B_4	SDG 4 - QUALITY EDUCATION	C_4	A_4 and B_4
A_5	SDG 5 - GENDER EQUALITY	B_5	SDG 5 - GENDER EQUALITY	C_5	A_5 and B_5
A_6	SDG 6 - CLEAN WATER AND SANITATION	B_6	SDG 6 - CLEAN WATER AND SANITATION	C_6	A_6 and B_6
A_7	SDG 7 - AFFORDABLE AND CLEAN ENERGY	B_7	SDG 7 - AFFORDABLE AND CLEAN ENERGY	C_7	A_7 and B_7
A_8	SDG 8 DECENT WORK AND ECONOMIC GROWTH	B_8	SDG 8 DECENT WORK AND ECONOMIC GROWTH	C_8	A_8 and B_8
A_9	SDG 9 - INDUSTRY, INNOVATION AND INFRASTRUCTURE	B_9	SDG 9 - INDUSTRY, INNOVATION AND INFRASTRUCTURE	C_9	A_9 and B_9
A_10	SDG 10 - REDUCED INEQUALITIES	B_10	SDG 10 - REDUCED INEQUALITIES	C_10	A_10 and B_10
A_11	SDG 11 - SUSTAINABLE CITIES AND COMMUNITIES	B_11	SDG 11 - SUSTAINABLE CITIES AND COMMUNITIES	C_11	A_11 and B_11
A_12	SDG 12 - RESPONSIBLE CONSUMPTION AND PRODUCTION	B_12	SDG 12 - RESPONSIBLE CONSUMPTION AND PRODUCTION	C_12	A_12 and B_12
A_13	SDG 13 - CLIMATE ACTION	B_13	SDG 13 - CLIMATE ACTION	C_13	A_13 and B_13
A_14	SDG 14 - LIFE BELOW WATER	B_14	SDG 14 - LIFE BELOW WATER	C_14	A_14 and B_14
A_15	SDG 15 - LIFE ON LAND	B_15	SDG 15 - LIFE ON LAND	C_15	A_15 and B_15
A_16	SDG 16 - PEACE, JUSTICE AND STRONG INSTITUTIONS	B_16	SDG 16 - PEACE, JUSTICE AND STRONG INSTITUTIONS	C_16	A_16 and B_16
A_17	SDG 17 - PARTNERSHIPS FOR THE GOALS	B_17	SDG 17 - PARTNERSHIPS FOR THE GOALS	C_17	A_17 and B_17

Source: Authors' elaboration

Successively, for the first group (A) and the third group (C) of indicators, we developed a scoring system ranging from 0 to 3 to facilitate data collection (see Table 3). For incidence indicators (A), a score of 0 was assigned if the SDG was not mentioned in the sustainability plan. Conversely, a score of 3 was awarded if the SDG was explicitly mentioned as a goal, accompanied by multiple actions to achieve the goal over time, with detailed descriptions and monitoring of results. Intermediate scores of 1 or 2 were assigned based on whether the SDG was implicitly mentioned or explicitly referenced, with at least one proposed action detailed.

For the frequency indicators (B), the assigned value corresponds to the number of occurrences of the keyword or group of keywords in the document. For the third set of indicators categorized under typology (C), a score of zero was assigned in instances where the SDG was deemed absent. A score of 1 was awarded if the information was disclosed descriptively without further elaboration. A score of 2 was given if the goals were clearly outlined and supported by tables, while a score of 3 was reserved for disclosures that include graphs and figures.

Table 3 – Scoring system

Score	**Explanation**	
	A	**C**
0	SDG not mentioned	SDG not present
1	SDG is implicitly referenced but not elaborated upon	SDG is elaborated with qualitative information (description)
2	SDG is explicitly identified as a goal/objective in the Sustainability Plan, with at least one associated action provided	SDG is elaborated on in the Table
3	SDG is explicitly identified as a goal/objective in the Sustainability Plan, with more associated actions and detailed descriptions provided	SDG is elaborated with graphs and figures

Source: Authors' elaboration

The semi-manual content analysis approach was implemented to systematically examine sustainability planning disclosures, combining manual qualitative assessment with software-assisted quantitative text analysis. This dual-approach design enabled a comprehensive evaluation of both the substantive content and frequency of sustainability commitments. The manual analysis was performed on incidence and typology indicators. For quantitative frequency analysis (Indicator B), we employed Voyant Tools to conduct automated text mining of predetermined sustainability terminology. The software's computational text analysis capabilities provided objective,

replicable metrics to complement the qualitative findings.

Two researchers performed the data analysis. The manual coding process was conducted independently to evaluate the presence and categorization of sustainability objectives (Indicators A and C). A five-document subsample was used to align coding and refine protocols. We adopted a consensus-based validation procedure throughout the coding process, with all coding decisions requiring mutual agreement. This approach reflects an established qualitative methodology that emphasizes in-depth, collaborative verification for small-sample analyses (O'Connor and Joffe, 2020). To ensure coding rigour, 15% of the total sample underwent independent duplicate coding followed by systematic reconciliation of any interpretive differences (Lombard *et al.*, 2002; Neuendorf, 2017).

Results were deemed reliable through the merging of independent analyses and cross-validation, which enhanced consistency and depth of understanding in sustainability planning indicators. The research framework emphasized a contextually relevant interpretation, backed by systematic verification processes, that suited the study's exploratory approach and sample characteristics. Then, methodological transparency was ensured through the thorough implementation of the steps mentioned earlier.

Finally, all indicators were normalized to a scale of 0 to 1 for consistency and comparability. The content analysis enables us to create a comprehensive indicator for measuring the level of sustainability planning in relation to the SDGs. This indicator was named Sustainability Planning Total (SPT) and is composed of the sum of the 51 indicators that measure the sustainability planning information of the 17 SDGs, following the value systems as reported below:

$$SPT = \sum_{x=1}^{51} x_i$$

(1) SPT = the indicator of sustainability planning;

(2) x = the value of each indicator.

To enhance the interpretation of our findings, we categorized the total scores of the SPT indicator into three distinct levels following best practices in the literature (Lombardi *et al.*, 2022):

(1) high value of planning (indicators disclosed >34);
(2) medium value of planning (indicators disclosed >17 and <34);
(3) low value of planning (indicators disclosed <17).

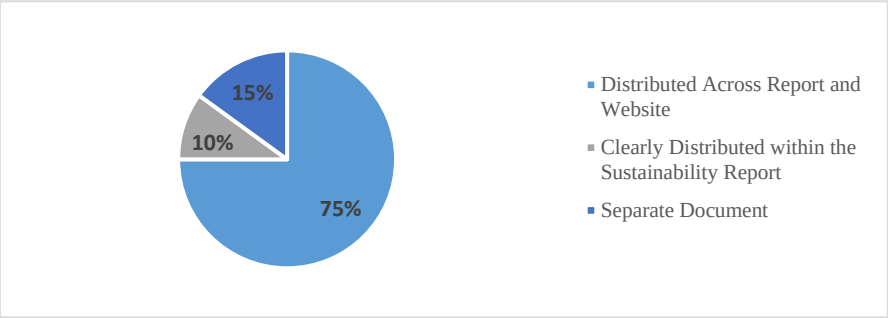
This categorization enables a more explicit assessment of each company's position regarding the extent of its sustainability planning.

4. Results and Discussion

This section presents and discusses the findings of our analysis. Figure 1 shows that 75% of companies disclose their sustainability planning strategy through reports and websites, 15% provide it in dedicated sustainability plans, and 10% include it in specific sections of their reports. This indicates that the sustainability plan regarding stakeholder disclosure remains a practice not widely embraced by companies in the automotive sector.

This does not imply that companies that do not engage in public disclosure lack internal plans; instead, in the context of external disclosure, it remains a relatively uncommon practice. This confirms previous findings that, despite the introduction of regulations such as the NFRD, climate-related disclosure remains incomplete and often lacks strategic detail (Lombardi *et al.*, 2022). In the coming years, with the enactment of the CSRD, companies will be required to disclose details of their corporate social responsibility strategies. This may lead to the voluntary disclosure of sustainability initiatives, even in the absence of explicit mandates or direct requirements.

Figure 1 - Distribution of Sustainability Plan Types



Source: Authors' elaboration

Table 4 presents the results for the incidence indicators (A). SDG 7 (Affordable and Clean Energy) scores the highest at 16.36 (81,80%), followed by SDG 13 (Climate Action) at 15,60 (78%) and SDG 12 (Responsible Consumption and Production) at 13,40 (67%). This confirms the sector's strategic focus on renewable energy, emissions reduction, and environmental sustainability. These findings align with previous studies that highlight the automotive industry's prioritization of environmental SDGs due to EU regulations (Lenort *et al.*, 2023; Lisowski *et al.*, 2020). For instance, the prominence of SDG13 can be directly related to the EU's "*Fit for 55"* package, which aims at a 55% emissions reduction by 2030. However, measurable targets

are often absent, reflecting ongoing gaps between regulatory pressures and actual disclosure (Lombardi *et al.*, 2022). Indeed, only 6 of 20 companies linked SDG 13 to specific timelines, showing that compliance-driven disclosures may lack actionable strategies.

SDG 1 (4,95%) and SDG 2 (1,65%) reflect a limited strategic emphasis. Similarly, SDG 16 (14,85%) and SDG 14 (8,35%) received comparatively lower attention. These results align with the perception that such social and environmental goals are less integral to automotive companies' core activities (Lukin *et al.*, 2022; Rhoden *et al.*, 2022; Vaz *et al.*, 2017), suggesting a stronger planning focus on energy and environmental issues than on social justice, poverty, or hunger.

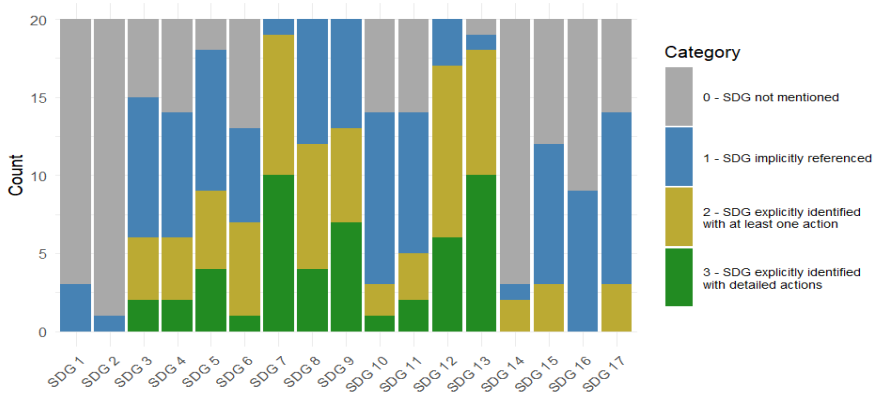
Table 4 - Indicators based on presence-absence (A)

Code	Indicator	Score	Percentage
A_1	SDG 1 - NO POVERTY	0,99	4,95%
A_2	SDG 2 - ZERO HUNGER	0,33	1,65%
A_3	SDG 3 - GOOD HEALTH AND WELL-BEING	7,65	38,25%
A_4	SDG 4 - QUALITY EDUCATION	7,32	36,60%
A_5	SDG 5 - GENDER EQUALITY	10,32	51,60%
A_6	SDG 6 - CLEAN WATER AND SANITATION	7	35,00%
A_7	SDG 7 - AFFORDABLE AND CLEAN ENERGY	16,36	81,80%
A_8	SDG 8 DECENT WORK AND ECONOMIC GROWTH	12	60,00%
A_9	SDG 9 - INDUSTRY, INNOVATION, AND INFRASTRUCTURE	13,33	66,65%
A_10	SDG 10 - REDUCED INEQUALITIES	5,97	29,85%
A_11	SDG 11 - SUSTAINABLE CITIES AND COMMUNITIES	6,98	34,90%
A_12	SDG 12 - RESPONSIBLE CONSUMPTION AND PRODUCTION	14,36	71,80%
A_13	SDG 13 - CLIMATE ACTION	15,69	78,45%
A_14	SDG 14 - LIFE BELOW WATER	1,67	8,35%
A_15	SDG 15 - LIFE ON LAND	4,98	24,90%
A_16	SDG 16 - PEACE, JUSTICE, AND STRONG INSTITUTIONS	2,97	14,85%
A_17	SDG 17 - PARTNERSHIPS FOR THE GOALS	5,64	28,20%

Source: Authors' elaboration

Figure 2 displays the number of incidence indicators (A) linked to various SDGs, categorized into four levels of involvement: SDG not mentioned (category 0, in grey), SDG mentioned implicitly (category 1, in blue), SDG identified explicitly with at least one action (category 2, in yellow), and SDG identified explicitly with detailed actions (category 3, in green). SDGs 7, 12, and 13 dominate category 3, confirming a strategic focus on environmental goals. On the other hand, social SDGs, including SDG 1, SDG 2, and SDG 14, are primarily classified as 0, reflecting their low priority in corporate policies, which is consistent with the findings in Table 4.

Figure 2 - Stacked Bar Chart of (A) SDG Indicators



Source: Authors' elaboration

Table 5 analyzes the frequency of keywords related to the SDGs, confirming that SDG 7 (9,59; 47,95%) is the most emphasized, consistent with the sector's focus on decarbonization through energy efficiency, alternative fuels, and electrification (Lisowski *et al.*, 2020; Masoumi *et al.*, 2019). SDG 12 (6,83; 34,15 %) emphasizes the focus on the circular economy and resource management, while SDG 13 (6,24; 31,20 %) highlights efforts to reduce emissions and promote sustainable supply chains (Lenort *et al.*, 2023; Vaz *et al.*, 2017). Such efforts are expected to gain further relevance under regulatory pressure (Rhoden *et al.*, 2022; Wolff *et al.*, 2020).

Table 5 - Indicators based on frequency (B)

Code	Indicator	Score	Percentage
B_1	SDG 1 - NO POVERTY	1,8	9,00%
B_2	SDG 2 - ZERO HUNGER	1	5,00%
B_3	SDG 3 - GOOD HEALTH AND WELL-BEING	1,8	9,00%
B_4	SDG 4 - QUALITY EDUCATION	2,35	11,75%
B_5	SDG 5 - GENDER EQUALITY	2,69	13,45%
B_6	SDG 6 - CLEAN WATER AND SANITATION	4,03	20,15%
B_7	SDG 7 - AFFORDABLE AND CLEAN ENERGY	9,59	47,95%
B_8	SDG 8 DECENT WORK AND ECONOMIC GROWTH	3,37	16,85%
B_9	SDG 9 - INDUSTRY, INNOVATION, AND INFRASTRUCTURE	3,83	19,15%
B_10	SDG 10 - REDUCED INEQUALITIES	4,17	20,85%
B_11	SDG 11 - SUSTAINABLE CITIES AND COMMUNITIES	4,36	21,80%
B_12	SDG 12 - RESPONSIBLE CONSUMPTION AND PRODUCTION	6,83	34,15%
B_13	SDG 13 - CLIMATE ACTION	6,24	31,20%
B_14	SDG 14 - LIFE BELOW WATER	2,07	10,35%
B_15	SDG 15 - LIFE ON LAND	3,86	19,30%
B_16	SDG 16 - PEACE, JUSTICE, AND STRONG INSTITUTIONS	2,07	10,35%
B_17	SDG 17 - PARTNERSHIPS FOR THE GOALS	2,47	12,35%

Source: Authors' elaboration

SDG 9 (3,83; 19,15 %) demonstrates considerable interest in innovation and infrastructure, although with less emphasis than other environmental goals, partly due to the complexity of implementation. This focus is primarily driven by the growth of electric vehicles, smart manufacturing, and the expansion of charging stations. On the other hand, SDGs less related to core automotive activities, such as SDG 1 (1,8; 9,00%), SDG 2 (1,0; 5,00%), SDG 14, and SDG 16 (both 2,07; 10,35%), receive limited attention. Although relevant, these considerations are not prioritized in industrial practices, where other environmental, social, or economic goals often prevail (Gulluscio *et al.*, 2020; Lenort *et al.*, 2023; Lukin *et al.*, 2022; Mayyas *et al.*, 2012).

The frequency analysis reveals that the automotive sector is highly focused on environmental sustainability, particularly in relation to the SDGs related to energy, climate action, and responsible consumption (Lisowski *et al.*, 2020; Wolff *et al.*, 2020). Social issues, such as poverty reduction and peacebuilding, receive less focus. This trend reflects the industry's emphasis on technological innovation, planetary sustainability, and regulatory compliance, resulting in a greater connection with ecological and economic SDGs than with social ones.

Table 6 shows that most indicators are represented in descriptive form, with high percentages (e.g. above 60% for C_4, C_5, and C_8).

Table 6 - Indicators based on typology (C)

Code	Indicator	Not Present	Descriptive	Table	Figure/ graphs
C_1	A_1 and B_1	17 (85,00%)	3 (15,00%)	0 (0,00%)	0 (0,00%)
C_2	A_2 and B_2	19 (95,00%)	1 (5,00%)	0 (0,00%)	0 (0,00%)
C_3	A_3 and B_3	5 (25,00%)	10 (50,00%)	5 (25,00%)	0 (0,00%)
C_4	A_4 and B_4	6 (30,00%)	12 (60,00%)	2 (10,00%)	0 (0,00%)
C_5	A_5 and B_5	2 (10,00%)	14 (70,00%)	3 (15,00%)	1 (5,00%)
C_6	A_6 and B_6	8 (40,00%)	8 (40,00%)	4 (20,00%)	0 (0,00%)
C_7	A_7 and B_7	0 (0,00%)	9 (45,00%)	4 (20,00%)	7 (35,00%)
C_8	A_8 and B_8	0 (0,00%)	18 (90,00%)	2 (10,00%)	0 (0,00%)
C_9	A_9 and B_9	0 (0,00%)	12 (60,00%)	4 (20,00%)	4 (20,00%)
C_10	A_10 and B_10	6 (30,00%)	12 (60,00%)	2 (10,00%)	0 (0,00%)
C_11	A_11 and B_11	6 (30,00%)	11 (55,00%)	2 (10,00%)	1 (5,00%)
C_12	A_12 and B_12	0 (0,00%)	10 (50,00%)	10 (50,00%)	0 (0,00%)
C_13	A_13 and B_13	1 (5,00%)	6 (30,00%)	8 (40,00%)	5 (25,00%)
C_14	A_14 and B_14	17 (85,00%)	3 (15,00%)	0 (0,00%)	0 (0,00%)
C_15	A_15 and B_15	8 (40,00%)	12 (60,00%)	0 (0,00%)	0 (0,00%)
C_16	A_16 and B_16	12 (60,00%)	8 (40,00%)	0 (0,00%)	0 (0,00%)
C_17	A_17 and B_17	6 (30,00%)	14 (70,00%)	0 (0,00%)	0 (0,00%)

Source: Authors' elaboration

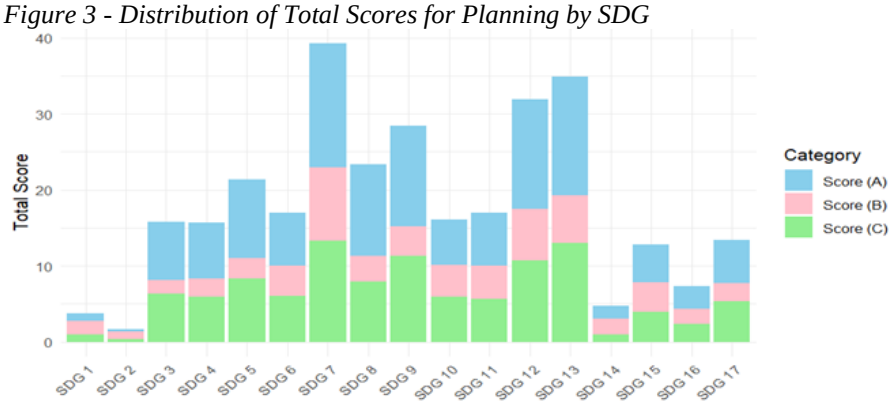
This result highlights that many companies in the sector lack structured and comprehensive plans, opting for general descriptions rather than detailed

representations in tables or charts. This approach aligns with a still early or inadequately formalized stage of corporate sustainability strategies.

Figure 3 illustrates the distribution of total scores for SDG planning, categorized as A, B, and C, indicating a strong focus on SDGs 7, 12, and 13, which are closely linked to energy and environmental sustainability. This emphasis reflects the automotive sector's focus on environmental sustainability and energy efficiency, driven by EU regulatory pressures such as *"Fit for 55"* package and Regulation 2023/851, aiming to reduce vehicle emissions by 55% by 2030 and promoting hybrid and electric mobility (Lisowski *et al.*, 2020; Lenort *et al.*, 2023). Furthermore, in March 2025, the European Commission also presented the *"Industrial Action Plan for the European automotive sector"* aimed at establishing *"concrete measures to help secure global competitiveness of the European automotive industry and maintain a strong European production base through action in five key areas: 1) innovation and digitalisation, 2) clean mobility, 3) competitiveness and supply chain resilience, 4) skills and social dimension, and 5) level playing field and business environment."* (EU, 2025, p.1).

In the automotive sector, sustainability planning primarily focuses on environmental goals to meet EU goals, regulatory requirements, and stakeholder expectations (Lokuwaduge and Heenetigala, 2017). In contrast, SDGs 1 and 2 score low, confirming a preference for ecological and economic priorities over social ones. The concentration of indicators in category A indicates that many firms adopt only basic planning approaches.

Figure 3 - Distribution of Total Scores for Planning by SDG



Source: Authors' elaboration

Figure 4 displays the 50 most frequently occurring terms across the documents analyzed in our sample. The visualization was created using

Voyant Tools software, and irrelevant words were filtered from the results. Frequent keywords such as energy, emissions, and production reflect the focus on SDGs 7, 12, and 13, as identified in earlier sections. Likewise, for SDG 9, with *production, technology, mobility, strategy, digital, and vehicles*. It analyses the adoption of sustainable technologies in production systems, the digital transformation of production processes, and the promotion of electric mobility.

Other goals, including SDG 5, are also addressed but seem to have less emphasis within the automotive industry. The limited presence of terms related to social SDGs, such as *poverty, justice, or equality*, confirms their marginal role in the sustainability planning discourse. The word cloud illustrates a thematic imbalance that aligns with existing literature, showing how the focus on environmental regulations, especially concerning emissions, often eclipses social equity and community well-being in corporate and policy contexts (Lukin *et al.*, 2022; Gulluscio *et al.*, 2020; Izzo *et al.*, 2020; Vaz *et al.*, 2017).

Figure 4 – Top 50 most frequent words
Source: Voyant Tools software

Lastly, Table 7 presents the results of content analysis indicating the total value of SPT indicators. The possible maximum score for the sustainability plan general indicator is 51. As shown in the table, no company falls into the *"high*

value of planning" category (indicators > 34), which suggests a low level of sustainability planning across all companies. By contrast, most companies fall into the *"medium value of planning"* category, with scores between 17 and 34, indicating a moderate commitment to sustainability planning. In this group, we have Companies 10 (22,54%), 11 (19,03%), and 19 (28,33%).

Companies with lower scores, such as Company 2 (8,37) and Company 3 (6,87), fall into the category of *"low value of planning"*, indicating less emphasis on sustainability planning. These companies provide less disclosure of performance, suggesting their approaches to sustainability are not as well-developed or highly prioritized as those of higher-scoring companies. In general, although several companies show improvement, the significant difference between companies suggests that there is still much to be done in terms of sustainability planning, especially by the companies with the lowest scores.

The lack of standardization among published sustainability plans limits their comparability across companies over time and across different locations. This confirms that sustainability reports and plans are still far from creating a coherent and comparable narrative, which would enhance both transparency and accountability across the sector (Eccles *et al.*, 2010). Additionally, in some instances, there is purely qualitative information regarding the inclusion of measurable goals and a defined timeline for their achievement. This hampers the effectiveness of evaluating improvements over time, making it challenging to assess the effectiveness of the same (Bebbington and Unerman, 2018; Erin *et al.*, 2022).

The analysis reveals that automotive companies are focusing on environmental SDGs, driven by industry-specific environmental challenges and increasing regulatory demands in Europe. Despite emphasizing SDGs 7, 12, and 13, only 30% of companies provided measurable targets for SDG 13, and fewer than 15% set benchmarks for SDG 12. Therefore, many sustainability disclosures lack the strategic depth necessary to effectively engage stakeholders, despite their potential to strengthen market positioning (Aureli *et al.*, 2020; Rosati and Faria, 2019). Comparable trends were observed among Italian-listed companies, where disclosures related to the SDGs often remained at a narrative level, lacking measurable targets or tangible implementation (Izzo *et al.*, 2020). This shows limited operationalization of key environmental goals.

Although this study does not investigate the relationship between long-term sustainability objectives and short-term operational actions, it contributes value by illustrating how distinctly this connection is articulated in public planning documents. By identifying the presence or absence of essential implementation tools, such as Key Performance Indicators, budgets, and timelines, the study establishes a foundation for future research on how the formal components of sustainability planning influence actual performance time. The leading

automotive companies in the EU market are focusing on environmental SDGs 7, 12, and 13 to fulfil European regulations and address the climate emergency. However, the lack of clear targets and practical tools suggests that sustainability planning is still in its early days or not yet fully developed. This reinforces the need for companies to more effectively align their business practices with societal expectations by adopting standardized and transparent reporting, which serves as a key mechanism for safeguarding organizational credibility and public image (Adams and Abhayawansa, 2022; Ascani *et al.*, 2021; Barroso-Méndez *et al.*, 2024; Lozano and Huisingh, 2011).

These initial findings underscore the need to align strategy and action, as well as explore the evolution of the SDGs. This finding reinforces the idea that sustainability plans should act as a connection between obligatory sustainability reports and the organization's broader strategic objectives. They help ensure that environmental initiatives go beyond symbolic commitments, fostering alignment between financial and non-financial performance (Brinkmann, 2019).

Table 7 – Total value of SPT indicator

Company	High value of planning	Medium value of planning	Low value of planning
Company 1			15,46
Company 2			8,37
Company 3			6,87
Company 4		19,49	
Company 5			11,09
Company 6			13,66
Company 7			8,06
Company 8			16,87
Company 9			14,44
Company 10		22,54	
Company 11		19,03	
Company 12		20,35	
Company 13			12,1
Company 14			11,72
Company 15		18,80	
Company 16			16,82
Company 17			12,62
Company 18			10,57
Company 19		28,33	
Company 20		17,22	

Source: Authors' elaboration

5. Conclusions, limitations, and future research

This exploratory study examines how sustainability goals are planned within the automotive sector in relation to achieving the SDGs. We employed a semi-manual content analysis on a sample of leading European manufacturing companies operating in the automotive industry. Our analysis reveals that sustainability plans in the automotive industry remain predominantly focused on environmental goals. This aligns with existing literature, indicating that the automotive sector, a major contributor to global CO2 emissions, has adopted strategies to reduce environmental impact, focusing on energy efficiency, electrification, and circular economy models (Lisowski *et al.*, 2020; Lenort *et al.*, 2023). Regulatory pressure from European directives, such as the CSRD, encourages companies to integrate sustainability into their strategies (Galeotti *et al.*, 2023). Despite these regulatory drivers, gaps in the actual disclosure and depth of climate-related sustainability information remain a critical challenge, as highlighted in previous research (Lombardi *et al.*, 2022).

A key discussion point concerns the nature of sustainability and environmental strategies, which can possess either symbolic or practical attributes. The automotive industry has not been exempted from environmental controversies, with the Volkswagen case, commonly referred to as Dieselgate, being a notable example (Majláth and Ricordel, 2021; Li *et al.*, 2018; Siano *et al.*, 2017). There exists a tangible risk of greenwashing, a phenomenon that is increasingly characterized as a *"fraud waiting to happen"* (Kurpierz and Smith, 2020, p. 1088). Specifically, organizations may establish environmental objectives and publicly declare their accomplishments; however, the actual outcomes may not correspond with their expressed commitments (He *et al.*, 2022). This phenomenon, previously recognized within the context of sustainability reports through the concept of information decoupling, may also emerge within sustainability plans, thus concealing the inability to achieve environmental objectives (Amores Salvadó *et al.*, 2023; Li *et al.*, 2018; He *et al.*, 2022; Siano *et al.*, 2017).

The limited representation of social SDGs reflects a strategic focus on goals aligned with the core business. This approach is acceptable only if the selected objectives are well-defined and supported by measurable indicators (Izzo *et al.*, 2020). As noted by Hristov *et al.* (2022), plans should serve as a guide for achieving results rather than remaining vague. When carefully designed, they represent a commitment that goes beyond mere compliance (Palmer and Flanagan, 2016).

Theoretically, our research underscores the importance of a targeted strategy for achieving the SDGs, consistent with the literature, which suggests that

companies focusing on strategically important goals can attain measurable outcomes and enhance their competitive edge (Izzo *et al.*, 2020; Hristov *et al.*, 2022; Mintzberg, 1993). Additionally, our work highlights the importance of allocating more attention to the measurability of goals in sustainability plans (Hristov *et al.*, 2022; Lombardi, 2022). As highlighted by Erin *et al.* (2022) and Bebbington and Unerman (2018), this focus is crucial to ensure that strategies are practical and yield tangible results. The lack of standardization among sustainability plans remains a significant theoretical and practical barrier, limiting the ability to make meaningful comparisons across companies and assess the effectiveness of various practices. Our study expands the discussion on integrating social SDGs into corporate sustainability plans, suggesting that their inclusion could enhance a holistic view of sustainability, promoting a more balanced management of environmental, social, and economic challenges (Bebbington and Unerman, 2018; Izzo *et al.*, 2020).

From a practical perspective, automotive companies should selectively focus on core SDGs with clear, measurable targets, enhancing resource efficiency and stakeholder trust (Liao *et al.*, 2020; Van Zanten and Van Tulder, 2021). A selective approach helps align strategies with regulations and market demand. To avoid vague initiatives and improve progress tracking, organizations should set quantifiable goals and adopt standardized formats for sustainability plans. While integrating social SDGs may not be an immediate priority, doing so could enrich the holistic view of sustainability, helping balance environmental, social, and economic factors and ultimately strengthening corporate sustainability. Furthermore, while our study outlines planning structures, longitudinal data are necessary to evaluate whether disclosures are associated with tangible sustainability improvements, thereby addressing the risks of greenwashing. European focus limits global generalizability due to regulatory differences. Additionally, the absence of a standardized structure in the plans or their lack limits the accuracy of comparative analyses, as noted by Izzo *et al.* (2020).

Since the study examines large EU automotive manufacturers, future research should investigate small and medium-sized enterprises and assess the actual effects of planning through longitudinal and comparative analysis. Moreover, given the voluntary nature of sustainability plans, smaller firms may not publish them on their websites. However, this does not exclude the possibility that they adopt internal strategies, whether formal or informal, to pursue their sustainability goals. This limitation can be addressed by employing alternative qualitative methodologies, such as conducting in-depth interviews or targeted case studies.

Future research should investigate how sustainability planning translates into operational targets, leveraging longitudinal data to track progress. Cross-sector comparisons (e.g., automotive vs. tech) could also clarify industry-specific

challenges in SDG operationalization. Cross-industry comparisons could shed light on how planning adapts to sector needs. Moreover, a longitudinal study tracking the evolution of these plans over time would be beneficial for assessing the impact of emerging regulations, such as the CSRD, and their role in fostering greater attention to measurability and integration of goals.

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